EXPLORE THE USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY OF JIN DYNASTY COSTUMES

By
Mrs. Oulu YUE

A Thesis Submitted in Partial Fulfillment of the Requirements
for Doctor of Philosophy Design
Silpakorn University
Academic Year 2023

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Mrs.Oulu YUE

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต

สาขาวิชาการออกแบบ แบบ 1.1 ระดับปริญญาปรัชญาดุษฎีบัณฑิต

มหาวิทยาลัยศิลปากร

ปีการศึกษา 2566

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Title	EXPLORE THE USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY OF JIN DYNASTY COSTUMES
By	Mrs. Oulu YUE
Field of Study	Design
Advisor	Assistant Professor Dr. Atithep Chaetnalao

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630430042 : Major Design
Keyword : Jin Dynasty costumes; cultural heritage preservation; digital knowledge repository; interactive learning tools; user-centered design.

Mrs. Oulu YUE : EXPLORE THE USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY OF JIN DYNASTY COSTUMES Thesis advisor : Assistant Professor Dr. Atithep Chaetnalao

This study aims to create and assess a user-centered digital knowledge repository for Jin Dynasty costumes to create public awareness and enhance the comprehension of this important cultural heritage. The primary objectives of the research included: 1) To analyze the challenges and opportunities of digital knowledge repositories in the experience of traditional costume culture. 2) To explore the design strategies and methods of Jin Dynasty costumes' user-centered digital knowledge repository. 3) To construct a new model for Jin Dynasty costumes' user-centered digital knowledge repository and evaluate its user experience. The study employed qualitative and quantitative methods, including expert interviews, field interviews, online questionnaires, and data collection and analysis. It consisted of four phases: initial research, prototype evaluation, user testing, and a final phase of user evaluations leading to model improvement. The results of this study show a significant increase in public interest and understanding of Jin Dynasty costumes, especially in the experience and cognition of costume culture among the younger generation, as derived from target user testing and expert feedback. Thus, it confirms the importance of digital knowledge repositories in inheriting and transmitting costume culture. In addition, the study attempted to create a more attractive digital experience through a user-centered digital design strategy, which creatively developed multi-dimensional and engaging multi-level digital experiences, such as virtual themed halls and virtual digital dress-ups, by combining them with user experience theories, thus increasing public participation and educational value. This study contributes to interdisciplinary research at the interface between digital cultural heritage preservation and user experience design while also exploring the potential of digital learning tools to enhance cultural education and engagement for a new generation of traditional costume enthusiasts.

ACKNOWLEDGEMENTS

Throughout my doctoral journey, I have been fortunate to receive invaluable knowledge and experiences made possible by the support and assistance of many. I want to express my profound gratitude to my doctoral advisor Assistant Professor Dr. Atithep Chaetnalao, His kindness, humor, and rigorous academic approach have greatly enriched my learning path. During the challenging phases of my research, Professor Chaetnalao has always been a source of encouragement and support, guiding me through numerous long nights toward hope and clarity. I am deeply thankful to him for his invaluable guidance and support.

Special thanks to Assistant Professor Dr. Watanapun Krutasaen, Director of the Doctor of Philosophy Program in Design for his commitment and invaluable contributions to the program's success. I also thank Assistant Professor Dr. Gomesh Karnchanapayap and Professor Wattana Jutavipard for their guidance and support. Their knowledge and academic attitudes inspired me.

I am equally grateful to my team members, Ms. Zhang Siqi, Mr. Nie Fankai, and Mr. Guo Jie. Their companionship, support, and encouragement have been pivotal in facing and overcoming various challenges and obstacles.

Finally, I would like to express my heartfelt gratitude to my family, especially my mother, for her unconditional support and for helping me take care of my daughter during my studies. In addition, I would like to give special thanks to my six-year-old daughter, who is still so young but has given me complete understanding, love, and support. Their strength and encouragement are a constant source of motivation for me.

Thank you all for making this journey enriching and memorable.

Oulu YUE

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CHAPTER 1

RESEARCH INTRODUCTION

1.1 BACKGROUND AND SIGNIFICANCE OF THE RESEARCH

In today's interconnected global landscape, preserving and promoting cultural heritage, mainly through digital platforms, is paramount (Baioni et al., 2021; Luther et al., 2023). This study highlighted the rich yet underexplored legacy of Jin Dynasty costumes, a critical aspect of Chinese cultural heritage (Gu, 2008; Wang, 2016). The Jin Dynasty, known for its cultural richness and diverse ethnic composition, offered a unique perspective on traditional costumes (Li, 2017). These were not merely attire but reflected their era's historical, social, and artistic ethos, encapsulating intricate designs and complex cultural narratives (Fang, 2022; Pingchun, 2019). However, traditional costume cultures, especially those from the Jin Dynasty, are confronted with contemporary appreciation and dissemination challenges. This included the under-demonstration of extant artifacts and the general alienation of the public due to a lack of awareness of the culture, thus requiring innovative preservation and promotion strategies. Current display methods often fail to provide in-depth cultural interpretation or engaging interactive experiences. Even when some museums tried to integrate digital experiences, they often stopped at simple "digital dress-up" and failed to convey the rich cultural context of the costumes through multidimensional digital interaction, leading to a superficial understanding of their significance. Therefore, it was crucial to adopt an innovative and practical approach to ensure that people understood and appreciated the cultural story behind each piece of costume while at the same time gaining a more interesting digital cultural experience to provide the new generation with a more exciting and diversified cultural experience of heritage preservation in the context of the larger global digital environment.

The critical role of digital repositories in cultural heritage preservation has attracted significant academic attention. Research has emphasized these technologies' transformative impact on preserving and disseminating traditional customs knowledge (Martin & Vacca, 2018; Ye, 2023; Zhao et al., 2019). Despite these advances, challenges remained in the accessibility of repositories and the integration of user-centered approaches (Dvořák et al., 2024). Moreover, the literature emphasized that user-centered design was essential for enhancing user interaction with digital platforms (Berg et al., 2021; Poux et al., 2020). Customizing the design of repositories to users' needs enhanced engagement and ensured the actual usability of these platforms (Fleury & Chaniaud, 2024). At the same time, focused studies on traditional

costumes, particularly those from the Jin Dynasty, revealed a gap in digital preservation practices (Liu, Zhou, & Zhu, 2022). These studies called for innovative approaches to digitize and popularize these cultural heritages, including the establishment of a digital repository of traditional culture (Zhao et al., 2019), the digital display of cultural heritage (Bruno et al., 2010; Mason & Vavoula, 2021), the application of digital archaeology (Haegler et al., 2009; Shott, 2014), digital restoration and reconstruction of cultural relics (Demetrescu et al., 2020; Tang et al., 2020), digital modeling and innovative design of Chinese traditional opera costumes (Liu, Gao, et al., 2022; Liu, Zhou, Zhu, et al., 2022), etc. Therefore, from the literature review perspective, there is a significant gap relative to integrating user-centered design principles in digital repositories (especially traditional costume repositories). This gap hindered effective user engagement and limited the potential of digital platforms for cultural heritage preservation.

This study aimed to bridge this gap by developing a user-centered digital knowledge repository dedicated to Jin Dynasty costumes through a strategic needs analysis. First, the researcher outlined the current challenges in preserving and disseminating Jin Dynasty costumes by analyzing field survey results. Then, the researcher laid the groundwork for discussing the strategic development of digital solutions to enhance users' engagement and experience of Jin Dynasty costume culture through extensive user needs analysis. At the same time, the researcher delved into the complexity of Jin Dynasty costumes and their cultural significance by integrating the insights of history scholars, costume design experts, and digital technologists to inform the design and functionality of the proposed digital repository. This study contributed to academic knowledge and provided practical guidance for developing digital repositories in the cultural heritage field.

In doing so, this study makes an important contribution to the interdisciplinary fields of digital cultural heritage preservation and user experience design. It aligned historic preservation with modern technological advancements, offering new educational and cultural engagement avenues. The project highlights the importance of user-centered design in enhancing public interaction with cultural heritage and progressive learning experiences, promising a renewed interest and more profound comprehension of the Jin Dynasty's legacy.

1.2 RESEARCH HYPOTHESIS

1.2.1 Digital media is better than traditional methods of the user experience of costume culture.

To research the fact that through interactivity and multimedia features, digital media can provide a more in-depth experience of the Jin Dynasty costume culture than traditional media, attracting audiences more effectively and enhancing their interest and understanding.

1.2.2 Digital experience promotes the inheritance and innovation of traditional costume culture.

To research the fact that digital experiences such as VR/AR displays and 3D modeling can promote the inheritance of Jin Dynasty costume culture while stimulating modern innovative designs of traditional costume elements.

1.2.3 Specific digital design strategies significantly enhance the public interest.

To research the fact that through customized digital design strategies (such as gamification, storytelling, and interactive exhibitions), public interest in Jin Dynasty costume culture can be significantly enhanced, promoting broader cultural education and learning.

1.3 RESEARCH OBJECTIVES

The main purpose of this study is to explore how digital media can enhance the cultural experience of traditional costumes, thereby enhancing viewers' interest and understanding of costume culture. Specifically, the study aims to:

1.3.1 To analyze the challenges and opportunities of digital knowledge repositories in the experience of traditional costume culture.

1.3.2 To explore the design strategies and methods of Jin Dynasty Costumes' user-centered digital knowledge repository

1.3.3 To construct a new model for Jin Dynasty Costumes' user-centered digital knowledge repository and evaluate its user experience.

1.4 RESEARCH QUESTIONS

To achieve the research objectives, the following research questions are proposed:

1.4.1 How can digital media be used as an alternative tool for experiencing Jin Dynasty costume culture?

1.4.2 How can digital media create interesting cultural experiences for the display of Jin Dynasty costumes?

1.4.3 How did the researcher discover a pattern to create an interesting Jin Dynasty costume culture experience and enhance public interest?

1.5 EXPECTED RESULTS

After the completion of this study, it is expected to achieve the following three main results:

1.5.1 DEEPEN CULTURAL EXPERIENCE AND COGNITION

By leveraging digital media's interactivity and multimedia capabilities, an immersive Jin Dynasty costume culture experience platform will be constructed to

effectively enhance the cultural experience and cognitive depth of the public, especially the younger generation.

1.5.2 PROMOTE CULTURAL INHERITANCE AND INNOVATION

Through digital experiences such as AR and 3D modeling, a bridge is established to combine traditional costume culture with modern technology, promoting the inheritance of Jin Dynasty costume culture and innovative application of traditional elements in novel forms.

1.5.3 IMPROVE PUBLIC PARTICIPATION AND EDUCATIONAL VALUE

Develop and implement attractive digital design strategies, such as virtual dressing and personalized DIY, to significantly enhance public participation, especially among young people, and promote broader cultural education and self-learning.

1.6 THE IMPORTANCE OF RESEARCH

The significance of this study lies in:

1.6.1 This study used digital technology as a tool to innovatively present Jin Dynasty costumes, enhance public understanding and interest in traditional costume culture, and promote Chinese costume culture.

1.6.2 This study explored how to create interesting and meaningful costume cultural experiences through digital technology, enhanced public awareness and participation in traditional costume culture, and provided new ideas and directions for developing culture-related industries.

1.6.3 This study used various research methods to ensure the scientific validity and reliability of the research and constructed an effective digital cultural experience model of the Jin Dynasty costume, thereby providing new ideas and methods for the protection, display, and dissemination of digital cultural heritage.

1.6.4 The significance of this study lies in enhancing public awareness and understanding of traditional costume culture, providing new perspectives and inspiration for the use of digital technology in traditional costume culture exhibitions, promoting the innovation and application of digital technology in the field of costume culture, and injecting new vitality into the sustainable development of the cultural industry.

1.7 RESEARCH SCOPE

To conduct research in line with the established research objectives, the researcher divided the scope of the study into three aspects: information, population, and design as follows:

1.7.1 INFORMATION SCOPE

1. Historical evolution, cultural significance, and aesthetic characteristics of Jin dynasty costumes.
2. Current status of cultural experiences of traditional costumes, especially the cultural experience of Jin dynasty costumes.
3. The use of digital media to present and inherit traditional costumes, particularly the digital display and cultural heritage of Jin dynasty costumes.
4. Exploration of digital technology's role in enhancing traditional costumes' cultural experience.
5. Investigating how digital technology affects users' perception and participation in the cultural experience of traditional costumes.

1.7.2 POPULATION SCOPE

1. Visitors interested in traditional costumes, particularly the younger generation, aim to enhance their cultural awareness and engagement through new technologies.
2. Designers, scholars, and cultural workers provide insights and tools on using digital media to display and inherit traditional costume culture.
3. Also, considering general users and tourists, especially those interested in experiencing traditional costume culture, demonstrates how to enhance their cultural and educational value through interactive experiences.

1.7.3 DESIGN SCOPE

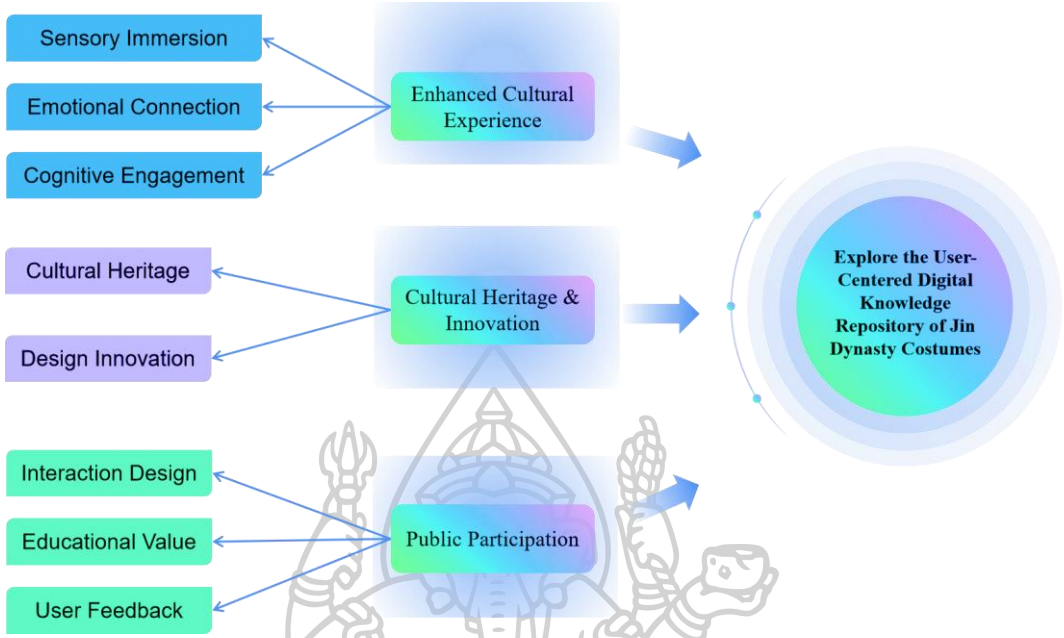
1. Design of digital displays and experiences of Jin dynasty costumes, including virtual displays, interactive experiences, and customized content development.
2. Application of various experience design theories, such as Gilmore's "4E" model and Garrett's elements of user experience theory, guide product design and development (Garrett, 2000; Pine & Gilmore, 1998).
3. In the product design evaluation phase, Quesenbery's 5E evaluation model is applied to ensure that the design meets user needs and the goals of cultural experience (Quesenbery, 2004).

1.8 RESEARCH CONCEPTUAL FRAMEWORK

The conceptual framework of this study is the theoretical structure and empirical analysis foundation that guides the study. The conceptual framework of this study is built on three core concepts: cultural experience enhancement, cultural heritage and innovation, and public participation (Figure 1).

Figure 1

Research Conceptual Framework



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1.8.1 ENHANCED CULTURAL EXPERIENCE

This section focused on enhancing individuals' perception and experience of Jin Dynasty costume culture through digital technology. It will explore the following aspects:

1. Sensory Immersion: How to use VR/AR technology to create an immersive experience that simulates a journey back to the Jin Dynasty, allowing visitors to experience the lifestyle and costume culture of that era intuitively.
2. Emotional connection: Study how digital storytelling and interactive design can stimulate emotional responses among users, thereby deepening their emotional identification with Jin Dynasty culture.
3. Cognitive participation: Explore how interactive learning modules can increase users' cognitive participation, enabling them to acquire knowledge and understanding during the experience process actively.

1.8.2 CULTURAL INHERITANCE AND INNOVATION

This section examined how digitalization can facilitate the inheritance of traditional costume culture and encourage innovation. The following will be considered:

1. Cultural heritage: Research how digital technology can help record, preserve, and display Jin Dynasty costumes, maintaining their historical accuracy and cultural authenticity.

2. Design innovation: How to use digital technology to explore modern innovations in traditional costumes while maintaining its cultural essence.

1.8.3 PUBLIC PARTICIPATION

This part focuses on enhancing public participation and interaction through digital technology. Specifically, it will explore:

1. Interactive Design: How to design interactive exhibitions or experiential activities that allow the public to be viewers and participants.
2. Educational value: Research on enhancing the public's interest and understanding of Jin Dynasty costume culture, especially among young people, through interesting digital content design and production.
3. User feedback: collecting and analyzing user feedback during engagement to optimize the experience and educational content continuously.

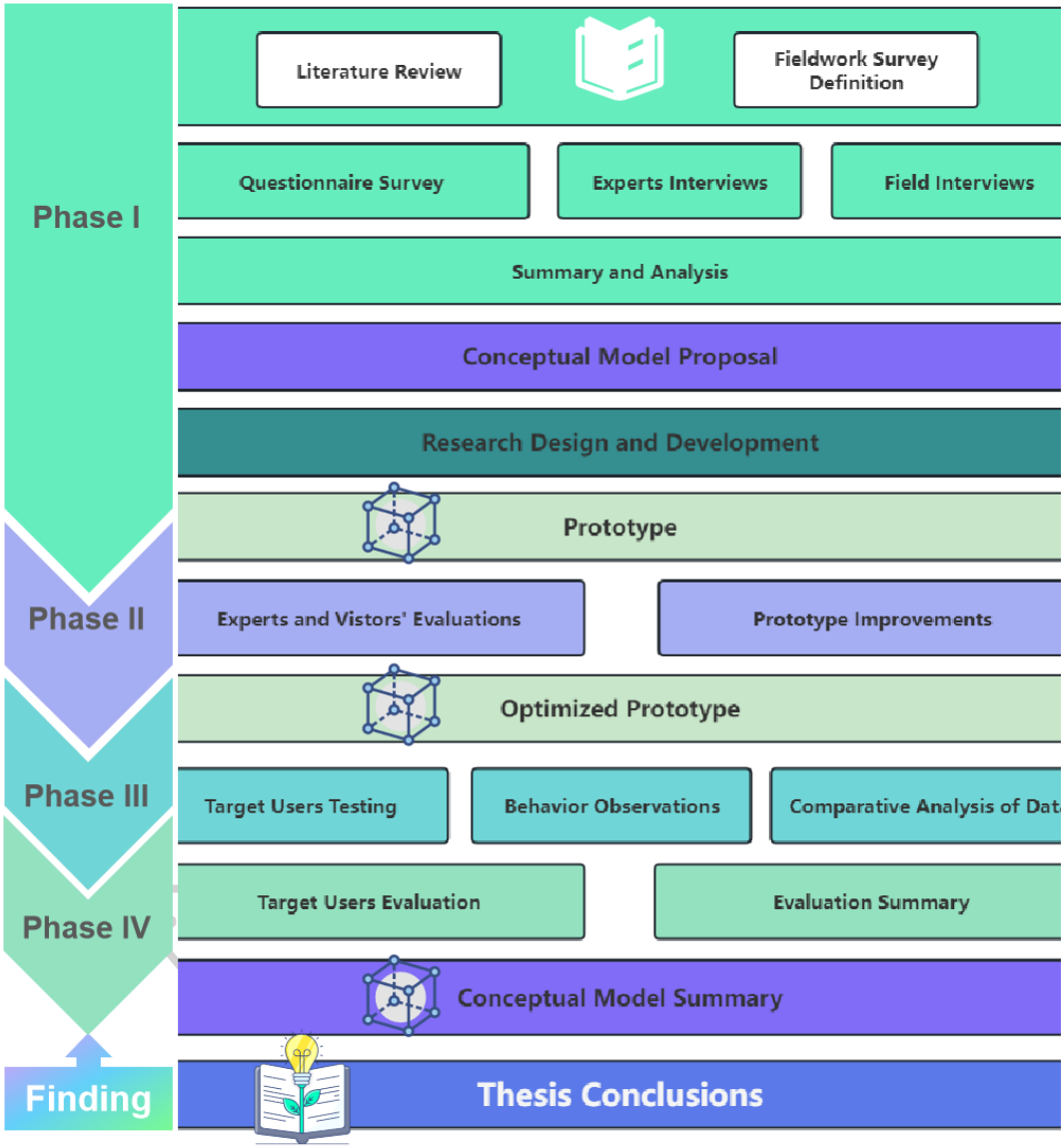
This conceptual framework was validated and developed through a literature review, case studies, and empirical analysis. The researcher tested hypotheses through a multi-stage research design, collected data, and adjusted research directions based on data analysis results. Ultimately, this framework aimed to provide a systematic approach to the digital experience of Jin Dynasty costume culture, promoting the modern dissemination and development of traditional culture.

1.9 RESEARCH METHODS AND PROCESS

The researcher conducted the study according to the research methods and processes shown in Figure 2, based on the following overview:

Figure 2

Research Methodology and Process



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1.9.1 RESEARCH METHODS

This study used a mixed-method approach, primarily employing quantitative and qualitative methods. In addition, this study utilized the Index of Item Objective Congruence (IOC) test. By establishing accuracy criteria, it was appropriate to use it as a research data collection tool.

The quantitative analysis method of this study mainly includes: 1. Questionnaire survey; 2. Data collection; 3. Data analysis;

The qualitative analysis method of this study mainly includes 1. Literature review, 2. Fieldwork and interviews, 3. Expert and visitor interviews, etc.

1.9.2 RESEARCH PROCESS

This research plan is divided into the following steps:

1. Phase I Study
    1) Expert interviews: Interviewed 9 experts in related disciplines using open-ended questions to understand the elements of experiencing and designing costume culture in the Jin Dynasty and creating digital works.
    2) Field interviews: Conducted interviews with 12 relevant practitioners and visitors through semi-open questions to understand the current status of the Jin Dynasty costume culture experience and gather suggestions and expectations for the digital experience.
    3) Questionnaire survey: Conducted online questionnaire research by distributing 500 questionnaires to understand the public's interest in Jin Dynasty costumes, their level of understanding, and their digital expectations.
    4) Summary analysis: Used descriptive analysis methods to summarize the suggestions and ideas of experts, practitioners, visitors, and the public.
    5) Prototype Development: Derived conceptual models from analytical studies, synthesized relevant elements for prototype development and design, and presented the first version of the prototype.
2. Phase II Study
    1) Experts and visitors' evaluations: Invited 9 experts and 12 visitors conducted validity evaluations on the prototype and provided feedback on improvements.
    2) Optimized the prototype: The researcher scientifically analyzed the experts and visitors' evaluations and improved the prototype to present the second version of the prototype.
3. Phase III Study
    1) User testing: Conducted prototype testing on 30 target users.
    2) Information question setting: The Jin Dynasty costumes digital knowledge repository prototype was tested through experiential sensory testing and the collection of test data was conducted.
    3) Comparison of pre-test and post-test: Differences in the sample's experiences and perceptions before and after experiencing the prototype were tested by comparing pre-and post-test questionnaire data to validate the validity of the prototype.
    4) Behavior observations: During the testing period, the researcher used behavior observation form to collected information displayed by the target users during the experience process.
4. Phase IV research

1) User evaluation: After testing and collecting information from 30 target user samples, the sample groups were asked to complete an evaluation questionnaire to obtain further improvement suggestions for further refining the Jin Dynasty costumes digital knowledge repository prototype.
2) Evaluation summary: After testing and evaluating the target users, we combine the "5E" evaluation model of user experience design and summarize and analyze the evaluation data (Quesenbery, 2004).

1.10 RESEARCH DEFINITION

1.10.1 THE JIN DYNASTY

The Jin Dynasty, which ruled from 1115 until 1234, lasted 119 years. The Jurchen, predecessors of the later Manchus, created the Jin Dynasty in northeastern China and progressively moved southward, eventually defeating the Liao and Northern Song dynasties and uniting northern China. Northern China saw significant economic and cultural development and numerous political and social upheavals throughout the Jin Dynasty's reign. The Jin Dynasty was a vibrant and inventive time in Chinese history that significantly affected China's development and evolution. The Mongol Empire finally toppled the Jin Dynasty. Although the Jin Dynasty was only in power briefly, it significantly impacted Chinese history.

1.10.2 THE JURCHEN PEOPLE

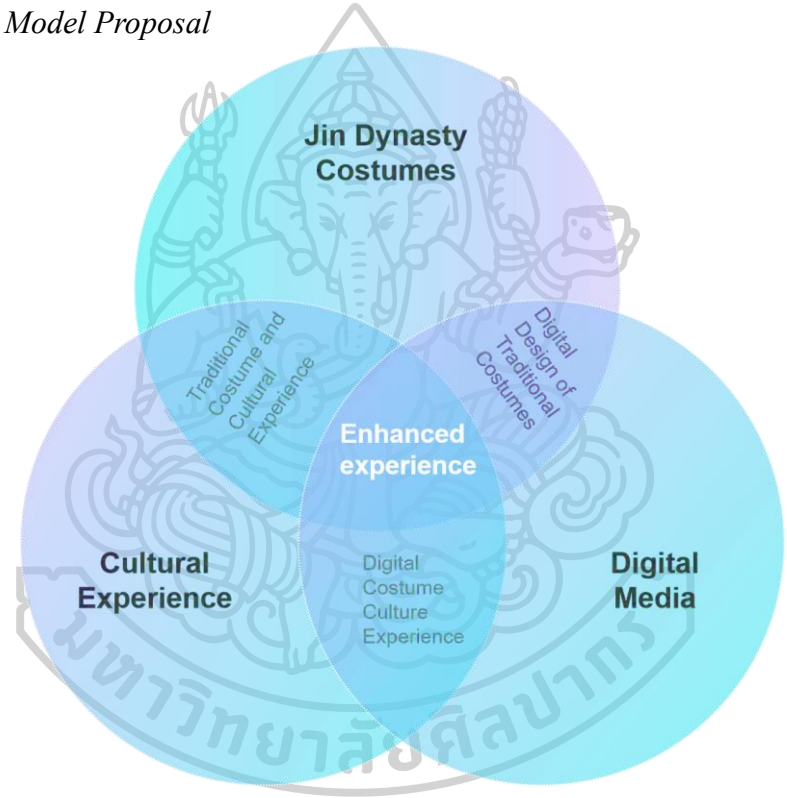
The Jurchen people, also known as the Zhu Li Zhen, Nv Zhen, and Nv Zhi, are now known as the Manchu people. They originated from the Sushen people more than 3,000 years ago. During the Han and Jin dynasties, they were known as the Yilou people. They were known as the Wuji people during the Northern and Southern dynasties. During the Sui and Tang dynasties, they were known as the Heishui Mohe people. During the Liao Dynasty, they were known as the Nv Zhen and Nv Zhi (to avoid the taboo of Liao Xingzong Yeluzongzhen). During the Liao Dynasty, the Jurchen were divided into the raw- Jurchen and the Sheng-cooked- Jurchen. In 1115, Jin Taizu Wanyan Aguda unified the various tribes of the Jurchen and established the Jin Dynasty in Huining Prefecture (A Cheng, Harbin). After the Jin Dynasty destroyed the Liao Dynasty and the Northern Song Dynasty and occupied the Central Plains, in the 1st year of the Yuan Dynasty (1153), the capital was moved to Yanjing, and the policy of "moving south and migrating north" was implemented. The Jurchen originally migrated to the Yanshan area. Later, they settled in North China, while the Han people gradually migrated northward. The Jurchen who settled in the Central Plains gradually integrated with the Han people under the influence of the Han and surrounding environments (Hoyt Cleveland Tillman & West, 1995).

1.11 CHAPTER SUMMARY

Through the content of this chapter, the researcher expounded the background, hypothesis, objectives, research questions, scope, framework of the study, and the expected research results. At the same time, the researcher also analyzed the importance and necessity of the study in an overview and how the researcher would create more diversified cultural experiences through digital technology, improve the public's awareness and participation in Jin Dynasty costume culture, and promote the inheritance and development of traditional costumes culture.

Figure 3

Conceptual Model Proposal



Note. Produced and edited by the author.

In summary, the researcher proposed a conceptual model (Figure 3) on the relationship between costume, cultural experience, and digital media in the Jin Dynasty. This model is based on the above content analysis and aims to use digital media to engage the public in experiencing Jin Dynasty costume in a new way, thereby improving public awareness and understanding of traditional costume culture. Consequently, it provides new perspectives and inspiration for the use of digital media in traditional costume culture experience, promotes innovation and application of digital media in the field of costume culture, and injects new vitality into the sustainable development of cultural industries.

CHAPTER 2

LITERATURE REVIEW AND RELATED RESEARCH

2.1 INTRODUCTION TO THE COSTUME OF THE JIN DYNASTY

The costume of the Jin Dynasty is an important period in Chinese history, with rich cultural value and unique historical background. This section will introduce the cultural significance, historical development, institutional characteristics, and regional characteristics of Jin Dynasty costumes and review the current status and existing problems of Jin Dynasty costume research.

2.1.1 THE IMPORTANCE OF COSTUME IN THE JIN DYNASTY

The costume of the Jin Dynasty occupies a unique position in history, reflecting the cultural and historical background of the time. As the main rulers of the Jin Dynasty, the Jurchen people's costume culture was a core part of the Jin Dynasty. On the basis of inheriting the traditions of the Liao and Song Dynasties, the Jurchen people combined ancient systems of the Han and Tang Dynasties to form a unique costume system of the Jin Dynasty. In addition, the Jurchen costume also absorbed elements from the Sushen, Yilou, Wuji, Ganfu, and other tribes, as well as the northern ethnic groups such as the Xiongnu and Khitans, showing its unique ethnic characteristics (Li, 2017).

The multi-ethnic exchanges in the Jin Dynasty provided favorable conditions for the development of costume culture. During the 119-year history of the Jin Dynasty, it coexisted with many regimes such as the Liao, Northern Song, Southern Song, Western Xia, Dali, Gaochang, Heihan, Western Liao, and Tubo, which promoted the blending of costume cultures among various ethnic groups (Gu, 2009). In their interactions with other ethnic groups, the Jurchens not only promoted their own culture but also learned from the excellent cultures of other ethnic groups, making the costumes of the Jin Dynasty richer and more diverse (Gu, 2011).

The uniqueness and diversity of costumes in the Jin Dynasty provide valuable information for our research on the history, culture, and society of the Jin Dynasty. It reflects the social hierarchy and cultural heritage of the time and provides a reference for developing contemporary costume culture (Ye, 2019). Deepening our understanding of costume during the Jin Dynasty enabled us to inherit Chinese culture better and inspired modern culture's development. Therefore, the research and protection of costume culture in the Jin Dynasty is profoundly significant.

2.1.2 THE HISTORICAL EVOLUTION AND DIVERSITY OF COSTUME IN THE JIN DYNASTY

The Jin Dynasty was established by the Jurchen ethnic group, which had a vast territory and diverse ethnic composition. In addition to the ruling Jurchen ethnic group and the dominant Han ethnic group, the ethnic composition of the Jin Dynasty was also very rich, including Khitans, Bohai, Xi, Shiwei, Mongolians, Jilimi, Ure, Tiele, Uyghurs, Beigu, and Darugu (Gu, 2011). These ethnic groups all developed during the Jin Dynasty and were influenced by Jurchen culture. There were various forms of cultural exchanges between Jurchen and other ethnic groups, such as war, trade, migration, ethnic integration, diplomacy, book exchange, translation, and missionary work. The Han and Khitans significantly influenced Jurchen culture (Song, 2022).

2.1.2.1 INTEGRATION OF ETHNIC EXCHANGES AND COSTUME CULTURE

During the 120-year history of the Jin Dynasty, it coexisted with multiple regimes such as the Liao, Northern Song, Southern Song, Western Xia, and Dali. These regimes were ethnically diverse and engaged with the Jurchen people through war and trade, which in turn influenced the costume culture of the Jin Dynasty. Although each ethnic group had its own unique costume culture, they also absorbed elements from other ethnic groups, leading to a blending of costume cultures. While promoting their own culture, the Jurchen people also learned from other advanced cultures, making the costume culture of the Jin Dynasty both rich and unique. Many ethnic groups' costumes included elements from other ethnic groups, and some ethnic groups even adopted, to a large extent, the costume culture of other ethnic groups (Wang, 2016).

In short, the Jin Dynasty's costume culture was diverse and rich and had a distinctive ethnic flavor. The exchange and integration of costume culture between different ethnic groups added a unique charm to the costume culture of the Jin Dynasty.

2.1.3 CHARACTERISTICS OF THE COSTUME SYSTEM AND DEVELOPMENT OF THE JIN DYNASTY

2.1.3.1 JURCHEN COSTUME EVOLUTION

After inheriting the Costume traditions of the Liao and Song Dynasties, the Jurchen people integrated elements from various northern ethnic groups, including the Xiongnu and Khitan, to develop their unique style. Their Costume materials ranged from fabrics and hemp textiles to animal furs (Gu, 2009; Song, 2022).

1. Distinctive Features of Jurchen Costume (Figure 4) (Table 1)

The direction of Lapel: Traditional Han Costume had a right overlap, while the Jurchen and other northern ethnicities had a left overlap.

Sleeve Width: The Han Costume featured wide sleeves, whereas the Jurchen typically had narrow sleeves.

Costume Structure: Han people traditionally wore robes with skirts, while the Jurchen and other northern ethnicities wore robes with trousers.

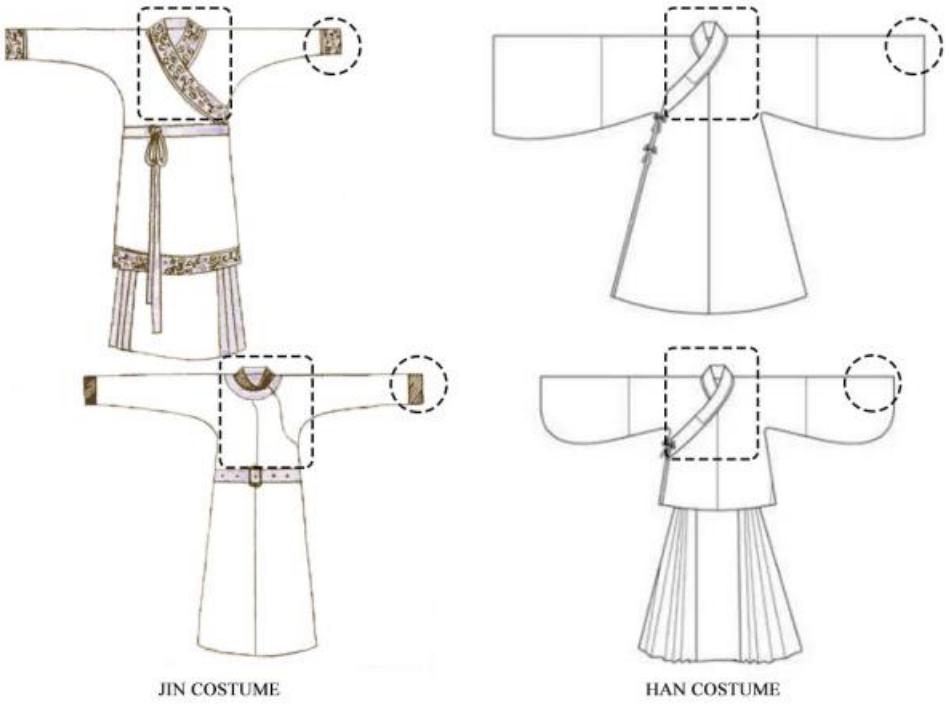
Collar Design: Han Costume often had a cross-collar, while the Jurchen typically had a round collar.

Fit of the Costume: Han Costume was generally loose-fitting, while Jurchen Costume was more form-fitting.

Additionally, while the Han people preferred shoes like sandals and clogs, the Jurchen predominantly wore boots.

Figure 4

Differences Between the Traditional Costumes of The Jin Dynasty Jurchen in The North and The Han in The Central Plains



Note. Produced by the author.

Table 1

Differences Between Jin Dynasty Jurchen Costumes and Han Costumes

Elements	Han costume	Jurchen costume
Direction of lapel	Right overlap	Left overlap
Sleeve width	Wide sleeves	Narrow sleeves
Collar design	Cross-collar	Round collar/cross-collar
Fit of the costume	Loose-fitting	Form-fitting
Shoes	Sandals/cloth shoes	Boots

Note. This table summarizes the differences between Jin Dynasty Jurchen Costumes and Han costumes in five aspects: Direction of the lapel, Sleeve width, Collar design, Fit of the costume, and Shoes (Li, 2017).

2. Influence of Han Costume on Jurchen Fashion

Over time, under the influence of Han Chinese fashion, the costumes of the Jurchen people during the Jin Dynasty began to show a trend from simplicity to luxury, reflecting a Sinicization in their fashion. This Sinicization became so ingrained that by the end of the Jin Dynasty, the Costume styles of the Jurchen and Han people had largely merged and influenced each other (Song, 2022).

2.1.3.2 LIAO DYNASTY COSTUME

The Liao Dynasty, ruled by the Khitan people, had a "one country, two systems" approach to governance and Costume. The Han people under Liao rule wore Han costumes, while the Khitan wore their traditional attire. However, high-ranking officials from the north also adopted Han Costumes for formal occasions (Li, 2019).

2.1.3.3 SONG DYNASTY COSTUME

The Song Dynasty's Costume system was strict and hierarchical, inheriting traditions from the Han and Tang Dynasties. There was also a noticeable "barbarization" trend in Han Costume due to interactions with northern ethnicities like the Khitan and Jurchen (Li, 2017).

2.1.3.4 THE INFLUENCE AND RELEVANCE OF THE COSTUME SYSTEM OF THE LIAO, SONG, AND JIN DYNASTIES

Establishing and developing the costume system in the Jin Dynasty are closely related to those in the Liao and Song Dynasties, with a relationship of inheritance and

mutual influence between them. Through a comparison of the costume systems of the Liao, Song, and Jin Dynasties, it can be seen that the types of costume systems in the Jin Dynasty reference the old systems of the Liao and Song Dynasties and integrate the traditional customs of the Jurchen ethnic group (Li, 2019). This can be seen from the comparison of specific styles of costume. For example, the belt and fish-shaped ornament reflect the characteristics of northern ethnic groups and the costume system of the Song Dynasty. The shape of the imperial robe further reflects the respect and inheritance of the Liao and Jin Dynasties for the rules and regulations of the Song Dynasty (Gu, 2011). However, in the learning process, the Jurchen rulers made changes based on their ethnic characteristics, such as the use of the twelve-patterned imperial robe and the improvement of the shape of the kneecap(GU, 2007).

In short, the costume systems of the Jin, Liao, and Song dynasties, as well as the costumes of the Jurchen, Khitai, and Han ethnic groups under their influence, all have unique ethnic characteristics. Together with other ethnic groups, they constitute a rich and colorful ethnic costume culture in the Jin Dynasty.

2.1.4 REGIONAL CHARACTERISTICS OF COSTUME IN THE JIN DYNASTY

After the founding of the Jin Dynasty, the Jurchen people marched southward from the cold Jinyuan region, occupying large territories of the former Northern Song Dynasty and establishing a parallel state with the Southern Song Dynasty. The expansion of territory gave rise to a diversified costume culture within the Jin Dynasty, and the repeated large-scale immigration of Jin rulers accelerated the integration of ethnic groups and promoted the diversified development of ethnic costume culture in the Jin Dynasty (Gu, 2009; Kessler, 2012).

The climate, ethnic composition, and economic and cultural development in different regions within the territory ruled by the Jin Dynasty varied, and the costume culture in each region also showed different characteristics accordingly. According to the environment and development of costume culture in different regions, the costume of the Jin Dynasty as a whole showed the characteristics of five regions, namely, the Jinyuan region in the northeast, the Yanliao region in northern China, the Shaanxi-Jin region in the northwest, the Qilu-Subei region, and the Jin-occupied Central Plains region (Hao, 2016; Li, 2017).

2.1.4.1 THE NORTHEAST JIN ORIGIN REGION IN THE JIN DYNASTY: NORTHERN ETHNIC LANDSCAPE

The Jin-origin region is a melting pot of diverse cultures, comprising ethnic groups such as the Jurchens, Khitans, and Shiweis. Their deep-rooted cultural exchanges have given birth to a unique aesthetic and way of life. Here, the people share a profound bond with nature, with fishing and farming being the mainstays of

their existence. Their costume choices beautifully echo this harmonious relationship with the environment (Pingchun, 2019).

The region's biting cold necessitates costumes crafted from animal hides and woven fabric. However, with the influx of Han Chinese textile techniques and silk materials, a touch of “Sinicization” emerged in Jin origin's fashion tapestry (Ye, 2019). Yet, the Jurchen people have impeccably maintained the authenticity of their attire. Elements like the left-overlapping robes, narrow sleeves, open slits, trousers, and boots are emblematic of the region's rich cultural legacy (Figure 5).

What is noteworthy is the elegant blending of "Han culture" into the Jurchen fashion. While cherishing their indigenous characteristics, the Jurchens gradually carved out a unique wardrobe, boasting designs such as round shirts, robes (Figure 6) (Figure 7), "stirrup" pants (Figure 8), wide-legged pants, Yunjian (Figure 9), white jade belt with gold buckle (Figure 10), and various distinctive hats. These are not merely costume pieces but profound articulations of the prevailing life philosophy.

The patterns used in their costume are evocative stories in themselves. Motifs drawn from nature, like floral designs, animal patterns, and particularly the fish and Haidongqing swan patterns, reflect the Jurchen's deep reverence for the natural world. Moreover, the exquisite jade carvings and beaded accessories perfectly embody Jurchen's distinctive flair.

Every detail is a testament to the Jurchen community of the Jin origin region, showcasing their unique interpretation and pursuit of beauty to the wider world.

Figure 5

Yagou Jurchen Men's Image Stone Carving Topographies

Note. Yagou Commune, Acheng District, Harbin City, Heilongjiang Province, China.

Figure 6

Front View of the Silk Costume of the Tomb of the King of Qi in the Jin Dynasty

Note. Tomb of the King of Qi in the Jin Dynasty, China.

Figure 7

The back of the silk fabric costume of the tomb of the King of Qi in the Jin Dynasty

Note. Tomb of the King of Qi in the Jin Dynasty, China.

Figure 8

Men's "Stirrup" Pants Excavated from the Tomb of the King of Qi in the Jin Dynasty

Note. Tomb of the King of Qi in the Jin Dynasty, China.

Figure 9

Image of Cai Wenji in "Wenji Returning to Han" (partial)

Note. Zhang Yu, a Jin Dynasty painter, is now in the Jilin Museum in China.

Figure 10

Jin Dynasty White Jade Belt With Gold Buckle

Note. Xishantun, Renewal Commune, Fuyu County, Jilin Province; now in the Jilin Provincial Museum, China.

2.1.4.2 THE NORTH CHINA YAN-LIAO REGION IN THE JIN DYNASTY: "HAN STYLE" INTO THE JURCHEN

In the Jin Dynasty North China, the Yan-Liao region was a land characterized by its intricate geographical landscape and a rich tapestry of history and culture. Agriculture flourishes here, with pastoralism making its subtle presence felt. The region is a cultural mosaic, with the Han, Bohai, Jurchen, Khitan, and Xi ethnic groups coexisting and contributing to its vibrant heritage (Li, 2017).

During the reign of the Jin Dynasty, the Yan-Liao region became economically prosperous. This was especially evident when Emperor Hailing relocated the capital to Yanjing until the southward migration in the Zhenyou era. Zhongdu, the region's epicenter, became the cultural and political hub of the Jin Dynasty. Handicrafts and commerce thrived, painting a picture of prosperity.

And talking about dress culture, the sartorial culture of the Yan-Liao region was predominantly influenced by the "Han style" infused with Jurchen aesthetics. As the Jurchen rulers established their dominance over the region, they began promoting their distinctive attire. Initially met with resistance by the Han populace, the sands of time and increased interactions between the two ethnicities led to a mutual appreciation of styles (Figure 11). The costumes and hairstyles of the Jurchen began to be widely spread here, gradually forming a unique hybrid style of ethnic minorities and Han Chinese (Ye, 2019).

Given its strategic location between the colder Northeast and the Central Plains, the region's costume materials are diverse. They range from insulating furs to the traditional textiles and silks cherished by the Han people. In terms of design, one can

find Han staples like round-collared robes, turbans, scarves, and skirts, as well as northern ethnic specialties like left-buttoned robes and golden crowns (Figure 12).

When it comes to accessories, the region is a treasure trove. Pendants, drop ornaments, hairpins, combs, rings, and many other adornments grace the land, each echoing the region's rich multi-ethnic essence (Song, 2022).

In short, the Jin Dynasty North China Yan-Liao region is a place of economic prosperity and a multi-cultural blend into the "Han style" of the Jurchen fashion culture capital.

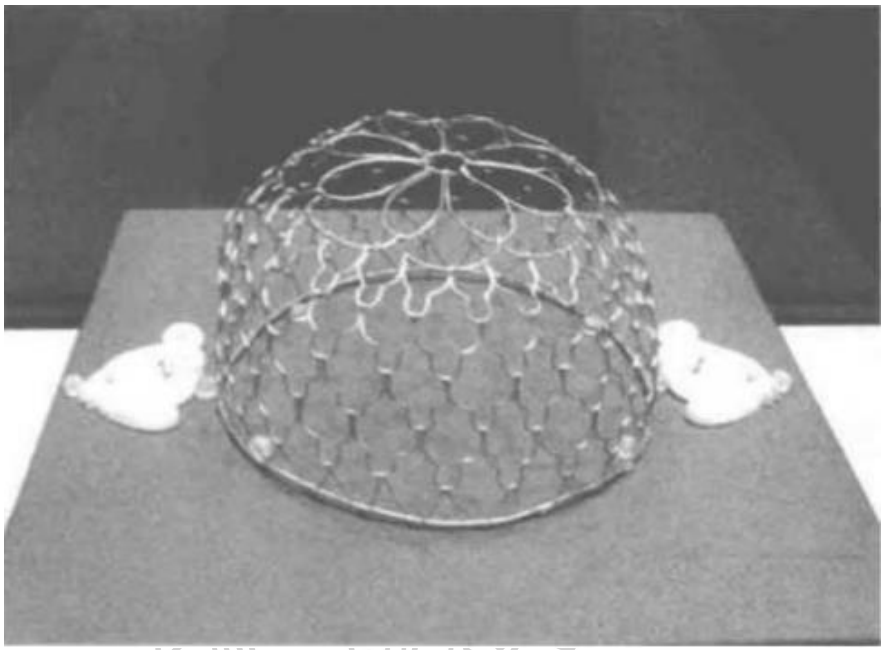
Figure 11

Neiqiu Jin Dynasty Mural Tomb Owner and Couple Sitting Toward Each Other

Note. Huli Village, Neiqiu County, Hebei Province, China.

Figure 12

Gold Filigree Crown Unearthed



Note. Jinling Ruins, Fangshan District, Beijing, China.

2.1.4.3 THE NORTHWESTERN SHANXI-SHAANXI REGION IN THE JIN DYNASTY: A FUSION OF WESTERN REGION ETHNIC STYLE

The Northwestern Shanxi-Shaanxi region, located in the northwestern region of the Jin Dynasty, shares its historical borders with the Western Xia and the Tibetan Empire. This area, rich in historical and cultural heritage, holds a unique geographical significance, making it a focal point for numerous wars. These conflicts were not just between nations but were a melting pot of various ethnicities and cultures colliding and blending (Li, 2017).

While the Han Chinese were the predominant ethnic group in this region, it was also home to several minority groups from the West, such as the Tangut and the Tibetan people. Additionally, there were smaller populations of the Jurchen, Xi, and Khitan tribes. This diverse ethnic composition gave the region a vibrant, colorful cultural and traditional tapestry.

Economically, the region primarily depended on agriculture and animal husbandry. Compared to other areas, its economic and cultural development lagged. However, trading posts were established during the Jin Dynasty, facilitating trade with other nations and enriching the local culture (WONG, 2013).

The region had a strong regional atmosphere at the crossroads of the Song, Jin, and Western Xia empires. The people here valued bravery, and this was reflected in their rugged and bold costume styles. Wars and trade fostered interactions and integrations among different ethnicities, leading to a distinctive sartorial style that showcased the characteristics of the Western region ethnicities (Song, 2022). Amidst

this cultural fusion, the costume incorporated Han Chinese styles and displayed the unique flair of the Western region ethnicities (Figure 13) (Figure 14).

Furthermore, given its location along the middle and upper reaches of the Yellow River, the region's high altitude and arid, cold climate influenced its costume materials. Warm materials like fur, cloth, and silk were predominant. Proximity to the Hexi Corridor also meant that the costume styles were diverse, blending traditional Han elements like headscarves, robes, skirts, shirts, and turbans with unique Northwestern boots (Wang et al., 2020) (Figure 15).

In summary, the fashion culture of this region, under the multifaceted influence of Northwestern ethnicities and Han Chinese styles, presents a harmonious blend of Han Chinese aesthetics with the distinctive flair of the Western region ethnicities.

Figure 13

Brick Clay Sculpture "Deer Milk for Mother" Unearthed

Note. Tomb No. 4, Macun, Jishan County, Shanxi Province, China.

Figure 14

Images of Maid and Servant Children in the Mural Tomb of Jin Dynasty

Note. Middle to Late Jin Dynasty Mural Tomb at Nanguan Village, Fanzhi County, Shanxi Province, China.

Figure 15

Brick Attendants Unearthed from the Shimotuking Jin Tomb

Note. Xiaotuijing Zhangjiazhuang, Xiaoyi City, Shanxi Province, China.

2.1.4.4 THE SHANDONG AND NORTHERN JIANGSU REGION IN THE JIN DYNASTY: HAN CHINESE STYLE

The Shangdong and Northern Jiangsu region, blessed with a warm and pleasant climate, has been a hub of economic prosperity and cultural richness since ancient times. Agriculture drives its economy, and the textile industry, especially silk production, thrives here, laying a solid foundation for the local costume style (Li, 2017).

The majority of the population in this region belongs to the Han ethnic group, but there is also a significant presence of the Jurchen and Khitan, among other northern ethnicities. Despite this diversity, the influence of Han culture remains dominant. The Han culture had already reached impressive heights during the Northern Song Dynasty. By the time of the Jin Dynasty, even though the rulers were of the Jurchen ethnicity, they did not impose Jurchen culture excessively. Instead, they wisely embraced and promoted the Han traditional culture, represented by Confucianism, and often turned to the Han people for learning (Ye, 2019) (Figure 16).

This cultural amalgamation is vividly reflected in the region's costumes. The Shangdong and Northern Jiangsu's costume style predominantly showcases Han characteristics, with minimal influence from the Jurchen and Khitan styles. The primary materials used for costumes include cotton and silk, with many designs rooted in Han traditions. This is not just because of the strong Han cultural influence but also the region's proximity to the Southern Song Dynasty, leading to cultural exchanges that introduced new elements to the local costume (Yuming, 2011).

In summary, the Shangdong and Northern Jiangsu region is rich in history and culture. Its costume primarily reflects the Han style. From another perspective, it also highlights the adaptability and continuous learning spirit of the Jurchen people during the Jin Dynasty, which in turn played a role in shaping the evolution of Jurchen ethnic costume.

Figure 16

Images of Attendants in Jin Dynasty Mural Tomb

Note. Daguanzhuang, Gangou Town, Licheng District, Jinan City, Shandong Province, China.

2.1.4.5 JIN-OCCUPIED CENTRAL PLAINS REGION IN THE JIN DYNASTY: "BARBARIAN" INTO THE HAN STYLE

In the era of the Jin Dynasty, the Jin-occupied Central Plains region held significant historical importance. It was once the capital of the Northern Song Dynasty and later became the southern capital and main city of the Jin Dynasty. This region was a hub of Han culture, flourishing economically, primarily driven by agriculture (Li, 2017). The ethnic composition was predominantly Han Chinese, but there was a significant influx of the Jurchen, Khitan, and Xi tribes, along with a minority of Bohai people.

The Jin Dynasty's governance approach in the Jin-occupied Central Plains region mirrored its strategy in the Qi-Lu and Northern Jiangsu regions, emphasizing the "Han governing Han" principle. Culturally, the dynasty ardently promoted Jurchen attire. Initially met with resistance by the Han people, this costume trend gradually gained acceptance.

With its warm climate, the Jin-occupied Central Plains region had a rich Han Chinese costume tradition. However, the Jurchen influence was undeniable, leading to a unique blend of Han traditional style with "barbarian" influences (Figure 17).

Historically, the Jin-occupied Central Plains region has always been a melting pot centered around the Han ethnicity. The massive migration of the Jurchens during the Jin Dynasty added a "barbarian" flair to the existing Han costume. The fabrics used ranged from the region's indigenous textiles, like cotton and silk, to furs from the Jin's northern territories. Due to the temperate climate, fur was more of a novelty, appealing to the costume-forward (Chin, 2008).

Men typically wore round-collared robes, headscarves, and boots. While retaining the traditional Han "Bei Zi" style from the Song Dynasty, women often opted for cross-collared narrow-sleeved robes with either left or right overlaps, paired with pleated long skirts or trousers. The Jurchen waist accessory also became widely popular. Noteworthy costume items included the robe decorated with braided threads, the "phoenix-winged hat," and ornate headpieces like the "Zhu Long Cong" (Gu, 2009) (Figure 18) (Figure 19).

In summary, the costume of the Jin-occupied Central Plains region during the Jin Dynasty was a harmonious blend of Han traditional style with "barbarian" elements. It reflects the socio-cultural dynamics of the time and stands as a testament to the diverse cultural tapestry of the Chinese nation.

Figure 17

The Image of Attendants on the West Wall of the Mural Painting of the Jin Dynasty Tomb

Note. Laowanzhuang, North Suburb of Jiaozuo City, Henan Province, China.

Figure 18

The Image of Attendants on the Northeast Wall of the Mural Painting of the Jin Dynasty Tomb

Note. Laowanzhuang, North Suburb of Jiaozuo City, Henan Province, China.

Figure 19

Dancing Figurines Unearthed from a Jin Dynasty Tomb

Note. Xifeng Feng Tomb, Jiaozuo City, Henan Province, China.

2.1.5 RESEARCH ON COSTUME IN THE JIN DYNASTY

In the 1980s and 1990s, the main focus was on a superficial and general study of the costumes of the Jin Dynasty based on historical records and archaeological materials, with relatively few thematic studies. In the early 21st century, with the increasing emphasis on ancient costumes in China, some achievements have been made in studying Jurchen costumes. Scholars have conducted academic research on the costume of the Jin Dynasty from different perspectives, as follows:

2.1.5.1 CULTURAL AND SOCIAL BACKGROUND OF JURCHEN COSTUME IN THE JIN DYNASTY

Gu Yunfen, Gao Yan, and Li Dan explored the integrated development of the Jurchen costume culture during the Jin Dynasty, emphasizing the characteristics of imbalance, leapfrogging, gradual progress, and dominance in this period (Gu, 2008).

Gu Yunfen and Zhang Shu conducted in-depth discussions on the acculturation characteristics, factors, and reaction attitudes of the Jurchen costume culture in the Jin Dynasty (Gu, 2009). The article details the acculturation process of the Jurchen costume culture in the Jin Dynasty, such as the implementation of Sinicization, the realization of the system of costume and uniforms, and the stages of acculturation from simplicity to luxury. At the same time, it also discusses various factors that

promote the acculturation of costume culture, as well as people's different reaction attitudes towards the acculturation of costume culture.

Wang (2016) reviewed the progress of women's studies in the Jin Dynasty over the past century, covering aspects such as hairstyles, costume, and marriage, and pointed out the main achievements and problems in the research.

2.1.5.2 THE SINICIZATION AND INNOVATION OF THE JURCHEN COSTUME IN THE JIN DYNASTY

Li (2013) explored the Sinicization and innovation of Jurchen costume in the Jin Dynasty, taking the robes and knee-cap garments unearthed from the tomb of the Jin Qi King as examples, emphasizing that the Sinicization of Jurchen costume was not a passive acceptance but an active reference.

Ye (2019) systematically studied the Sinicization of the Jurchen people in the Jin Dynasty from an archaeological perspective in his doctoral dissertation, exploring its evolution process, motivations, and characteristics and conducting in-depth analysis in conjunction with the social and historical background.

Fang Yanyu and Zhan Jia (Fang, 2022) have explored the role of red-green painting as a vehicle for the blending of Jurchen and Han cultures, emphasizing its importance in art, craftsmanship, and culture. In addition, they have conducted detailed analyses from the perspectives of craftsmanship, patterns, and figurines (Figure 20) (Figure 21).

Figure 20

The Red and Green Glazed Figure of a Woman in the Jin Dynasty

Note. Cui Xiannu's Tomb, Fengfeng Mining District, Handan City, Hebei Province, China.

Figure 21

Red and Green Glazed Figurine of a Dancing Girl in Jin Dynasty

Note. Cui Xiannu's Tomb, Fengfeng Mining District, Handan City, Hebei Province, China.

2.1.5.3 THE ART AND CRAFT OF JURCHEN COSTUME IN THE JIN DYNASTY

Gu Yunfen and Liu Guolian have described in detail the characteristics of Jin brocade patterns and the techniques of costume layout in the Jin Dynasty, providing a new direction for the combined study of the history of costume and silk (GU, 2007).

Li (2015) proposed the use time and function of the skirt support for the Jurchen women in the Jin Dynasty through research on historical records and archaeological materials and explored the reasons for its disappearance.

In his doctoral dissertation, Hao (2016) conducted a systematic zoning study of the tombs of the Jin Dynasty, conducting detailed discussions on the types of tombs, funerary objects, and dating and summarizing the characteristics of each region.

Pingchun (2019) conducted an in-depth study of the stone carvings of Yagou in Heilongjiang Province, exploring their costume characteristics, historical background, and geographical location.

2.1.5.4 THE ARTISTIC FUSION AND INNOVATION OF JURCHEN COSTUME IN THE JIN DYNASTY

Gu (2011) detailed the development and changes of decorative patterns during the Song, Liao, Xia, and Jin dynasties in her doctoral dissertation, emphasizing that

this period was a time of great fusion of multi-ethnic culture and art in Chinese history.

Chen (2013) described in detail the turning point and development of the music and dance art in the Song, Liao, and Jin Dynasties, especially the changes in music and dance costumes, and conducted in-depth discussions from the perspectives of music and dance themes, values, and social aesthetics. She emphasized the great role of music and dance art in the Song, Liao, and Jin Dynasties in the continuous development of music and dance costumes in later generations and the emergence of profound opera costumes.

The above research shows that the Jurchen costume culture in the Jin Dynasty is a rich research area involving art, craftsmanship, culture, history, archaeology, and many other aspects. However, although there has been some research on the costumes of the Jin Dynasty, there are currently very few people who understand the costume culture of the Jin Dynasty, especially among the current young generation who are interested in traditional costumes. It is hoped that more people will understand and appreciate this unique cultural heritage through further research on the Jurchen costume culture in the Jin Dynasty.

2.1.6 SUMMARY

From the perspective of internal factors, people of different ethnic groups are very fond of each other's costume culture and are willing to accept costumes from other ethnic groups. For example, the Jurchen people admire the developed Han culture in the Central Plains and love Han costumes. After the founding of the People's Republic of China, they have continued to learn traditional Han culture, which has promoted the development of Jurchen costume culture. On the other hand, the Han people also like the costumes of other ethnic groups, including the Jurchen people, and wear them. This psychological acceptance has promoted the integration of costumes from different ethnic groups subjectively. During the interactions between the ethnic groups in the Jin Dynasty, the changes and convergence of ethnic psychology provided a prerequisite for further developing ethnic costumes.

The external causes are multifaceted. Firstly, after the Jurchens entered the Central Plains, the lifestyle change was an objective condition for the change in Jurchen costumes. Secondly, the large-scale ethnic migrations in the Jin Dynasty also allowed the costume cultures of various ethnic groups to blend further. Finally, the natural geographical environment, historical and cultural development, and ethnic composition of various regions in the Jin Dynasty also contributed to the regional characteristics of ethnic costumes in the Jin Dynasty.

In summary, the style of costume art design in the Jin Dynasty is characterized by diverse fusion, and it has an important position in the history of Chinese costume art design development. The industrious and brave Jurchens and people of various

ethnic groups in the Jin Dynasty jointly composed a brilliant chapter in the costume culture of the Chinese nation.

2.2 OVERVIEW OF CULTURAL EXPERIENCE

Cultural experience integrates "culture" and "experience" and is a subordinate branch of experience design. Cultural experience refers to the personal perception formed by users participating in and after cultural activities, and it is the impression and perception of a specific culture. These specific feelings and experiences are obtained by the experience subject in specific cultural activities, and the process of cultural acquisition is highly complex and is affected by multiple dimensions (Yu, 2016). This study focuses on a detailed discussion of the theories of "experience design" and "user experience" that are highly related to cultural experience.

2.2.1 EXPERIENCE DESIGN

2.2.1.1 DEFINITION OF EXPERIENCE DESIGN

Experience is a personalized feeling that can be recalled through participation or exposure to events or themes. The international standard ISO9241-210 defines the user experience (UE/UX) in interactive systems as "people's cognitive impressions and responses to products, systems, or services that they use or expect to use (4, 2019)." The theoretical research on experience has gained significant attention in the design community in the past two decades. Experience is a human ability that is innate and feels natural and social. Experience is abstract, more derived from the subjective feelings of the user, difficult to express in concrete terms, and includes not only the intuitive feelings of the person but also the reflective process after the experience.

In the context of the industrialization era, efficient and scalable production needs to meet the basic needs of the masses. Experience research in this stage focuses on the practicality and efficiency of products. With the development of the Internet and intelligent hardware, user experience design has emerged in the field of human-computer interaction. The so-called human-computer interaction mainly studies the information exchange between users and systems. Improving the efficiency of information exchange and the usability of human-computer operation has become a major concern for scholars. Pine and Gilmore first proposed the "4E" model of experience design in "The Experience Economy", which states that a perfect product experience should satisfy the needs of entertainment, escapism, aesthetic, and educational experiences (Pine & Gilmore, 2011). Donald Norman proposed the three levels of design of "instinct, behavior, and reflection" in the emotional design of "The Psychology of Everyday Things", which explored the impact of perceptual experience (Norman, 1988). The "user-centered" experience design concept came into being. The rapidly developing Internet industry has put forward higher requirements for the user experience of products. Jesse James Garrett abstracted the product design process into

five levels in "The Elements of User Experience," defining the experience elements in website development and opening the prelude to the research of Internet product experience design (Garrett, 2000).

2.2.1.2 TYPES OF EXPERIENCE

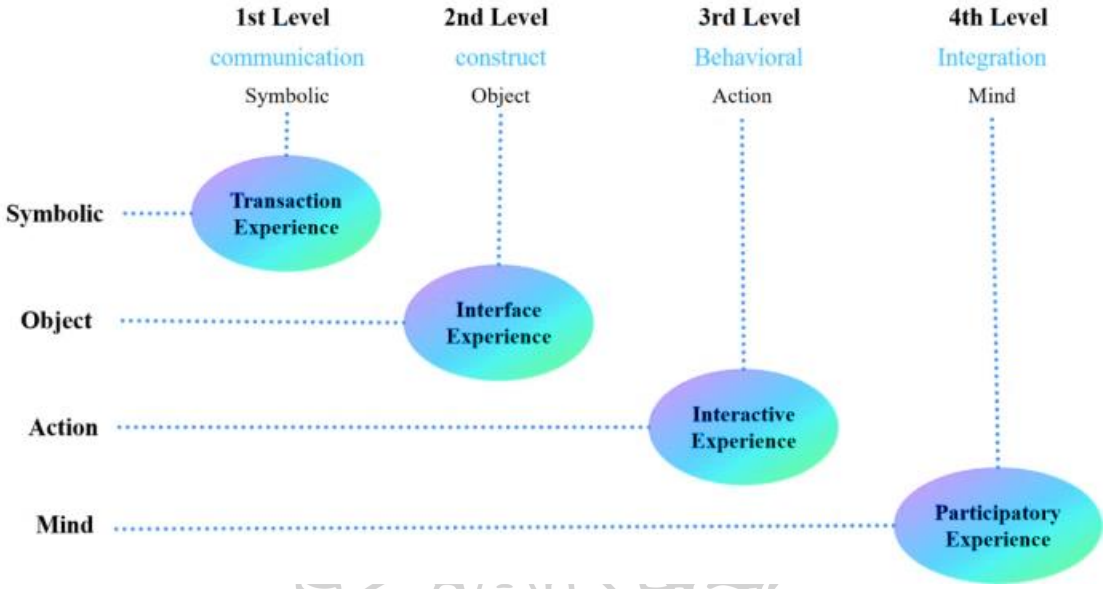
The research on the types of experience design belongs to the basic theoretical research category of experience design, and its research object is the type of experience, that is, the object of design action. Scholars mainly focus on physical experience, psychological experience, emotional experience, social experience, and other aspects of their research content.

American scholar Richard Buchanan first proposed four types of experience design at the International Conference on Experience Design, namely, transactional experience, interface experience, interactive experience, and participatory experience, and divided them into four levels (Hu, 2019) (Figure 22).

1. Transaction experience (the first level): mainly refers to the problems of early communication through the interaction between people, building connections, forming concepts of the objective environment, and ultimately forming user personas, symbols, and actions.
2. Interface experience (second level): mainly refers to the construction of problems through the interaction between people and things, stimulating creativity, and constructing recognizable symbols and logos, thus forming a traditional screen operation experience.
3. Interactive experience (third level): mainly refers to the behavioral issues of interaction between people and the environment and more often refers to a form of interaction between people and nature, society, and culture, such as the user experience brought by certain social software.
4. Participatory experience (fourth level) mainly refers to integrating human and cultural interaction. This experience is related to culture and values and refers to the enhancement of people's cultural and spiritual value experience and cognitive thinking in the intelligent Internet world.

Figure 22

The Four Types and Layers of Experience Design



Note. Summarized and edited by the author. Figure 22 shows that the American scholar Richard Buchanan first proposed four types of experience design at the International Conference on Experience Design: transactional experience, interface experience, interactive experience, and participatory experience, and divided them into four levels (Hu, 2019).

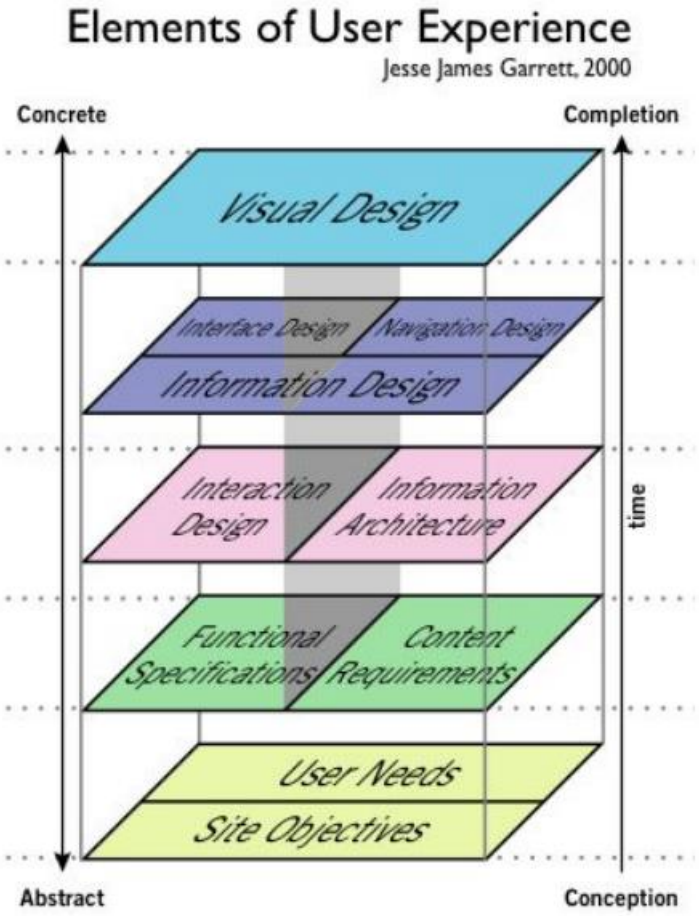
2.2.1.3 ELEMENTS OF EXPERIENCE

Garrett's user experience element model: User experience refers to the subjective feelings and emotional experiences generated by users when interacting with products, services, systems, or websites. This concept was first proposed by Norman in 1994. Later, Jesse James Garrett's user experience element model proposed in his book "The Elements of User Experience" had a significant impact on the industry (Garrett, 2000). The model is shown in Figure 23. Among them:

1. Strategic level: determining the product design goals and user object needs positioning;
2. Scope layer: Analyze the design goals and user needs proposed by the strategy layer, and generate design opportunities;
3. Structural layer: Set the product information architecture distribution model and overall interaction design requirements;
4. Framework layer: optimizing product functions and operation processes;
5. The presentation layer: improve the final visual design based on the overall product requirements;

Figure 23

The Elements of User Experience



Note. Created by Garrett (2000).

2.2.1.4 EXPERIENCE EVALUATION MODEL

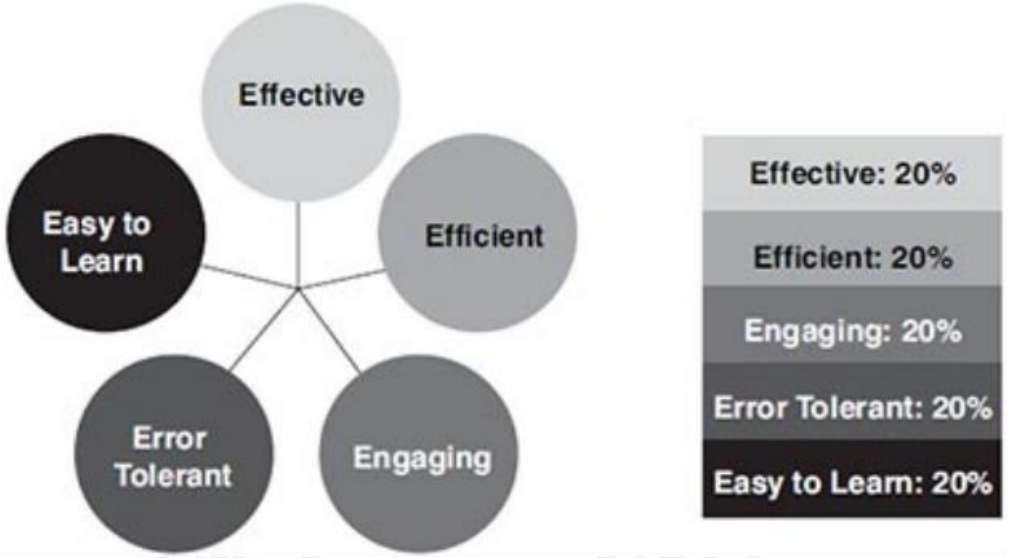
The experience model has strong applicability and practicality. Due to the different perspectives of users and designers, there are often deviations between the designer's ideas and user needs. The user experience evaluation model can help designers think about product design from the users' perspective, thus deriving design strategies with positive user experience effects. The commonly used evaluation models include the 5E model proposed by Whitney Quesenbery and the honeycomb model proposed by Peter Morville. The evaluation models often work together with experience testing tools, such as the Likert five-level test scale and the SUS system usability test scale.

The 5E model was first proposed by Whitney Quesenbery. The optimization and evaluation of product experience can refer to five principles, namely Effective, Engaging, Easy to learn, Error tolerant, and Efficient, referred to as the "5E" principle (Quesenbery, 2004). Among them, Effective represents the product’s usability helping

users achieve their goals and meeting their initial needs for using the product; Efficiency refers to the speed of work and is related to the accuracy of completing tasks. The higher the accuracy, the slower the speed of completing tasks; Attractiveness refers to the aesthetic enjoyment brought to users by the interface, making users feel happy, relaxed, and other positive emotions; Error tolerance refers to the extent to which the product avoids errors and helps users to compensate for errors; Easy to learn refers to minimizing the learning cost of the product. As shown in Figure 24, there is no specific level difference among the five principles. In practical applications, priority should be assigned according to the goals of the product.

Figure 24

Whitney Quesenbery's 5E Model



Note. Created by Quesenbery (2004).

The user experience honeycomb theory proposed by Peter Morville, the father of information architecture, points out that the seven elements of user experience include: usefulness, usability, desirability, findability, accessibility, reliability, and value (Morville, 2005). Usefulness refers to whether the product and system are useful in facing the real needs of users and exploring creative ways to make the product more useful; usability refers to the ability of product functions to meet user needs but not limited to this; desirability refers to all aspects of emotional design, including graphics, branding, and image, which have unique value; findability refers to the ability of users to find operational goals; reliability refers to the ability of users to complete operations, even for people with disabilities efficiently; trust refers to factors that enable users to generate trust and confidence; value refers to the need for the product to bring value to users, and user experience must promote the completion of

user goals. The honeycomb diagram defines the priority of needs and helps people understand their needs. This model has become one of the most effective models for improving user experience because it can quickly achieve design goals, as shown in Figure 25.

Figure 25

The User Experience Honeycomb

Note. Created by Morville (2005).

2.2.2 CULTURAL EXPERIENCE MODES

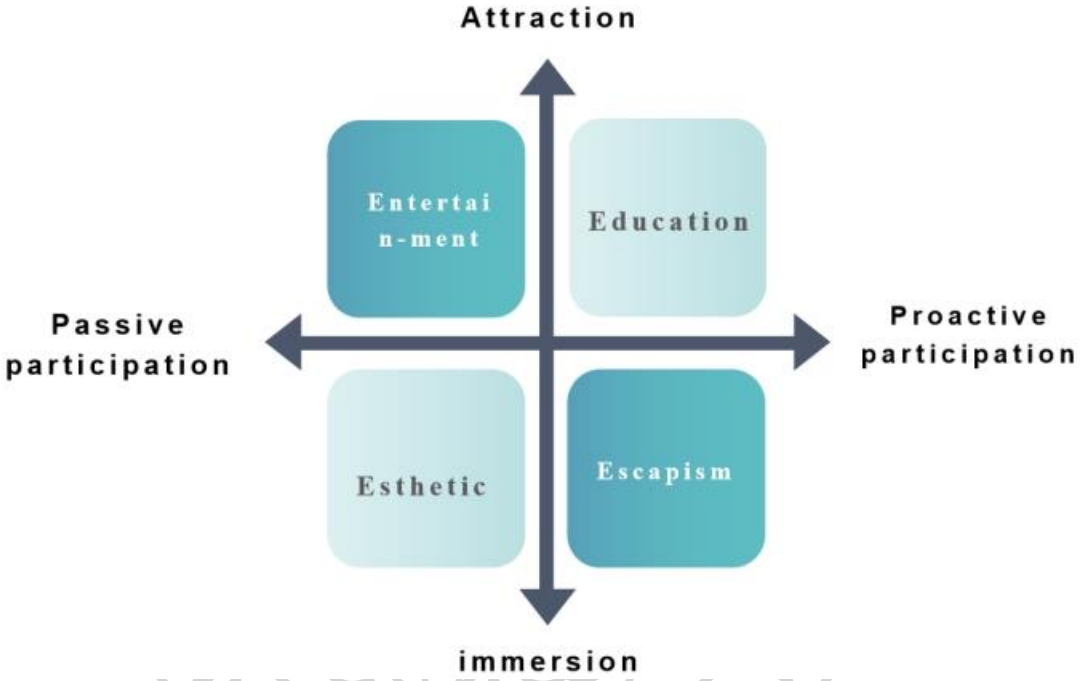
The mode of experience is diverse. B. Joseph Pine and James H. Gilmore first proposed the "4E" model of experience design in The Experience Economy, and they believed that a perfect product experience should satisfy the needs of entertainment, escapism, aesthetic, and educational experiences (Pine & Gilmore, 2011) (Figure 26); Bernd Schmitt divided experience into five forms in the book Experiential Marketing, which include sensory experience, emotional experience, thinking experience, action experience, and association experience (Schmitt, 1999). They are all scholars who have studied the field of experience economy and experience design.

1. B. Joseph Pine and James H. Gilmore:
    1) Esthetic experience: This refers to people who are just observers in an environment and do not change that environment. For example, entering a museum to appreciate art.

2) Entertainment experience: This experience is mainly about passive participation, such as watching movies or listening to concerts.
3) Educational experience: This experience involves active participation and learning, such as participating in workshops or courses.
4) Escapist experience: This is a fully immersive experience, such as participating in virtual reality games or theme park activities.

Figure 26

The Four Dimensions of an Experience (Pine & Gilmore, 2011)



Note. Summarized and edited by the author.

2. Bernd Schmitt:
   1) Sensory experience: Experience related to the five senses, such as aroma, touch, sound, etc.
   2) Emotional experience: Refers to emotional and emotional reactions, such as watching a touching movie.
   3) Cognitive experience: This experience involves thinking and learning, such as solving a difficult problem or reading an in-depth article.
   4) Acting experience: This experience involves physical actions or behaviors, such as participating in sports activities.
   5) Relational experience: This is related to the experience of establishing connections with others or things, such as social activities or teamwork.

However, the following points should also be noted:

1. These classifications are mainly based on the nature and characteristics of the experience. If it is combined with cultural experience, it may need to be further refined and explained in conjunction with the specific content and purpose of the cultural experience.
2. When applying these classifications, it is important to maintain openness and flexibility, avoiding being overly rigid or formalistic.
3. When combined with cultural experience, it is possible to consider incorporating other relevant theories and research, such as cultural theory, cross-cultural communication, etc., to provide a richer and more in-depth model division and understanding of cultural experience.

In general, the experience classification of these two scholars provides a valuable starting point for the model division of cultural experience, but further adjustments and additions may be needed in specific applications, taking into account the actual situation and needs of cultural experience.

2.2.3 RESEARCH STATUS AND CHALLENGES OF CULTURAL EXPERIENCE

2.2.3.1 RESEARCH STATUS OF CULTURAL EXPERIENCE

Currently, most research on cultural experience is theoretical research on user experiences, such as the level of elements involved in the experience, design principles, evaluation models, and future development trends. It proposes targeted design methods and strategies, such as branding, games, etc., but there is a lack of corresponding practical research on experience design. Overall, scholars are more focused on research on theories and methods and tend to prefer interactive and experiential research on products or services or propose experience evaluation models for products and services. No specific theoretical model or research method is proposed for the cultural experience.

2.2.3.2 FUTURE CHALLENGES OF CULTURAL EXPERIENCE

With the development of new media technology, future research on cultural experience may focus more on the digital transformation of culture. This is not only a transformation at the technical level but also involves conveying the depth and richness of culture in a digital environment. There are relatively few academic studies on how to design combined with traditional culture and online experience. For example, there is almost no academic research on designing a comprehensive costume culture experience model through relevant practices. Therefore, how to integrate cultural elements into the design, how to combine traditional offline cultural experience models with online interactive and fun experiences, reduce user experience costs while enhancing their emotional cognition, and ensure that the public can generate a sense of identity and cultural confidence in traditional culture are major challenges facing current cultural experience research.

2.3 TRADITIONAL COSTUMES AND CULTURAL EXPERIENCE

2.3.1 THE SIGNIFICANCE AND IMPORTANCE OF TRADITIONAL COSTUMES

As an important part of each culture, traditional costumes have always been regarded as a symbol of community and personal identity. They are not only products of a certain historical period but also have important cultural and social values in modern society. The rapid advancement of globalization has made the exchange of different cultures increasingly frequent, and traditional costumes play an important role in it. They have become an important carrier for connecting different cultures, spreading cultural information, and promoting cultural exchanges. At the same time, traditional costumes also provide a rich source of inspiration for modern designers, promoting innovation and diversity in fashion design.

Traditional costumes are an important part of cultural heritage and are the materialized expression of history, culture, and community identity. By protecting and inheriting traditional costumes, the researcher can promote cultural diversity, disseminate historical knowledge, and preserve valuable cultural resources for future generations. For example, the Hanfu movement in China began in 2001, aiming to restore and promote traditional Han costumes. This movement demonstrates the young generation's respect and love for traditional culture and provides a powerful platform for protecting and inheriting Chinese culture (Team, 2023). In addition, Al-Shehri and Al Dabbagh (2021) explored the possibility of transmitting cultural information and promoting cultural education through traditional costumes. This is significant for protecting traditional costumes, which can effectively protect cultural heritage and promote cultural inheritance.

Traditional costume helps strengthen community identity and cohesion. They provide a shared cultural symbol for community members, deepening their connections and understanding. traditional costumes also display the uniqueness and diversity of the community, helping to promote community cohesion and external communication. For example, Scotland's famous tartan skirt is not only a symbol of Scottish culture but also an important symbol of family honor and community identity. Each family has its own unique tartan pattern, which strengthens the cohesion of the family and the community. Ankara fabric, originally known as "Dutch wax print," originated in the Netherlands but has been widely accepted and promoted in Africa, becoming an important part of African culture. Its diverse designs and patterns reflect the essence of African multiculturalism and become an important carrier of community identity.

Integrating traditional costumes and modern design is an important manifestation of cultural innovation and fashion development. Modern designers create designs with traditional cultural characteristics and meet modern aesthetic standards by borrowing and integrating traditional elements. This integration not only enriches the diversity of

design but also provides a new way to inherit and promote traditional culture. For example, the design of Chinese cheongsam has evolved from the original loose style to the modern close-fitting design, highlighting the body shape of Chinese women while retaining traditional elements, making it a popular choice for modern Chinese women. Therefore, integrating traditional elements into modern design preserves and inherits cultural heritage and promotes design innovation and market development. The integration of tradition and modernity is considered to be an important driving force for cultural innovation and social development (Deepshikha et al., 2018).

Traditional costume is a material manifestation of history and culture and an important carrier of cultural exchange and innovation in modern society. The protection and promotion of traditional costumes can promote culture, facilitate cultural exchange and understanding, and also provide rich resources and inspiration for modern design and market. In the context of globalization, traditional costumes have become an important carrier for connecting different cultures, spreading cultural information, and promoting cultural exchange. In the future, with the deepening of cultural awareness and the increasing pursuit of cultural value by consumers, the value and influence of traditional costumes may be further enhanced (Minhus & Huie, 2021).

2.3.2 CULTURAL EXPERIENCE IN TRADITIONAL COSTUMES

Traditional costume provides people with a unique cultural experience that goes beyond pure aesthetic and material satisfaction and deepens into emotional and spiritual levels. Wearing traditional costumes, people can feel a connection to the past and experience a deep connection to a specific culture, history, and social background. However, the cultural experience in traditional costumes is not always positive. Sometimes, due to cultural differences and misunderstandings, wearing traditional costumes can lead to cultural conflicts and misunderstandings. Therefore, to provide an authentic and in-depth cultural experience, the researcher must ensure that traditional costumes' design, production, and dissemination are based on a deep understanding and respect for specific cultures. However, traditional costumes generally provide people with a unique cultural experience that can help people better understand and appreciate various cultures and histories.

2.3.2.1 CLASSIFICATION OF TRADITIONAL COSTUMES CULTURAL EXPERIENCES

Table 2 shows that the types of traditional costumes and cultural experiences currently open to the public mainly include the following, each with its unique characteristics, advantages, and disadvantages:

Table 2

Classification of Traditional Costumes Cultural Experiences

Type	Feature	Advantage	Disadvantage
Costume Try-on		Directly experience the style and charm of traditional costumes, enhancing cultural identity.	The experience may be limited to specific locations.
Handicraft		Gain an in-depth understanding of costumes' craftsmanship, cultivating manual skills.	It requires certain manual skills, and the learning process may be time-consuming.
Historical and Cultural Lectures		Increases knowledge and deeper understanding of Chinese costume culture.	It may require some historical and cultural background and could be relatively dry for some people.
Cultural Exhibition Visits		Visually demonstrate the aesthetic value and craftsmanship of costumes.	The experience is relatively passive, mainly observational rather than hands-on.
Interactive Workshops		Combines practice with learning, making it livelier and more interesting.	It may require higher participation costs and time investment.
Online Experience Courses		It is convenient and suits modern lifestyles.	Lacks the experience of physical contact and on-site interaction.

Note. This table summarizes the types of traditional costume cultural experiences and the advantages and disadvantages of each type of category. All images in the table are organized and collected by the author.

2.3.2.2 POPULARITY AND IMPACT OF HANFU EXPERIENCE

In the experience of Chinese traditional costume culture, especially among the younger generation, the Hanfu experience is widely loved and accepted. Here are some key points about the Hanfu experience:

Popularity and Trend of Hanfu: As a carrier of traditional culture, Hanfu has rapidly become popular among young people in recent years, moving from a niche hobby to mainstream acceptance, forming a large market.

Consumer Numbers and Preferences: According to a report by iiMedia Research, by the end of 2022, the number of Hanfu enthusiasts in China reached 8.507 million (iiMedia, 2022). Female consumers dominate the market, accounting for nearly 80%. Consumers of different age groups have varied interests and focus on the material, pattern, form, and style of Hanfu.

Integration with Cultural Activities: Hanfu is not limited to clothing itself but integrates into various cultural activities, such as garden tours, performances, treasure hunt games, etc. These activities allow young people to showcase themselves while boldly inheriting and interpreting traditional culture.

Influence of social media: social media has played a significant role in the spread of Hanfu culture. According to surveys, about 54.7% of the public encountered Hanfu through social media (iiMedia, 2022). On platforms like TikTok, Kuaishou, and Bilibili, content about Hanfu is increasing, promoting the spread and popularization of this culture (Figure 27).

In summary, the Hanfu experience has become one of the public's favorite traditional costumes and cultural experiences due to its rich cultural connotations, fashion integration, and promotion through social media. Therefore, in this study, the researcher will mainly focus on the costume try-on experience as one of the important traditional costume cultural experiences (Figure 28) (Figure 29) (Figure 30).

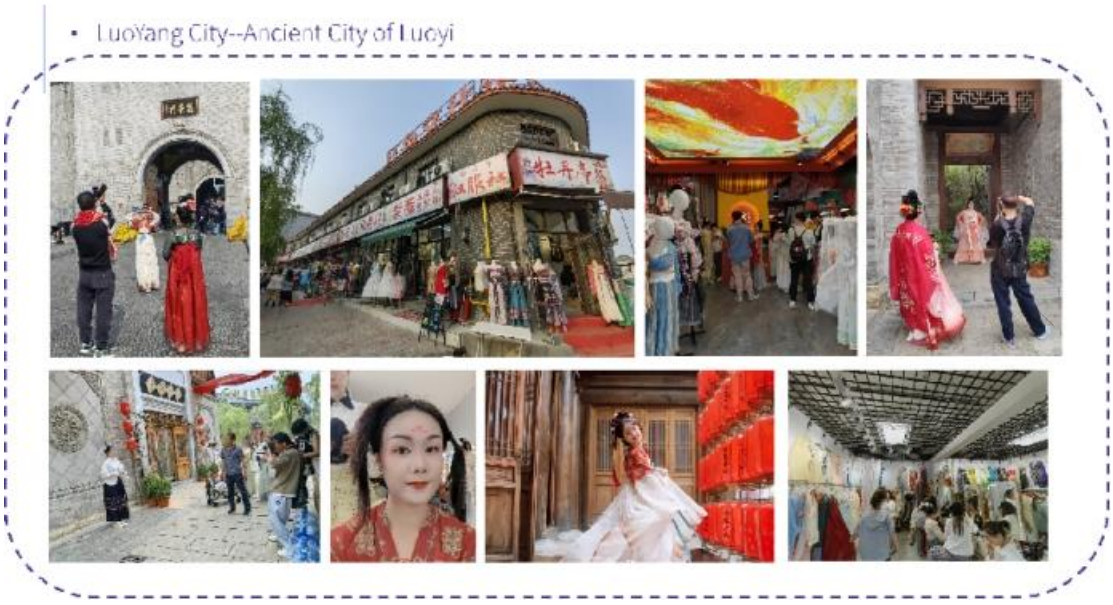
Figure 27

Investigation of the Ways Chinese People Know Hanfu 2022

Note. Created by iiMedia (2022).

Figure 28

The *Researcher Researched the Hanbok Experience in Luoyi Ancient City, Luoyang City, Henan Province, China*



Note. Photographed by the author.

Figure 29

The *Researcher Researched the Hanbok experience in Millennium City Park, Kaifeng City, Henan Province, China*

Note. Photographed by the author.

Figure 30

The *Researcher Researched the Hanbok Experience in Gankeng Hakka Theme Park, Shenzhen City, Guandong Province, China*

Note. Photographed by the author.

2.3.3 CULTURAL EXPERIENCE AND AUDIENCE OF TRADITIONAL COSTUMES

Traditional costume is not just an external decoration; it has profound significance in cultural, historical, and social contexts. For the audience, wearing traditional costumes can express the identity, respect, and inheritance of a certain cultural heritage. This experience is not limited to a specific culture or community but spans various cultures, ages, and backgrounds. Different audiences may have different experiences and reactions based on their cultural background, knowledge, and experience.

1. Local residents

For those who live in a particular culture, traditional costumes may be part of their daily lives or related to certain rituals and celebrations. For example, the Han people in China may choose to wear Hanfu at certain festivals or celebrations to commemorate and celebrate their cultural heritage.

2. Young generation

In the context of globalization and modernization, many young people may gradually distance themselves from their traditional culture. However, in recent years, there has been a clear trend that more and more young people are beginning to rediscover and cherish their cultural heritage. For example, the phenomenon of "Hanfu fever" in China, where many young people choose to wear Hanfu to express their respect and pride for traditional culture (Fan & Ip, 2022).

3. International tourists and immigrants

For those from other cultural backgrounds, understanding and experiencing traditional costumes provides them with a unique cross-cultural experience. This enhances their cross-cultural communication and understanding abilities and helps them better understand and appreciate other cultures (Chiang, 2015).

4. Scholars and the researcher

Scholars and researchers who study traditional culture and costumes explore and analyze traditional costumes' cultural significance and value from a more in-depth and systematic perspective.

5. Designers and Craftsmen

Traditional costumes provide rich inspiration to those engaged in costume design and production. They can combine traditional design and craftsmanship to create works with traditional charm and modernity.

In general, the cultural experience of traditional costumes is diverse and varied, and different audiences may have different experiences and reactions. For audiences, wearing traditional costumes is not only for external decoration but also an expression of identity and cultural heritage in a cultural, historical, and social context. In the closed-loop information dissemination process, balancing the relationship between traditional costumes and audiences and how to meet audiences' needs better are important directions for current research.

2.3.4 PROBLEMS AND CHALLENGES IN EXPERIENCING TRADITIONAL COSTUMES CULTURE

With the advancement of globalization and the deepening of cultural exchanges, the cultural experience of traditional costumes faces a series of problems and challenges. These problems and challenges involve traditional costumes and multiple levels, such as cultural heritage, identity recognition, and cross-cultural communication.

1. Cultural misunderstandings and conflicts: Traditional costumes may be misunderstood or misinterpreted in a multicultural context. For example, traditional costumes from certain cultures may be seen as "exotic" and overlooked for their deep cultural and historical background. Additionally, wearing traditional costumes from other cultures may be seen as "cultural appropriation," which can lead to cultural conflict and controversy.

2. Conflict between tradition and modernity: Traditional costumes may conflict with modern aesthetics and lifestyles in modern society. For example, some traditional costumes may not be suitable for modern work and living environments, limiting their use in daily life.

3. The combination of technology and tradition: As stated in the 2015 study by Michaela Honauer and E. Hornecker, the challenges faced in creating and staging interactive costumes for the theater stage emphasize the need for interdisciplinary collaboration between technological features and traditional craftsmanship. This suggests that introducing modern technology and innovation while maintaining tradition is an important challenge (Honauer & Hornecker, 2015).

4. Cultural heritage and commercialization: As traditional costumes become popular, they may be commercialized and commoditized. This may lead to traditional costumes losing their original cultural and historical significance and becoming purely fashionable consumer goods.

5. Sustainability and environmental issues: As the traditional costume industry develops, ensuring its production and consumption are sustainable and not burden the environment excessively is also an important challenge (Min & Koo, 2017).

In general, the cultural experience of traditional costumes faces various problems and challenges, which require us to conduct in-depth research and discussion from multiple perspectives. In order to ensure that the cultural experience of traditional costumes is authentic, profound, and meaningful, the researcher needs to consider and address these issues and challenges carefully.

2.3.5 SUMMARY

As an important part of various cultures, traditional costumes carry a rich historical and cultural heritage and provide people with a unique cultural experience.

From the emotional, aesthetic, cognitive, social, physical, and spiritual levels, traditional costumes allow people to interact with culture, history, and society deeply.

However, with the advancement of globalization and the deepening of cultural exchanges, the cultural experience of traditional costumes is also facing a series of problems and challenges. Cultural misunderstandings, conflicts between tradition and modernity, the integration of technology and tradition, cultural heritage and commercialization, and sustainability and environmental issues are all important issues that need attention and solutions in the current field of traditional costumes and cultural experience.

In order to ensure that the cultural experience of traditional costumes is authentic, profound, and meaningful, the researcher needs to consider and address these issues and challenges carefully. This requires interdisciplinary collaboration, research, joint efforts, and participation of various cultures and communities.

With the development of technology and the deepening of cultural exchanges, the cultural experience of traditional costumes is expected to reach a new height. Through in-depth research and innovation, the researcher can provide people with richer, more diverse, and deeper cultural experiences, thereby deepening people's understanding and respect for various cultures.

2.4 DIGITAL DESIGN OF THE TRADITIONAL COSTUMES

2.4.1 THE IMPORTANCE AND SIGNIFICANCE OF DIGITAL DESIGN OF TRADITIONAL COSTUMES

With the rapid development of digital technology, the digital design of traditional costumes has become an important research area. traditional costumes are an important part of a country's or region's culture and a combination of history, art, and craftsmanship. The researcher can better preserve, inherit, and promote this valuable cultural heritage through digital technology.

1. Preservation and inheritance of cultural heritage: As part of cultural heritage, traditional costumes are crucial for maintaining the cultural characteristics of countries and regions. Digital technology provides a new way of preserving these costumes, allowing them to be preserved for a long time and protected from the physical environment (Kim et al., 2010). For example, through 3D scanning and modeling techniques, the researcher can conduct detailed analysis and research on ancient costumes, thereby better understanding their structure and craftsmanship. This digital preservation method ensures the original state of the costumes is protected and provides important data resources for subsequent research and education.

2. Interactive cultural experience: Digital technology allows people to experience and appreciate these traditional costumes in a virtual environment, thereby providing a more intuitive understanding of the culture and history behind them (Ying Wu et al., 2022). This interactive experience attracts more young people to participate and

provides new tools for education and training. For example, through virtual reality technology, viewers can experience the costumes worn at ancient banquets or ceremonies immersively, thereby gaining a deeper understanding of their cultural background and historical significance.

3. Inspiration source of modern design: The digital design of traditional costumes provides rich inspiration for modern designers. Through research and simulation of traditional costumes, designers can better understand their structure and craftsmanship, thus creating more innovative and unique designs. For example, Kaixuan Liu's team attempted to conduct a virtual simulation of Yue Opera costumes through understanding and analysis of Yue Opera costumes. It used extracted elements related to Yue Opera costumes to conduct modern costume design based on the Yue Opera costume style (Liu, Zhou, Zhu, et al., 2022).

4. Promote cultural exchange and cooperation: Digital technology makes it easier to display and promote traditional costumes across the globe, thereby promoting exchanges and cooperation between different cultures (Yue Wu et al., 2022). For example, through digital exhibitions or online platforms, traditional Chinese costumes can be appreciated by global audiences, thereby enhancing cultural exchange and understanding. At the same time, this also provides new opportunities for international cooperation, such as cross-border costume design projects or cultural exchange activities.

Overall, the digital design of traditional costumes provides us with a more intuitive and vivid way to understand and appreciate this cultural heritage and inspires modern designers to create more innovative and unique designs. With the continuous advancement of digital technology, the researcher has reason to believe that the digital design of traditional costumes will play a greater role in the future, providing people with more cultural experiences and creative inspiration.

2.4.2 INTERACTION AND COMMUNICATION IN THE DIGITAL DESIGN OF TRADITIONAL COSTUMES

The core of traditional costumes' digital design is the participation and experience of the audience. This design concept has been further strengthened and developed in the digital age. Here are several key aspects of interaction and communication in traditional costumes digital design (Figure 31):

1. Audience-centered design: The digital design of traditional costumes focuses on the audience, emphasizing their initiative and participation. The goal of the design is to engage all of the audience's senses, enabling them to deeply engage with the costume display, thereby gaining deeper cognition and understanding.

2. Application of digital media technology: Digital media technology provides powerful tools and means for the digital design of traditional costumes. Through the combination of virtual and physical displays, audiences can gain a new experience.

For example, audiences can interact with costumes through touchscreens, augmented reality, and virtual reality technologies to obtain more information and knowledge.

3. Two-way communication of information: In digital design, information communication is no longer one-way but two-way. The audience can actively explore and obtain relevant information about the costumes. At the same time, the system can also provide personalized data push and suggestions based on the preferences and behaviors of the audience.

4. Integration of social media: With the help of social media, audiences can communicate and share with other audiences, obtaining multi-dimensional information and feelings. This social behavior enriches audiences' experience and strengthens the interaction and communication between audiences.

5. Experience beyond time and space: Digital media technology has broken through the limitations of time and space, providing audiences with experiences that transcend reality. Audiences can conduct virtual visits and obtain relevant information and knowledge through online platforms and virtual spaces at any time and at any place.

Overall, the digital design of traditional costumes provides a new way of experience for the audience. Through the application of digital media technology, the audience can participate more deeply in displaying costumes and gain richer knowledge and feelings.

Figure 31

The *Researcher Researched the Traditional Costumes Digital Experience at Chaoshan Intangible Cultural Heritage Museum, Shantou City, Guangdong Province, China*

Note. Photographed by the author.

2.4.3 THE EVALUATION CRITERIA FOR TRADITIONAL COSTUME DIGITAL DESIGN WITH CULTURAL EXPERIENCE AS THE CORE

The digital design of traditional costumes is not only the application of technology but, more importantly, how to provide users with an in-depth cultural experience through technology. Therefore, the success of it should be judged based on cultural experience. It mainly considers the following aspects:

1. Authenticity and accuracy: Digital design should restore the true appearance and details of traditional costumes as much as possible. This includes the costume's material, color, structure, and decoration. Only by ensuring authenticity and accuracy can users obtain a true cultural experience.

2. Interactivity and participation: A successful digital design should be able to attract users to participate and interact. For example, users can try on different traditional costumes in a virtual environment or communicate and share with other users. High interactivity and participation can enhance users' cultural experience and identity.

3. Education and inspiration: Digital design should function as education and inspiration. Users can not only understand the appearance and characteristics of traditional costumes but also have a deeper understanding of the culture and history behind them. This in-depth cultural experience can help users better understand and appreciate traditional costumes.

4. Innovation and adaptability: On the basis of maintaining authenticity and accuracy, digital design should also have certain innovativeness and adaptability. For example, designers can combine modern elements and technologies to create new designs and applications for traditional costumes. This kind of innovativeness and adaptability can make traditional costumes more widely applied and recognized in modern society.

2.4.4 RESEARCH ON DIGITAL DESIGN OF TRADITIONAL COSTUMES

Regarding research on the digital design of costume culture, the author has identified two keywords: Costume Digital Display, Digital display of costume culture, Costume Digital Museum, and Digital conservation of costumes. Searching on the Web of Science website and the China CNKI website until 17:30 on July 4, 2023, a total of 177 research results were obtained through searching and integrating these four keywords. Among them, 37 research results were found on the Web of Science website, and 138 research results were found on the China CNKI website. This reflects that relevant research is currently more common in China. From the perspective of overall research trends, there were few research papers between 2009 and 2017, with only 48 relevant research papers. It was not until after 2017 that research on the digital display of costume culture began to increase slightly, which is basically consistent with the rise of virtual clothing in China. The earliest research

paper on the digital display of costume culture from a costume digital museum perspective was Huan's master's thesis, "Research on the Virtual Museum of Modern Costumes" (Huan, 2009) from Shaanxi University of Science and Technology. In the thesis, the author used the history of modern Chinese costume as a guide and the theory of history as a framework. The development of China's costume history in the past century was analyzed using comparison, induction, and summarization methods. With information technology as the carrier, the historical discipline was combined with modern technology, and a more intuitive and concise way was used to display it on the Internet in the form of a webpage. The significance and bright future of the study of costume virtual museums were demonstrated. Kim et al. (2010) studied the possibility of traditional costume revival and digital exhibition, as well as the application of 3D virtual clothing modeling data to preserve and record disappearing costume heritage. They realized it as a social education tool through emerging 3D virtual clothing technology. From 2013 to 2017, research was conducted on the digital display design and exploration of the cultural heritage of the Xiangnan Yao ethnic group (Shanshan, 2014), Nanling ethnic group (Zheng et al., 2015), and Yunnan Yi ethnic group (Zheng et al., 2015) from the perspective of national cultural protection. After 2017, research on virtual museums and digital display of costumes has gradually enriched, with the research object either being a certain ethnic costume, such as Tibetan costume (Chen et al., 2018), Dong costume (Hanzhou et al., 2019), and Tu costume (Wuwei & Jixiao, 2020), or a certain dynasty's costume, such as Tang costume (Lyu et al., 2018), or a certain characteristic costume, such as cheongsam (Cao & Gao, 2022). However, for the five thousand years of Chinese civilization, costume culture has run through the whole process, and there is still a long way to go in researching the digital design of costumes.

2.4.5 SUMMARY

The digital design of traditional costumes is a cross-disciplinary field that involves multiple aspects, such as culture, art, technology, and design. With the development of digital technology, this field has shown unprecedented vitality and innovation.

First of all, the digital design of traditional costumes provides us with a new way to preserve, inherit, and promote this precious cultural heritage. Through digital technology, the researcher can ensure these costumes' long-term and accurate preservation while also providing the public with richer and more diverse cultural experiences.

Secondly, digital design brings new life and value to traditional costumes. Designers can combine traditional elements with modern technology to create a new costume with a traditional style and a modern feel. This innovation and adaptability have made traditional costumes more widely used and recognized in modern society.

Finally, the digital design of traditional costumes provides new opportunities for cultural exchange and cooperation. Through digital technology, people from different cultures and regions can more easily share and exchange their designs and research results, thereby promoting cultural exchange and integration.

Overall, the digital design of traditional costumes has challenges and opportunities. With the continuous advancement of technology, cultural exchange, and cooperation, this field will play a more significant role in the future, providing people with more cultural experiences and creative inspiration.

2.5 VIRTUAL CLOTHING AND CULTURAL EXPERIENCE

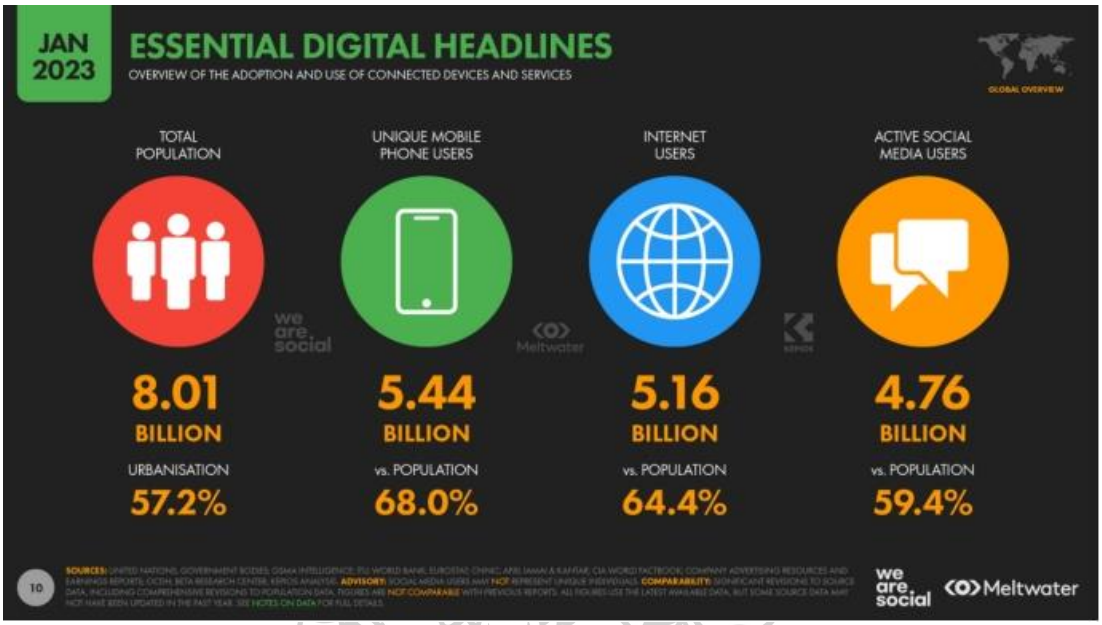
Virtual clothing is a type of costume created and displayed digitally. It is not just a visual representation but an entity that can interact and customize with users. Unlike traditional physical costumes, virtual clothing is designed and simulated in computer graphics software, and it can be displayed and tried in virtual reality, augmented reality, or other digital platforms (Volino & Magnenat-Thalmann, 2000).

2.5.1 THE VALUE AND SIGNIFICANCE OF VIRTUAL CLOTHING

With the advent of the digital age, people's lifestyles and work styles are undergoing profound changes. The Internet broadens people's horizons and makes them more dependent on the virtual world. According to the report "Digital 2023: Global Overview Report", there are 5.16 billion Internet users in the world today, which means that 64.4% of the world's total population is now online, and more than 6 out of every 10 people on Earth are already using the Internet (Figure 32). However, from the perspective of users' time spent on the Internet, the time spent online by users in 2023 decreased by nearly 5% year-on-year (Figure 33). Therefore, the decrease in total online time tells us what the constantly changing digital behavior of the world is. Careful analysis of the data shows that people become more thoughtful and purposeful in online activities, of which "finding information" is still the main reason for people to use the Internet today (Figure 34) (Datareportal et al., 2023). Therefore, to some extent, these data clearly reveal the potential and challenges the virtual world faces in the future.

Figure 32

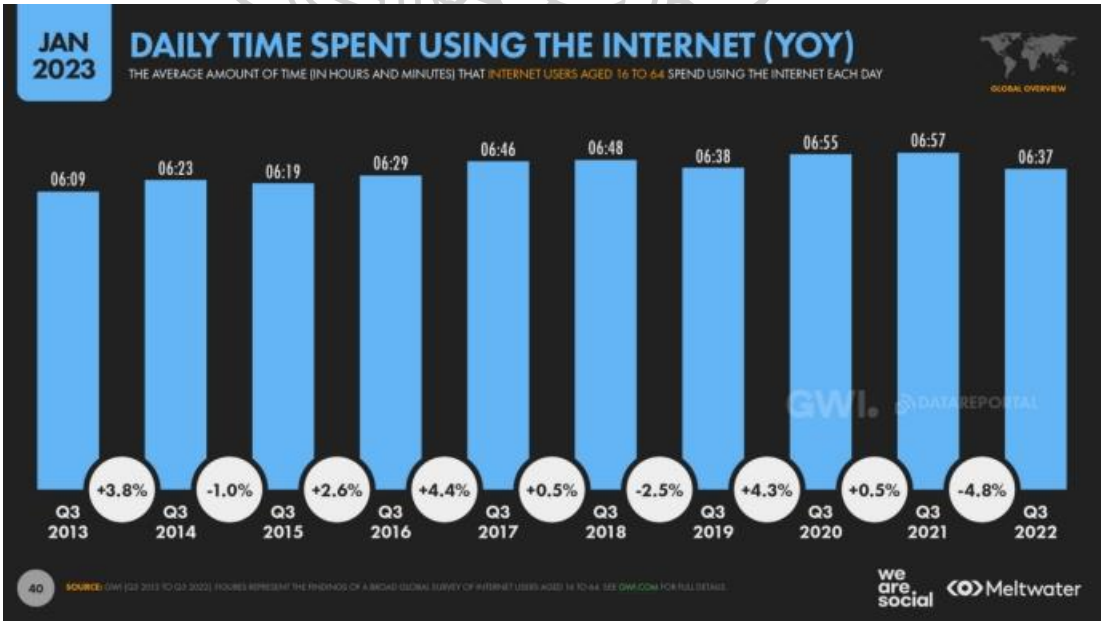
Essential Digital Headlines



Note. Created by Digital 2023: Global Overview Report (Datareportal et al., 2023).

Figure 33

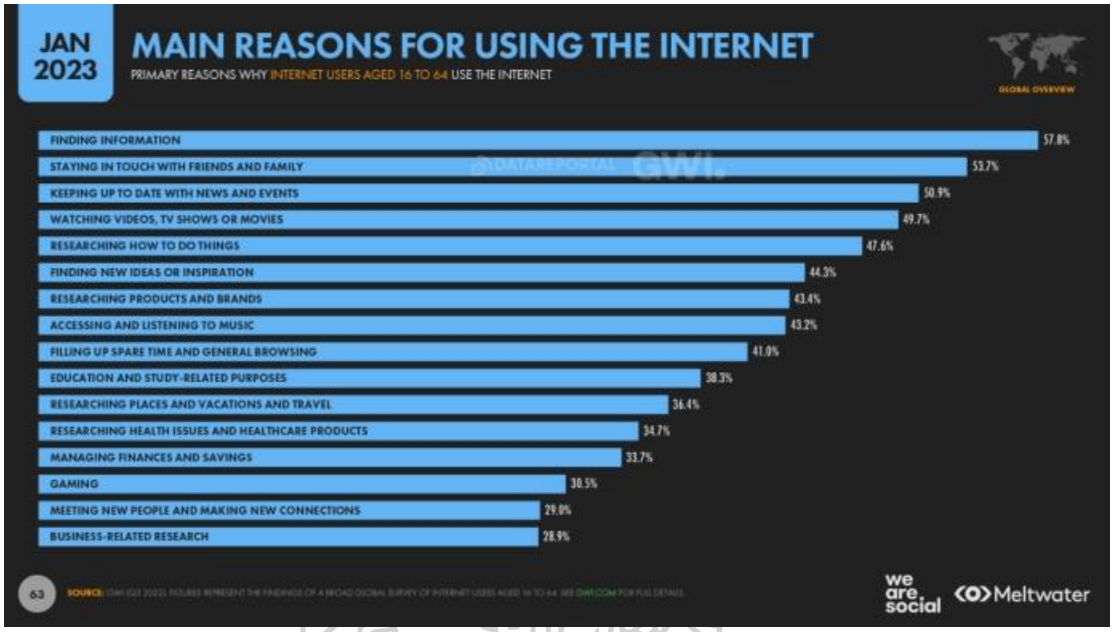
Daily Time Spent Using the Internet (YOY)



Note. Created by Digital 2023: Global Overview Report (Datareportal et al., 2023).

Figure 34

Main Reasons for Using the Internet



Note. Created by Digital 2023: Global Overview Report (Datareportal et al., 2023).

Against this backdrop, the fashion industry has also begun to explore the possibilities of digitalization. Virtual clothing can be a testing form for new product launches and an independent way for broader and more convenient dissemination. For fashion designers, the immersive virtual display format can make their designs easier to communicate, make the design concept of costume more easily perceived by people, and also improve the efficiency of design and production.

1. Infinite Design Space

The design process of virtual clothing has infinite possibilities due to its unlimited design space. Physical materials and production processes limit traditional costume design, while virtual clothing can achieve various innovative design elements and effects through digital technology. For example, in their research, Duck-Ki Ahn et al. conducted a digital fashion show using virtual clothing to explore whether it can make them similar to actual costumes. This design method enables richer and more diverse design effects and gives designers a broader space for innovation (Ahn et al., 2023).

2. Interesting interactive experience

The interactive experience of virtual clothing is also an important manifestation of its value. Through digital technology, users can directly try on and experience costumes in a virtual environment. This convenient and fast experience method gives users a more authentic and intuitive feeling. For example, K. Nah et al. explored in their research how to improve users' immersion in the digital human experience. Users directly observe and experience these unique patterns and designs in a virtual

environment, thus better understanding and appreciating their cultural value and aesthetic significance (Nah et al., 2022).

In addition, virtual clothing displays also provide new possibilities for disseminating costume culture. For example, immersive virtual clothing displays can be applied to displaying and disseminating ancient traditional costumes, allowing people to experience the charm of traditional costumes more modernly (Shuyuan & Xia, 2021). This can enhance people's knowledge and understanding of traditional culture and promote the inheritance and development of traditional culture.

3. Environmental Protection

In terms of environmental protection, virtual clothing displays can effectively reduce the waste of resources and environmental pollution in the process of designing, displaying, and selling physical costumes (Zhang & Dong, 2021). This has important practical significance in the context of the increasingly serious global environmental problems. How many clothes in the world exist to show photos on social media? The life of many clothes ends with taking photos, but the recycling and reuse of costumes is currently at a level where no one cares. Thousands of tons of clothes are thrown away every year. Clothes made of various synthetic fibers are non-degradable in the environment and are more serious than plastic pollution.

4. Wide Range of Uses

It is worth mentioning that the research on virtual clothing displays is also a cross-disciplinary and cross-professional research project (Hegde, 2018). It not only has an important role in promoting the field of costume design and production but also has a profound impact on the development of video games (Fu & Liang, 2022), virtual spaces (Gottschalk, 2010), virtual communities (Zhang & Dong, 2021), and future educational spaces (Jiang et al., 2017). Therefore, the researcher believes virtual clothing will be increasingly important in the future digital era.

2.5.2 DISPLAY AND APPLICATION OF VIRTUAL CLOTHING

2.5.2.1 DISPLAY TECHNOLOGY AND PROCESS OF VIRTUAL CLOTHING

As an important part of the digitalization and virtualization of costume, virtual clothing display technology embodies the integration of technology and art. It is an important basic technical support for designers and users to communicate closely. It is particularly important, especially in today's rapidly popularizing network and fully matured information technology.

The Miralab laboratory in Switzerland has accumulated a wealth of research experience and scientific research results in virtual clothing and animation. In 1990, the "FlashBack" virtual clothing project of the Miralab laboratory was the first case of a virtual display of a three-dimensional costume in the true sense (Volino & Magnenat-Thalmann, 2000). At the same time, the emergence of three-dimensional human body modeling technology, collision detection technology, and response technology has also greatly promoted the development of costume simulation effects.

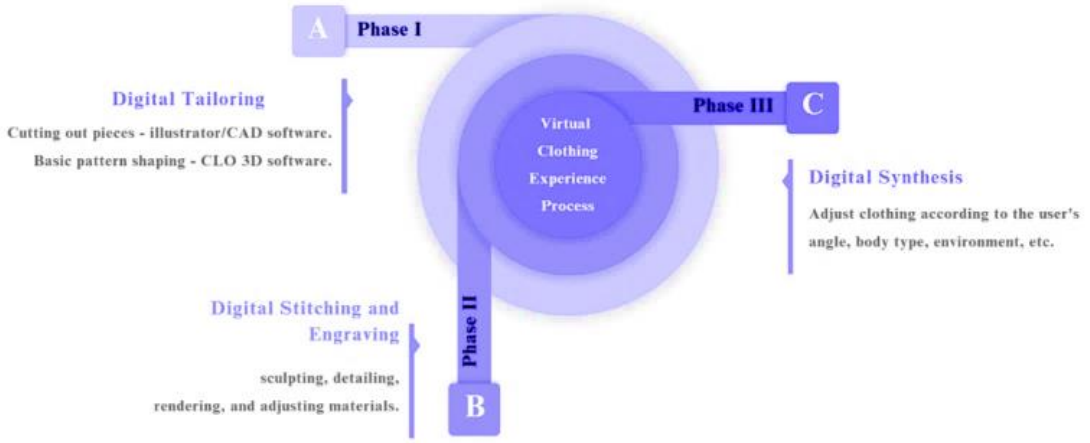
The Miralab laboratory at the University of Geneva in Switzerland has long been in a leading position in virtual clothing simulation research. The laboratory has completed dozens of research projects involving virtual human body modeling, human body animation, and virtual environment generation, among other topics (MIRALab, 2003). In addition, the "Center for 3-D Electronic Commerce" project of the London School of Technology in the United Kingdom, which aims to establish an online virtual clothing store, has a short-term goal of adding costume images to customer body maps and a long-term goal of modeling costume and simulating the wearing effect (Huie & Shouyong, 2015). The European Association for Information and Algorithms Research's "M to M 3-D (Made to Measure garments, 2D-3D Approach)" project, which aims to provide a new method for producing tailored costumes, is particularly targeted at those with special body types (CARACTERISATION, 2001).

Secondly, the research on virtual clothing display technology in China is currently developing vigorously. Hangzhou Sendo Digital Technology Co., Ltd. has independently developed a "3D virtual fitting" using the latest 3D technology, augmented reality, and body sensing technology. The folk costume museum of Jiangnan University has produced a virtual display of folk costumes based on the "CLO3D" 3D costume display software (Ji & Dongqing, 2014). In addition, Zhu Xinjuan and Lu Haiqing of Xi'an Polytechnic University, Xi'an, China, proposed an interactive costume design and personalized virtual display of the user's face to meet the needs for personalized costume customization (Zhu et al., 2018). However, the generated 3D human body still cannot accurately simulate the customer's body shape. On the other hand, the current virtual fitting system is far from practical application. For the virtual fitting system of costume simulation and human-computer interaction, in order to achieve a better customer immersion experience, Ying Wu et al. (2022) implemented a real-time interactive virtual fitting system based on Microsoft Kinect motion sensing equipment. They proposed a gesture determination algorithm based on finger recognition and an image transmission algorithm based on skeleton information matching, thus providing a broader technological space for the display of virtual clothing.

The technical process of the virtual clothing display is summarized as follows (Figure 35):

Figure 35

Virtual Clothing Experience Process



Note. Summarized and edited by the author. Meanwhile, in step 7, the real-life photos provided by the player should not cover parts of the body, and the environment in which the photos are taken should be clean and well-lit. The model's original costume should be as close to the body as possible (ISUX, 2022).

1. Phase I: Digital Tailoring.

This phase includes the following two steps:

1) Step 1: Use Illustrator or costume CAD software to create basic garment cutouts.
2) Step 2: Import the basic cutting pattern into the 2D window of the CLO 3D software, and then draw it through the template window of CLO3D to create a costume template in 2D.

2. Phase II: Digital Suturing and Carving.

This phase includes the following four key steps:

3) Step 3: Adjust the cut piece pattern in CLO 3D, and perform point-to-point suturing on the pre-set human model to make the cut pieces fit "wear" on the model.
4) Step 4: After the basic costume is formed, the details of the costume's shape are carved.
5) Step 5: Export the file after sculpting the basic costume model.
6) Step 6: Import the model file into Cinema 4D software and use Octane to render the material.

3. Phase III: Digital Synthesis.

This phase includes the following two final steps:

7) g) Step 7: Adjust and match the human body model based on the real photo movements provided by the player.

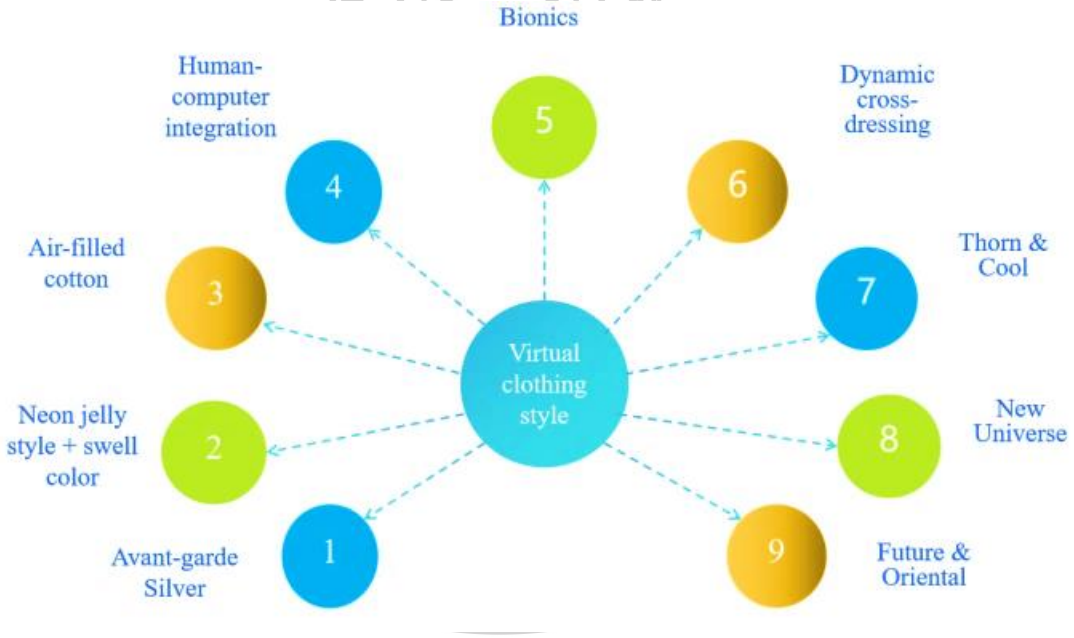
8) h) Step 8: Use Photoshop software to synthesize virtual clothing with real photos.

2.5.2.2 APPLICATION STYLES FOR VIRTUAL CLOTHING

On June 9, 2022, Tencent ISUX User Experience and Design Department released the "2022-2023 Design Trend ISUX Report· NFT Virtual Fashion" (Department, 2022), which pointed out that virtual clothing has covered most of the scope of our dressing, and the world of reality and virtuality can be freely switched. Virtual clothing can make rich and colorful fashion and different expressions based on the real-life dressing. Among the various virtual clothing, even in the early stages of menstruation, various outstanding styles are still worthy of attention (Figure 36).

Figure 36

The Style of Virtual Clothing



Note. Summarized and edited by the author (ISUX, 2022).

1. Avant-garde Silver

The style is cool and high-end and must be a must-have for futuristic successors (ISUX, 2022). It brings a unique sense of emptiness, giving people a strong sense of trend and a full sense of the technological future. A virtual dress in metallic silver is enough to make you gorgeous and stand out on social platforms. It has a strong impact, a sense of the future, and a sense of metal. The silver-plated material also adds more possibilities to the virtual fashion fantasy, not only wearing clothes but also wearing fantasy (Figure 37).

Figure 37

Avant-garde Silver-style Virtual Clothing

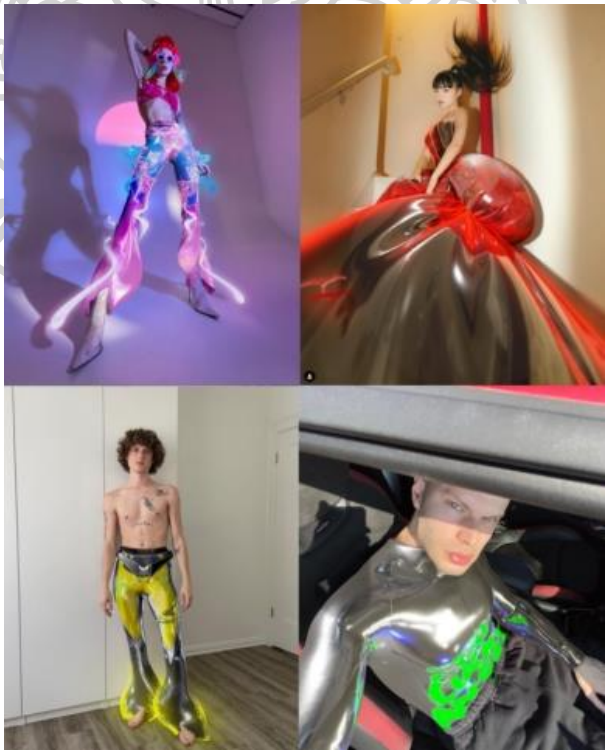
Note. Image sourced from the brand Seronine Lab. Summarized by the ISUX (2022).

2. Neon Jelly style + Swell Color

The stunning neon colors, futuristic bright materials, jelly-like shape, and flowing large lines all elements bring the fashionable atmosphere to the full, producing a cyberpunk-style blockbuster (ISUX, 2022). Because of its strong futuristic style and stunning colors, it is enough to bring many fans (Figure 38).

Figure 38

Neon Jelly Style + Swell Color Style Virtual Clothing



Note. Image sourced from the brand Tribute-brand. Summarized by the ISUX (2022).

3. Air-filled Cotton

Like the Neon jelly style + swell color style, it is also a bright color, but the soft and swollen volume sense is the difference. Practicality is not necessarily required; it can completely exist as an independent artwork. The alternative visual effects brought by costumes on different media make the display of costumes more interesting and diverse (ISUX, 2022) (Figure 39).

Figure 39

Air-filled Cotton Style Virtual Clothing

Note. Image sourced from Bai Wuchang PSC4D Studio. Summarized by the ISUX (2022).

4. Human-computer integration

The human-computer integration style refers to breaking the boundaries between humans and machines, abandoning all external definitions, and presenting the symbiosis between humans and machines. Its deeper significance lies in allowing life to continue for a longer time. This also reflects, to some extent, human's further exploration of foreignness and technology. As shown in the ANNAKIKI Fall/Winter 2022 Collection, the designer drew inspiration from the science fiction movie "Alita", inspired by the heroine Alita, who has a mechanical body, and felt the significance of cyborgs to humans (ISUX, 2022) (Figure 40).

Figure 40

Human-computer Integration Style Virtual Clothing

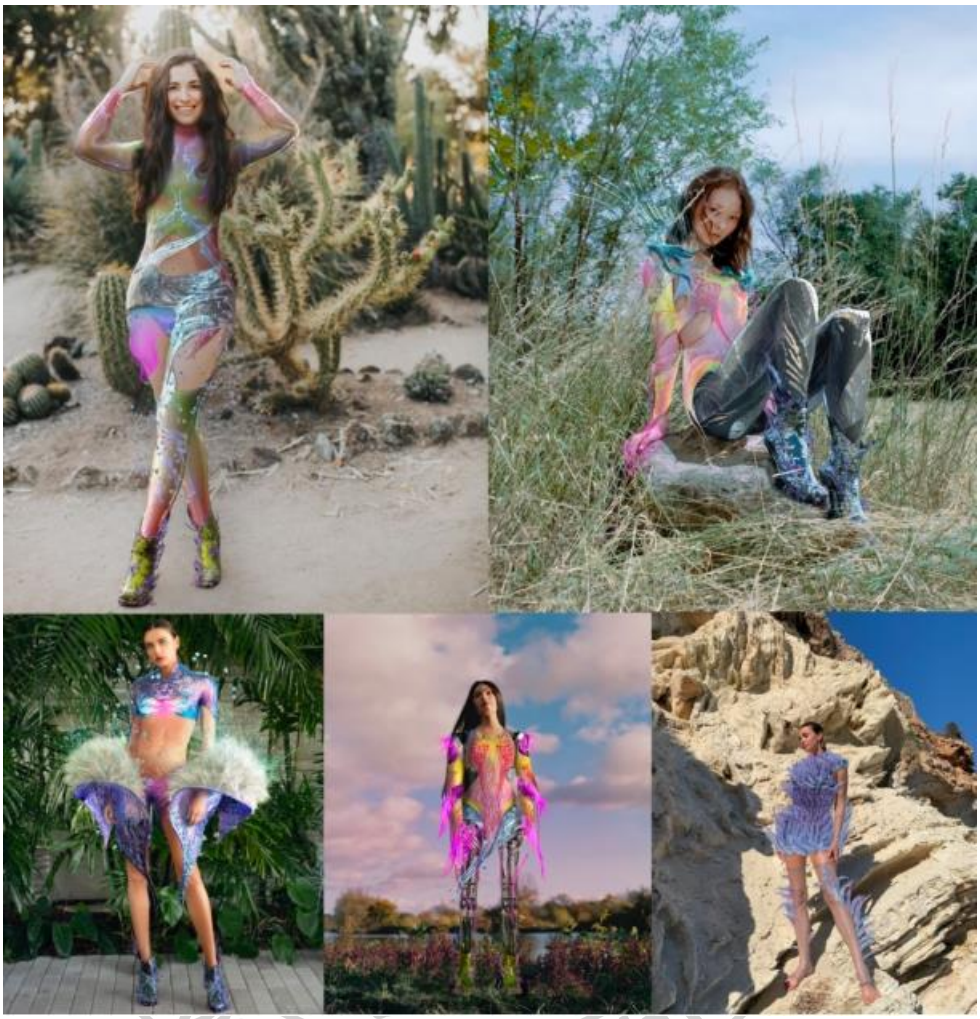
Note. Image sourced from the brand ANNAKIKI Fall/Winter 2022 Collection. Summarized by the ISUX (2022).

5. Bionics

"Biomimicry" is a very vivid and imaginative digital fashion that is interactive and can bring a world full of imagination. Many "Biomimicry" designers like to use scientific thinking to apply advanced technology to their own fashion world, not only to express "beauty" but also to explore nature and species in a new way (ISUX, 2022). Sometimes, it expresses an observation of life, and sometimes, it expresses an attitude towards life status (Figure 41).

Figure 41

Bionics-style Virtual Clothing



Note. Image sourced from the brand AUROBOROS. Summarized by the ISUX (2022).

6. Dynamic Cross-dressing

Tired of the same texture? Virtual clothing breaks the material and challenges the static and boring clothes. The image below is an ordinary shirt that is instantly burned by flames, but the clothes do not cause any burns to the person. The first virtual jacket designed by the virtual fashion brand RTFKT, the METAJACKET, is a top-level puffer jacket with mechanical animated ears and cuffs, a dynamic screen, and a power-levitation necklace. The first jacket designed by RTFKT sold for $125,000 (ISUX, 2022) (Figure 42).

Figure 42

Dynamic Cross-dressing Style Virtual Clothing

Note. Image sourced from the brand RTFKT. Summarized by the ISUX (2022).

7. Thorn & Cool

This style often features a virtual garment of thorns and spikes surrounding the body, expressing a kind of defensive posture against the dark world or a cooler attitude than the dark world (Figure 43). In addition, head-mounted virtual fashion with ear studs is also essential, playing with the element of thorns and spikes to create a cool and trendy style (ISUX, 2022) (Figure 44).

Figure 43

Thorn & Cool Style Virtual Clothing

Note. The image was sourced from the Seronine Lab and Davina India brands. Summarized by the ISUX (2022).

Figure 44

Thorn & Cool-style Virtual Accessories

Note. Image sourced from the Dressx platform and Sunwanw brand. Summarized by the ISUX (2022).

8. New Universe

The new universe style emphasizes the relationship between people and the environment. Through virtual dressing and virtual image settings, it allows people to have a stronger sense of experience and immersion. For example, ADIDAS Originals created a new digital experience of the Ozworld series, where the outline of Ozweego recreated the design elements of the late 1990s and early 2000s. During the event experience, players can choose their favorite OZ dress and generate a unique personalized image. There are about 1 billion combinations of different fluid bodies in the new universe, and all players can freely obtain their virtual image character (ISUX, 2022). After generating, they can experience interactive dressing, enter the virtual world, and become a member of the show (Figure 45).

Figure 45

New Universe-style Virtual Clothing

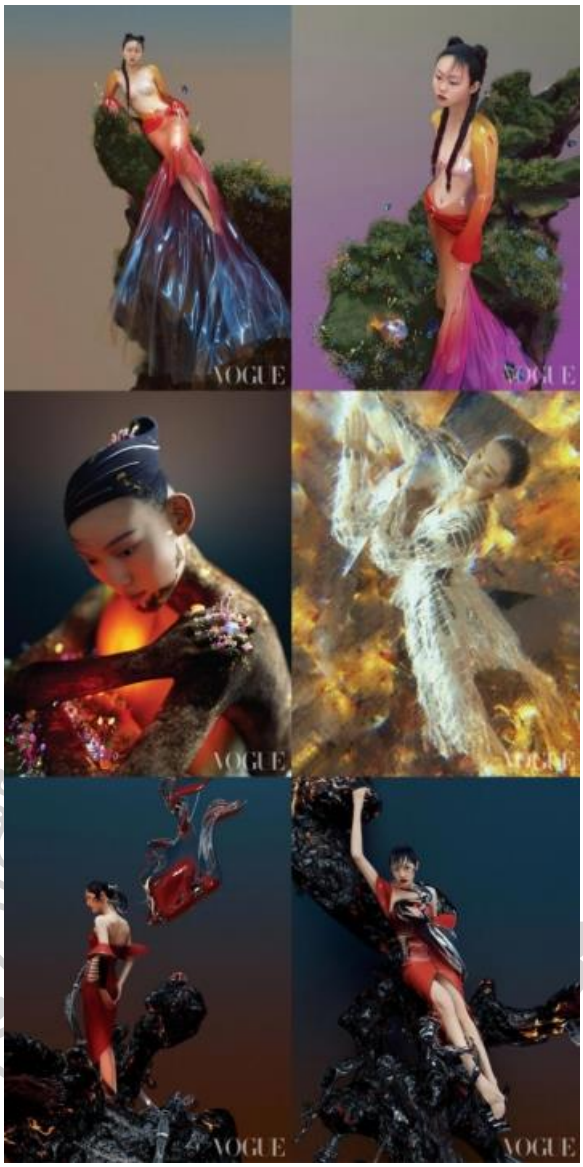
Note. Image sourced from the brand ADIDAS. Summarized by the ISUX (2022).

9. Future & Oriental

The future and oriental style is no longer just an abstract future style or an elegant oriental classical style. It refers to a new realm where everything tends to be virtualized and completely detached from the past definition of costume under the fusion of oriental aesthetics. In this new realm, the oriental classical aesthetics can convey a new aesthetic image through costume as a carrier. This image can be both traditional and dreamy or classical and futuristic. In this multi-dimensional fusion, a new experience of cultural interpretation is born. With these thoughts, Vogue especially takes the new season design of five Chinese designers as inspiration and combines the traditional five elements theory to jointly outline the future world of fashion (Figure 46).

Figure 46

Future & Oriental Style Virtual Clothing



Note. Image sourced from the VOGUE. Summarized by the ISUX (2022).

2.5.3THE COMBINATION OF VIRTUAL CLOTHING AND CULTURE

When exploring the integration of virtual clothing and culture, the researcher must consider from two dimensions: on the one hand, how to deeply explore and accurately capture the core elements of traditional culture in virtual clothing; on the other hand, how to combine these elements with modern design techniques and concepts to bring users novel experiences.

1. Capture and display traditional cultural elements.

Virtual clothing provides an unparalleled platform for capturing and presenting cultural elements. In the digital realm, everything can be accurately replicated and

simulated, whether it is ancient fabric textures, unique patterns, or complex decorations. For example, virtual clothing can simulate the physical characteristics and visual effects of various materials such as silk, satin, cotton, and linen. Furthermore, traditional handicrafts such as batik, embroidery, and tie-dyeing can also be displayed in virtual space, allowing audiences to understand various production processes better.

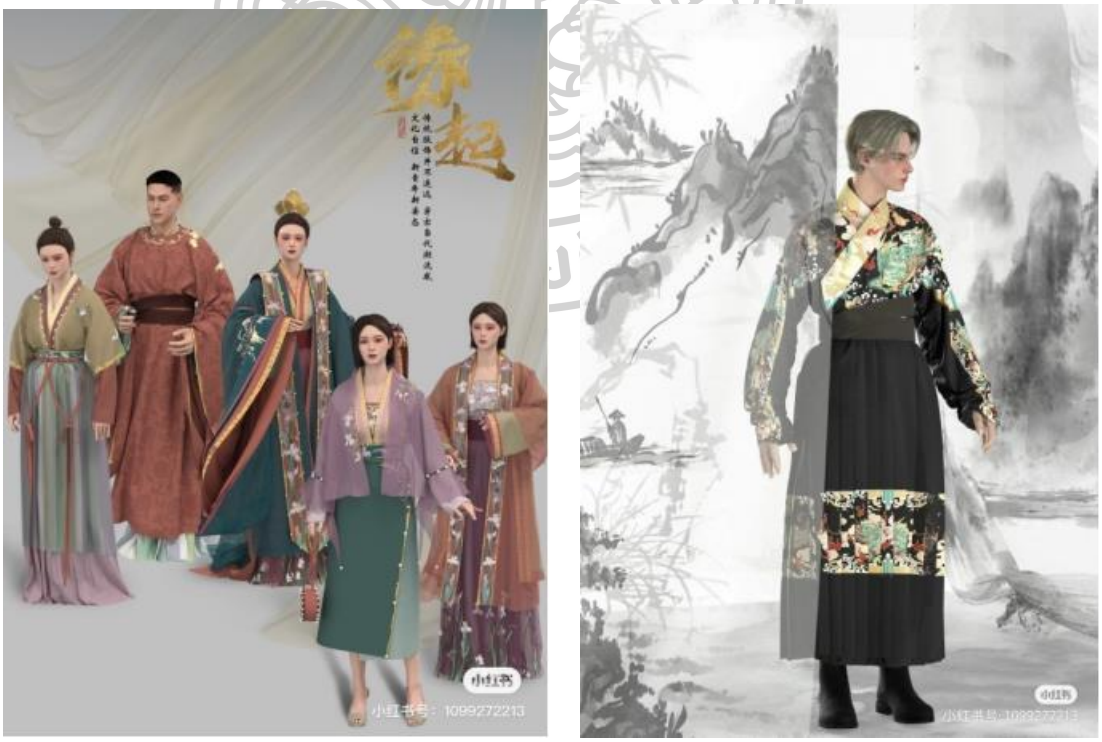
In addition, traditional costumes often contain profound cultural and historical information. For example, certain patterns and colors may be associated with specific myths, legends, or historical events. Virtual clothing can provide a new platform for these symbols, allowing them to resonate with modern audiences across time and space.

2. Innovate traditional cultural elements.

Virtual technology preserves cultural traditions and allows designers to innovate with traditional cultural elements freely. Traditional elements can be seamlessly combined with modern design concepts in the virtual world. For example, daily streetwear can be combined with ancient Hanfu elements to produce an ancient and modern design style (Figure 47). In addition, in the virtual environment, users can directly interact with costumes to experience different cultural backgrounds and stories. This interactivity provides users with a deeper and richer cultural experience.

Figure 47

Innovative Virtual Hanfu Costumes



Note. Image sourced from the Xiaohongshu, ID: wjw96983, 2022.

3. Performance and user acceptance under different cultural backgrounds.

In order to better promote virtual clothing, it is particularly crucial to understand the needs and acceptance of users from different cultural backgrounds. In some cultures, there may be some conservative views about the combination of tradition and virtuality, believing that this combination may damage the purity of traditional culture. This innovative combination may be seen as a new art form and cultural development in other cultures. In order to meet the needs of different regions and cultures, designers may need to consider localized design strategies to ensure that virtual clothing is in line with the cultural and aesthetic beliefs of the target market.

Overall, virtual clothing brings infinite possibilities for cultural experience, but in practice, it is also necessary to fully consider cultural differences and the real needs of users.

2.5.4 THE VALUE OF VIRTUAL CLOTHING IN CULTURAL EXPERIENCE

Virtual clothing is a novel design and display tool and has profound value in cultural experience. From strengthening cultural heritage to providing immersive cultural experiences to promoting cultural innovation, virtual clothing has demonstrated its importance in cultural experience in many ways.

1. Provide users with new and in-depth cultural experiences.
    1) Immersive experience: Traditional costume display methods, such as museums and fashion shows, can showcase the beauty of costume, but it is difficult to provide a truly immersive experience for the audience. In a virtual environment, viewers can personally "wear" these clothes and experience their texture, craftsmanship, and related cultural stories, resulting in a more authentic and in-depth experience.
    2) Interactivity: Unlike traditional display methods, virtual clothing provides users with more interactivity. Users can freely choose, try on, adjust, and customize virtual clothing, allowing them to understand and experience cultural elements more deeply.
2. Importance in cultural inheritance and innovation
    1) Inheritance of history and culture: Many traditional handicrafts and technologies have gradually disappeared in modern society. Virtual clothing technology can simulate these traditional crafts, ensuring their preservation and inheritance to future generations.
    2) Bridge role: Virtual clothing can serve as a bridge to connect the past and present, traditional and modern. It provides a platform for designers to freely integrate traditional cultural elements and modern design concepts, resulting in new design and cultural experiences.
    3) Encourage innovation: Introducing traditional elements provides infinite inspiration for virtual clothing design. Designers can innovate and

experiment on this basis, combining traditional elements with modern technology and concepts to create unprecedented novel designs.

2.5.5 FUTURE PROSPECTS OF VIRTUAL CLOTHING

With the rapid development of technology, virtual clothing has become increasingly influential in the fields of fashion and cultural experience. In the future, it will continue to shape how the researcher understands, experiences, and innovates culture. Here are some perspectives on the future of virtual clothing:

1. Further development and integration of technology.
    1) More realistic simulation: With the continuous advancement of virtual reality and augmented reality technology, virtual clothing in the future will be more realistic and detailed. Everything from texture, gloss, and dynamic effects will be nearly real.
    2) Multi-sensory experience: Beyond vision, future technologies may also introduce multi-sensory experiences such as hearing, smell, and touch, allowing the wearer not only to see but also to feel the real touch and other related experiences of virtual clothing.
2. Broader application areas.
    1) Education and training: Virtual clothing can be used for entertainment, display, and training. For example, designers and students can learn and simulate ancient costume skills and cultural backgrounds through virtual environments.
    2) Film and entertainment industry: With the increasing demand for realism in the film and game industries, virtual clothing may appear more frequently in these fields, providing audiences with a more shocking visual experience.
3. Challenges and possible solutions.
    1) The collision of technology and culture: ensuring that while pursuing technological progress, the researcher does not lose the depth and authenticity of culture is a continuous challenge. Solving this problem requires close cooperation between designers, technicians, and cultural researchers.
    2) Popularity and acceptance: Although virtual clothing has gradually become known, its popularity worldwide still needs improvement. Further publicity, education, and cultural exchanges are needed to allow more people to accept and experience virtual clothing.

2.6 ENHANCEMENT OF AUDIENCE CULTURAL EXPERIENCE UNDER THE INTERVENTION OF DIGITAL MEDIA

2.6.1 IMPORTANCE AND SIGNIFICANCE

In the digital age, combining traditional costumes and modern technology is an innovative attempt and an important means to inherit and promote traditional culture. As the International Council of Museums emphasized, modern exhibition spaces should be open to the public, inclusive, and promote diversity (Giannini & Bowen, 2019). The display of traditional costumes in digital media manifests this concept (Yue Wu et al., 2022). Through the effective collaboration of media, audiences, exhibitions, and experiences, the digital design of traditional costumes makes full use of the technological advantages and advanced design concepts of social development, creates a good digital experience for audiences, and promotes the improvement of their cultural cognition (Wu & Liang, 2023). Digital media technology has unique technological advantages, which can fully stimulate the audience's vision, hearing, touch, taste, and smell, providing a full-dimensional cultural experience of traditional costumes for the audience (Portalés et al., 2018). Digital media technology can break through the limitations of time and space, providing audiences with new cultural experiences anytime and anywhere through a new digital display format. The information interaction of digital media breaks through the traditional one-way information transmission mode of traditional display, and the audience can achieve two-way or even multi-directional information exchange under the support of digital media technology (Poulopoulos & Wallace, 2022). At the current stage of human social development, digital media technology can fully play the educational and propaganda functions of cultural relics and culture, stimulate the audience's interest, and create technical support for improving their cultural cognition (Poulopoulos & Wallace, 2022).

1. The traditional costume culture experience in the digital age has shifted from being centered on "things" to being centered on "people".

Digital media technology provides a new technological means for the cultural experience of traditional costumes, bringing a new form of display and experience and elevating the audience's digital experience and cultural cognition to an unprecedented new height. As the main body of traditional costumes cultural experience, the audience participates in the cultural experience design of traditional costumes together with the media, display, and experience links in the digital design of traditional costumes. The cultural experience of traditional costumes is no longer just a passive understanding of its "material" form but is more focused on the active experience and interaction of "people" (Giannini & Bowen, 2019).

2. The cultural experience of traditional costumes in the digital age is more focused on the comprehensiveness of the experience.

Different from the traditional experience that emphasizes academic and one-way dissemination of information, the traditional costumes culture experience under the intervention of digital media pays more attention to the participation and interaction of the audience, emphasizing the improvement of the audience's cognition in the process (Jonauskaite et al., 2024). In the digital age, people have more opportunities and ways to deeply understand, experience, and inherit traditional costume culture. People can easily understand the history and stories behind various traditional costumes through the Internet and social media. Through online communities, they can also share experiences and knowledge with other people interested in traditional costumes. However, these experiences require the audience to acquire through different channels and methods, making improving the comprehensive cultural experience difficult (Shin & Westland, 2017). Through the comprehensive design of digitalization, starting from different ways of traditional costumes and cultural experience, advancing from the four levels of perception, knowledge, experience, and cognition, thoroughly stimulating the interest of the audience, using the exciting and interactive design of the display to stimulate the participation and interaction of the audience, achieving the purpose of active exploration and active learning of the audience, and achieving the goal of enhancing the audience's cognition.

3. Cultural experience enhancement has become an important evaluation criterion for the digital design of traditional costumes.

The critical evaluation criterion for the digital design of traditional costumes is the cultural experience of the audience. Traditional costume experiences focus on objects, with evaluation criteria revolving around these objects. However, digital design shifts this focus to audience participation and interaction. It emphasizes the audience's active exploration and learning during their visit. It highlights their emotions, attention, inspiration, and perception throughout the participation process, thus creating a conducive learning environment for them (Pantano, 2011).

2.6.2 AUDIENCE DEMAND IN THE DIGITAL AGE

The audience in the digital age has new demands and expectations for cultural experience and costume display, and the intervention of digital technology meets these demands, forming a two-way interactive relationship (McGuinness, 2016).

A rising demand for personalized and interactive cultural experiences is noticeable in today's digital age. Modern technologies, such as virtual, augmented, and immersive media, are revolutionizing how audiences interact with traditional costumes and cultural displays (McGuinness, 2016). Digital technology allows exhibits to offer tailored experiences that cater to each visitor's specific interests and needs, thus enhancing engagement and understanding through a more personalized approach. Moreover, these technological advancements facilitate a multi-sensory experience, enabling audiences to explore the nuances of traditional costumes through

sight, sound, and touch (Wee, 2016, 2017). These contents enrich the cultural display and deepen the emotional connection to the heritage.

Digital media technologies are tearing down the barriers of time and space that once restricted access to cultural exhibitions. Now, audiences worldwide can access digitized traditional costume exhibitions anytime and from anywhere, making culture more accessible to those who may not have the chance to visit museums or heritage sites in person. When digital platforms integrate with social media, they enhance the cultural experience by promoting interactivity and social sharing (Mason & Vavoula, 2021). This digital environment encourages users to share their findings, engage with online cultural communities, and delve into traditional costumes' history, production process, and cultural significance. This further deepens their understanding and appreciation of cultural heritage.

In summary, audiences in the digital age are no longer just receivers of culture; they want to participate and contribute to culture. Digital media technology meets these new needs, making the display of traditional costumes more attractive and educational while enriching the audience's cultural experience. In the digital age, the digital display of traditional costumes helps to meet the evolving needs of audiences and enables broader and deeper cultural heritage and appreciation.

2.6.3 WAYS TO ENHANCE THE CULTURAL EXPERIENCE OF THE AUDIENCE

In the digital age, to enhance the audience's experience of traditional costume culture with the intervention of digital media, various methods, and strategies must be adopted to ensure that they can deeply participate in and enjoy the cultural value of traditional costumes.

1. Virtual reality and augmented reality display: Virtual reality (VR) and augmented reality (AR) technologies can provide immersive cultural experiences for audiences. Through VR headsets, audiences can travel back in time and immerse themselves in ancient scenes, experiencing the charm of traditional costumes firsthand.AR technology can overlay digital information onto the real world, providing real-time information about costume history and design and allowing audiences to understand the culture more deeply.
2. Interactive displays and immersive experiences: Digital media can create interactive displays that allow the audience to participate actively. Touchscreens, gesture recognition, and voice interaction technologies allow the audience to independently explore the elements and stories behind traditional costumes. Immersive experiences include cultural performances such as music, dance, and drama, allowing the audience to experience the vitality of culture better.

3. Digital archives and multimedia exhibitions: Digital technology can provide multimedia exhibitions for traditional costumes, including video, audio, and images. These exhibitions can explain costumes' history, uses, and production processes in-depth. Digital archives also help preserve cultural heritage and ensure its transmission.
4. Online communities and engagement platforms: Establishing online communities and engagement platforms is key to promoting cultural exchange and interaction. Audiences can share their cultural discoveries and exchange opinions and questions with each other, thereby forming a space for discussing culture together. This kind of Internet community helps connect people worldwide who are interested in traditional costumes.
5. Digital exhibitions and collaborations: Digital media also provides museums and cultural institutions with new ways to display traditional costumes. Digital exhibitions can be launched online to attract global audiences. Collaborative projects can promote cultural exchanges between different institutions and provide a broader platform for the inheritance and display of costumes (Du Puis & Yamakawa, 2022).

In summary, the involvement of digital media not only enhances the cultural experience of audiences with traditional costumes but also brings more opportunities and challenges to museums, cultural institutions, and related industries. Combining strategies such as virtual reality, interactive displays, and online communities can achieve deep engagement among audiences and promote cultural heritage and exchange. Digital media technology has made important contributions to preserving and inheriting the cultural value of traditional costumes.

2.6.4 SUMMARY

In the evolving landscape of digital media interventions, the inheritance of traditional costumes and the enhancement of cultural experiences have embarked upon a new epoch. This fusion opens avenues for the proliferation of traditional garments and enriches cultural encounters for audiences and institutions alike. Traditional costumes serve as conduits of rich cultural heritage and historical narrative, emphasizing the importance of their preservation and dissemination. Through the advent of digital media technologies, a novel methodology for promoting and maintaining cultural diversity emerges, enabling broader dissemination of traditional attire and fostering a deeper appreciation for cultural heritage.

The digital age has ushered in a paradigm shift in audience engagement, with a growing demand for immersive cultural experiences. Digital media technologies cater to this evolving expectation by diversifying and intensifying the cultural encounters available to the public. Employing strategies like virtual reality, interactive displays, digital archives, and online communities not only enhances the cultural experience but also affords audiences a more profound understanding and appreciation of the

intrinsic value of traditional costumes. Such innovative approaches offer a dynamic and interactive platform for cultural education and appreciation, thereby meeting the intricate needs of modern audiences.

Moreover, integrating digital media in the documentation and exhibition of traditional costumes plays a pivotal role in the economic and social realms. It acts as a catalyst for the growth of cultural industries, facilitating cultural exchange and showcasing cultural diversity globally. Looking towards the future, the continuous advancement in digital media technologies, including virtual reality, artificial intelligence, and online education, promises further revolutionizing the digital manifestation and preservation of traditional costumes. This ongoing development is anticipated to enrich cultural experiences significantly and fortify the bond between individuals and their cultural heritage. Consequently, the role of digital media in cultural inheritance and innovation is set to enrich people's cultural lives and continue fostering global cultural interaction and diversity.

2.7 CHAPTER SUMMARY

This chapter explores the important role of costume in the Jin Dynasty in the context of history, culture, and technology, highlighting its unique value in ancient Chinese history and culture. This chapter presents a rich and colorful costume era through a comprehensive analysis of the historical evolution, characteristics, and relationship between costume and cultural experience in the Jin Dynasty. At the same time, blending contemporary technology, especially digital and virtual technology, with traditional costumes allows us to re-examine and experience this historical period from a new perspective. It is mainly explained from the following six aspects:

Part I: A review of the costume of the Jin Dynasty. This part first reveals the historical background of the costume of the Jin Dynasty and its importance in contemporary research. By exploring the diversity and regional characteristics of the costume of the Jin Dynasty, the researcher learns that the costume of this period not only reflects the political, economic, and cultural characteristics of the Jin Dynasty but serves as an important window for future generations to study history and culture.

Part II: The core of cultural experience. This part further elaborates on the definition, models, current research status, and challenges of cultural experience. Combining experience design and cultural elements is the key to enhancing audience participation and experience depth.

Part III: The blending of traditional costumes and cultural experience. This part focuses on the role of traditional costumes in shaping cultural experience. Traditional costume carries the connotation of culture and presents its cultural value in audience interactions.

Part IV: The combination of traditional costumes and digital technology. This part explores how traditional costumes can be combined with digital technology to

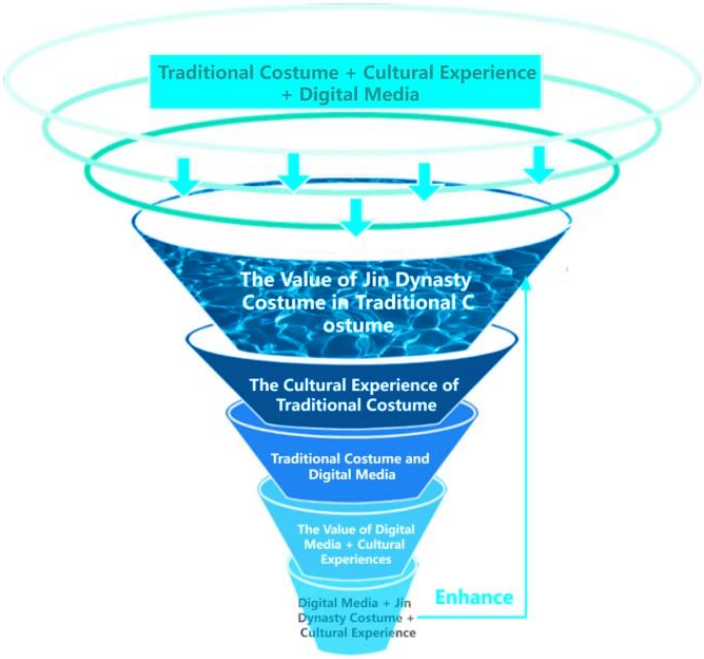
achieve the inheritance and innovation of traditional culture. Digital design allows traditional costumes to radiate new vitality in modern society.

Part V: The prospects of virtual clothing and cultural experience. This part breaks through tradition and conducts in-depth discussions on virtual clothing and cultural experience, revealing the enormous potential of virtual technology in promoting traditional culture and enhancing cultural experience.

Part VI: The enhancement of digital media on the cultural experience of audiences. This final part summarizes how digital media can help enhance the cultural experience of audiences, providing them with richer and deeper cultural experience opportunities.

Figure 48

Literature Review and Related Studies of Research Gap



Note. Produced and edited by the author.

Research Gap (Figure 48): While existing research has touched upon the amalgamation of traditional costumes, cultural experiences, and digital innovation, there remains a substantial gap in effectively harnessing digital for a genuine reinterpretation and showcasing of the Jin Dynasty's costumes, aiming to provide enriched and profound cultural engagements for contemporary viewers. Concurrently, a notable shortfall within the literature review needs to be revised to include the scant integration of user-centered design principles into digital repositories, particularly those dedicated to traditional costumes, limiting potent user engagement and the efficacy of digital platforms in preserving cultural heritage.

CHAPTER 3

RESEARCH METHODOLOGY AND PROCESS

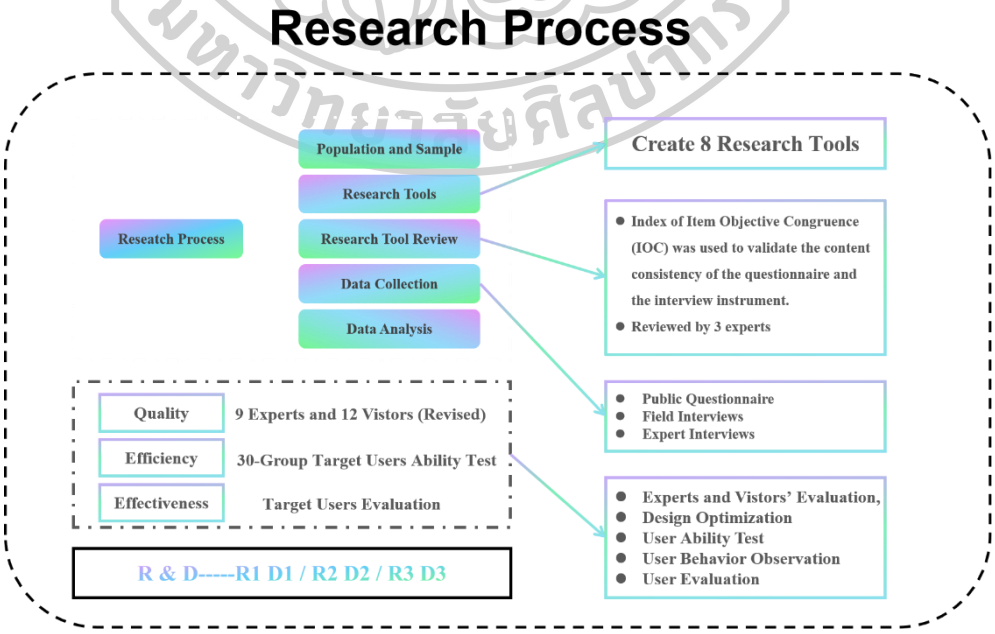
Enhance the traditional costume culture experience through digitalization.

" User-centered digital knowledge repository of Jin Dynasty costumes " is a research and development project and a digital product. The researcher designed the cultural experience of digitalized traditional costume through the following methods:

This study introduces the following methods to design a user-centered digital knowledge repository of Jin Dynasty costumes (Figure 49):

Population and Sample
Research Tools
Review of Research Tools
Data Collection
Data Analysis
Research Process

Figure 49
The Research Process



Note. Produced and edited by the author.

3.1 POPULATION AND SAMPLE

This research aimed to study the validity of the user-centered Jin Dynasty costumes digital knowledge repository. The samples for this research can be categorized into six groups as follows:

Group 1: The public who are interested in traditional costume

440 members of the public interested in traditional costumes. A questionnaire survey was conducted to understand the public's knowledge and demand for traditional costumes. The collected data was analyzed to construct and develop a user-centered digital knowledge repository for Jin Dynasty costumes.

Group 2: Relevant employees, visitors, and players in museums and theme parks

15 staff members, tourists, and players from museums and theme parks. Their ideas and opinions are understood and analyzed comprehensively through field research interviews. Moreover, conduct an intentional survey on the digitalized traditional costume culture experience model.

Group 3: Interviews with experts in related fields of this study

9 internationally recognized experts were selected by purposive sampling in the following fields: Historical research, costume design, digital technology, and new media art. This group provided crucial information for the researcher to design and develop a user-centered digital knowledge repository for Jin Dynasty costumes.

1. Expert Group 1: Historical Scholars, 3 people
    1) Ms. Li Yanhong, professor of the School of Art and Design at Huizhou University - expert in the study of costume history - expert in the study of the Jin Dynasty costume history.
    2) Ms. Zhang Xu, a three-level professor at Jilin University of the Arts, is an expert in studying art theory.
    3) Ms. Ke Yudan, Associate Professor of Guangdong Fashion Institute of Huizhou University - expert in the study of costume history.
2. Expert Group 2: Costume Design Experts, 3 people
    4) Mr. Qin Wenbao, Associate Professor, Department of Stage Art, National Academy of Chinese Theatre Arts - International Stage Costume Design Expert.
    5) Ms. Li Xiaoyu, Director of Costume Design at China Central Television - a rising Chinese fashion designer.
    6) Mr. Wang Zhihui, Associate Professor-Head of Department-senior fashion designer of the Department of Fashion and Apparel Design, School of Design, Jilin University of the Arts.
3. Expert Group 3: Digital and Technology Expert, 3 people
    7) Mr. Hong Qinzhen, General Manager of Huizhou Hongzhen Technology Co., Ltd., founder of the 3D virtual studio - digital art expert.

8) Ms. Liu Xushu, head of design at the Internet Business Department of Beijing Xiaomi Technology Co., Ltd., is a design expert and the leader of the Design Technology Committee.
9) Mr. Chen Ming, General Manager of Shenzhen HOTFUN Culture Communication Co., Ltd. - technology and new media art design expert.

Group 4: 109 visitors chose to experience the Digital Knowledge Base prototype through chance sampling

The group provided quantitative data on what happened after the prototype experience. The data collected was used to improve and develop a revised prototype.

Group 5: Evaluation experts provided improvement opinions and comments

9 internationally recognized experts were selected by purposive sampling in the following fields: Historical research, costume design, digital technology, and new media art. They evaluated and provided expert improvement opinions and comments on a prototype of the Jin Dynasty costume digital knowledge repository.

1. Expert Group 1: Historical Scholars, 3 people
   1) Ms. Li Yanhong, professor of the School of Art and Design at Huizhou University - expert in the study of costume history - expert in the study of the Jin Dynasty costume history.
   2) Ms. Zhang Xu, a three-level professor at Jilin University of the Arts, is an expert in studying art theory.
   3) Ms. Ke Yudan, Associate Professor of Guangdong Fashion Institute of Huizhou University - expert in the study of costume history.
2. Expert Group 2: Costume Design Experts, 3 people
   4) Mr. Qin Wenbao, Associate Professor, Department of Stage Art, National Academy of Chinese Theatre Arts - International Stage Costume Design Expert.
   5) Ms. Li Xiaoyu, Director of Costume Design at China Central Television - a rising Chinese fashion designer.
   6) Mr. Wang Zhihui, Associate Professor-Head of Department-senior fashion designer of the Department of Fashion and Apparel Design, School of Design, Jilin University of the Arts.
3. Expert Group 3: Digital and Technology Expert, 3 people
   7) Ms. Liu Xushu, Design Supervisor - Design Expert - Design Technical Committee Leader, Internet Business Department, Beijing Xiaomi Technology Co., Ltd.
   8) Ms. Ma Mina, Product Director of the Product Department of OPPO (China) Smart Platform - Product Design Expert.
   9) Mr. Chen Ming, General Manager of Shenzhen HOTFUN Culture Communication Co., Ltd. - an expert in technology and new media art design.

Group 6: 30 groups of target users who participated in the revised Jin Dynasty costume digital knowledge repository prototype

The validity of the model was tested through voluntary sampling and comparative analysis between the pre-test and post-test of the target users using the digital knowledge repository prototype.

Group 7: 30 groups of target users who evaluated the revised Jin Dynasty costume digital knowledge repository prototype

The same group of users as the Sixth group. After testing the digital knowledge repository prototype, feedback and evaluation of the overall experience.

There were eight duplicate samples in Groups 3 and 5. These eight experts covered expertise in history, costume design, digital technology, and new media art. The researcher used these expert opinions to validate the results after experiencing the Jin Dynasty costume digital knowledge repository prototype and to compare them with the initial opinions they collected during the initial phase of the study.

3.2 RESEARCH TOOLS

3.2.1 RESEARCH INSTRUMENTS

How to create a user-centered digital knowledge repository of Jin Dynasty costumes as a learning tool for cultural experience. The researcher of digital products, who wanted to experience the costume culture of the Jin Dynasty, created questionnaires and interviews. The specific steps are as follows:

1. Create research tools based on artifacts
    1) Research and concepts related to the history and display of costume in the Jin Dynasty, as well as theoretical and research tools.
    2) Determine the scope and structure of the research tool to cover and comply with the assumptions given in the study.
    3) Draft research tools, seek advice from doctoral mentors, and check and correct them to meet research goals.
    4) Use research tools to make improvements based on the advice of the doctoral mentor.
    5) Check the accuracy of the content through three experts.

The IOC value and the questions created are consistent with the content (Appendix 4).

The researcher let the three experts consider, comment on, and score the tools needed for the research content. Specific rules are as follows:

+1 means ensuring consistency of issues

0 means it does not ensure consistency of questions

-1 means inconsistency in determining issues

The data analysis results show that the IOC value of the problem is 0.92, which is considered to be accurate. The three experts include:

1. Professor Wattana Jutavipard, Faculty of Digital Art, Rangsit University.
2. Miyoung Seo, Ph.D., Department of Product Design, Faculty of Fine-Applied Arts, Burapha University.

3. Associate Professor Kriangsak Khiaomang, Ph.D., Department of Product Design, Faculty of Fine-Applied Arts, Burapha University.

3.2.2 TOOLS FOR EVALUATING MODELS

Research tools used to collect data are divided into three types: interviews, questionnaires, behavioral observations, and evaluations. The details are as follows:

3.2.2.1 INTERVIEW

The interview about the digital experience of Jin Dynasty costume culture is divided into the following two parts:

Part 1: On-site interviews, mainly referring to interviews with relevant employees, visitors, and players in museums and theme parks.

Part 2: Expert interviews, mainly referring to interviews with relevant industry experts before the development and design process.

3.2.2.2 QUESTIONNAIRE

The questionnaire used in this study is divided into the following three parts:

1. Part 1: A questionnaire about the general situation of the respondents. This questionnaire is divided into four sections:
   1) General information issues focus on understanding visitors' basic information, including gender, age, and educational background.
   2) "Jin Dynasty costumes" issues, which mainly focus on visitors' preferences for traditional costumes and their understanding of Jin Dynasty costumes.
   3) "Digital experience" issues mainly include visitors' understanding and use of digital technology and their interest in digital experience.
   4) "Jin Dynasty costumes + Digital experience" issues mainly focus on understanding visitors' attitudes and preferences towards enhancing traditional costume culture experience through digital means and their design style preferences for developing digital products for the Jin Dynasty costume culture experience.
2. Part 2: A questionnaire about the tester's understanding of the costume of the Jin Dynasty before the test.
3. Part 3: A questionnaire about the tester's understanding of the costume of the Jin Dynasty after the test.

There are 5 levels of knowledge about testing digital artworks. Each level is as follows:

5 represents the highest level
4 represents the high-level
3 represents the medium-level
2 represents the low-level
1 represents the lowest level

3.2.2.3 BEHAVIOR OBSERVATION

This is a structured observation model that records users' perceptions of the role of digital works in the dissemination and experience of costume culture.

The digital works are manifested in the experience process, which is divided into the following two parts:

1. Part 1: Observe the level of user interest during the experience of digital works.
2. Part 2: Observe the degree of excitement of users when experiencing digital works.
3. Part 3: Observe whether the user's experience of digital works is smooth.
4. Part 4: Observe the length of time users spend experiencing digital works.
5. Part 5: Observe where users spend the longest time during their experience of digital works.

3.2.2.4 EVALUATION

The evaluation of digital products for experiencing the costume culture of the Jin Dynasty is divided into the following two parts:

1. Part 1: Expert evaluation mainly refers to the expert's suggestions and evaluation of the model development after the preliminary model development of the product's first version, and it is also the preparation for the development of the test model of the second version.
2. Part 2: User Evaluation mainly refers to the evaluation and suggestions of the test model by users after the testing of the second version of the test model and prepares for the development of the improved model of the third version.

There are five levels for the effect evaluation of digital artworks, and each level is as follows:

5 represents the highest level
4 represents the high-level
3 represents the medium-level
2 represents the low-level
1 represents the lowest level

3.3 REVIEW OF RESEARCH TOOLS

3.3.1 Selection and Design Rationale of Tools

The researcher has chosen questionnaires, interviews, behavioral observation, and assessments as the primary research tools in this study. These tools are selected based on their respective characteristics and applicability for capturing and analyzing data related to the digital knowledge repository of Jin Dynasty costumes.

1. Questionnaires provide an efficient means to collect a large amount of standardized data,
2. Interviews offer an opportunity to delve deeply into individual perspectives and experiences.
3. Behavioral observation helps me record and analyze users' reactions during the experience.
4. Assessment tools are used to collect feedback from experts and users on the model.

3.3.2 EVIDENCE OF TOOL EFFECTIVENESS

To ensure the effectiveness of the tools, the researcher meticulously designed the structure of the questionnaire and the interviews. The questionnaire was designed following a clear logical sequence, balancing both open-ended and closed-ended questions. The interviews employed a mix of structured and semi-structured methods, adapting to different types of respondents. The researcher also used the Index of Item Objective Congruence (IOC) to validate the consistency of the content of the questionnaire and interview tools. A total of eight tools were evaluated, with an average IOC of 0.92, demonstrating high consistency and reliability.

3.3.3 EXPERT REVIEW PROCESS

1. Preliminary Preparation

In the preliminary phase of the tool review, the researcher first obtained an introduction letter from the Faculty of Decorative Arts, Silpakorn University in Thailand, and sent the designed questionnaire tools to the review experts in advance.

2. Review

Phase I: The researcher first visited Burapha University, meeting Miyoung Seo, Ph.D., and Associate Professor Kriangsak Khiaomang, Ph.D., and submitted the introduction letter. Then, the researcher gave the two experts a detailed overview of the research tools and answered their questions during the review process. Subsequently, each reviewer individually scored each question using the research tools. The review process appears in Figure 50 and Figure 51 (Appendix 1) (Appendix 2).

Phase II: The researcher then visited Rangsit University, met with Professor Wattana Jutavipard, and submitted the introduction letter. The researcher provided a detailed overview of the research tools to Professor Wattana Jutavipard and addressed the questions raised by the professor. Subsequently, the reviewer individually scored each question using the research tools. The review process is shown in Figure 52 (Appendix 3).

Figure 50

The Process of IOC Review with Two Experts, Miyoung Seo, Ph.D., and Associate Professor Kriangsak Khiaomang, Ph.D.

Note. Photographed by the author, June 2023.

Figure 51

Group Photo of the IOC Review Team at Burapha University

Note. Photographed by the author, June 2023. A group photo of Assistant Professor Atithep Chaetnalao, Ph.D., Associate Professor Kriangsak Khiaomang, Ph.D., Miyoung Seo, Ph.D., Associate Professor Guo Jie, Ph.D., Ms. Zhang Siqi, Mr. Nie Fankai, and the author.

Figure 52

The Process of IOC Review with Professor Wattana Jutavipard

Note. Photographed by the author, July 2023.

3.3.4 COMPREHENSIVE EVALUATION AND ANALYSIS OF LIMITATIONS

In this section, I have comprehensively reviewed the selected research tools. Questionnaires, interviews, behavioral observations, and assessment tools were key in capturing and analyzing data related to the digitalized cultural experience of Jin dynasty costumes. Despite these tools being designed following a scientific logical sequence and validated for their effectiveness through expert review and Index of Item Objective Congruence (IOC) tests, there are still some limitations and challenges.

1. Questionnaire Survey: Although the questionnaire effectively collected a large amount of data, its standardized format may limit exploring participants' deeper experiences. Additionally, differences in participants' understanding of the questions could affect the consistency of the data.
2. Interviews: Interviews provide an opportunity for an in-depth understanding of individual perspectives but may be influenced by the subjectivity of both participants and the researcher. Moreover, the time and resource costs of conducting interviews may affect the breadth of the sample.
3. Behavioral Observation: Behavioral observation provides direct data on user experience, but the observational setting might affect the natural behavior of participants, and the observer's biases could impact the objectivity of the data.
4. Assessment Tools: Assessment tools helped collect feedback from experts and users, but this feedback might be influenced by their personal preferences and expectations, thus affecting the objectivity of the evaluations.

3.4 DATA COLLECTION

To collect information, the researcher performed the following steps:

3.4.1 COLLECTING DATA THROUGH ON-SITE INTERVIEWS

1) The researcher collected data from interviews with staff members at museums and theme parks.
2) The researcher collected data from interviews with visitors and players in museums and theme parks.

3.4.2 INTERVIEWING EXPERTS TO COLLECT DATA

1) The researcher applied for a certificate from the School of the Faculty of Decorative Arts, Silpakorn University in Thailand, and introduced myself.
2) The researcher collected data from all interviews. Take further research steps.

3.4.3 COLLECTING DATA USING QUESTIONNAIRES

1) The researcher collected questionnaire data from the visitor.
2) The researcher collected user questionnaires before experiencing the digital knowledge repository of Jin Dynasty costumes.
3) The researcher collected questionnaires from users who had experienced the digital knowledge repository of Jin Dynasty costumes.

3.4.4 DATA COLLECTION FOR EXPERT REVIEW

1) The researcher applied for a certificate from the School of the Faculty of Decorative Arts, Silpakorn University in Thailand, and introduced myself. requesting expert feedback on this research work.
2) The researcher collected data from all the experts included in the review.

3.4.5 COLLECTING DATA USING A BEHAVIORAL OBSERVATION MODEL

1) The researcher observed and recorded the audience behavior in the digital works of the Jin Dynasty costumes and collated and analyzed the data.

3.4.6 DATA COLLECTION FOR USER EXPERIENCE REVIEW OF DIGITAL PRODUCT USAGE

1) The researcher asked users to conduct experience reviews after experiencing the works to assess their feelings and feedback on the digital knowledge repository of Jin Dynasty costumes.

3.5 DATA ANALYSIS

The researcher conducted a categorical analysis based on the classifications in the research tools:

3.5.1 FACE-TO-FACE INTERVIEWS

The researcher used the information collected from the interviews to summarize the issues by analyzing themes (content analysis). This included three aspects: 1) The appropriateness of presenting Jin Dynasty costumes and digital technology, and 2) The combination of Jin Dynasty costume cultural history experience and digital technology.

3.5.2 QUESTIONNAIRE

The researcher analyzed the data collected from the questionnaire. The process involved several steps as follows:

1. Step 1: Checked the completeness of all survey responses.
2. Step 2: The first part of the questionnaire analyzed the respondents' condition information. Frequency and percentage values were used to discuss research findings.
3. Step 3: The second part of the questionnaire calculated information about the mean and standard deviation (S.D.) of participation in the digitized costume cultural experience. According to the Likert five-point scale calculation method, the answers to the questions were divided into five levels, represented by 1, 2, 3, 4, and 5, respectively. Users rated the items based on their feelings. Finally, the average score of all participants was calculated. The interpretation of scores for the five levels was as follows:
    1) 1.00-1.49 indicates that respondents Strongly Disagree
    2) 1.50-2.49 indicates that respondents Disagree
    3) 2.50-3.49 indicates that respondents Moderately Agree
    4) 3.50-4.49 indicates that respondents Agree
    5) 4.50-5.00 indicates that respondents Strongly Agree.
4. Step 4: The third part of the questionnaire consisted of open-ended questions about suggestions after experiencing the digitized Jin Dynasty costumes. This involved analyzing by synthesizing opinions with similar meanings and identifying their frequency.

3.5.3 BEHAVIORAL OBSERVATION FORM

The researcher used a behavioral observation questionnaire for analysis. The steps were as follows:

1. Checked the completeness of all behavioral observation responses.
2. The user observation chart consisted of 3 rating questions and 2 single-selected questions to observe users' performance during the experience. The rating questions used a Likert five-point scale, ranging from

1 to 5, where 1 represented the worst experience and 5 the best. The researcher used these single-selected questions to assess the length of experience and the most popular aspects among the users.

3.5.4 EXPERT REVIEW

The researcher analyzed the collected data. The steps were as follows:

1. Record the expert review process.
2. Summarize the opinions of the experts.
3. Summarize key points raised and discussed by the experts.

3.5.5 PRE- AND POST-DEMONSTRATION KNOWLEDGE ASSESSMENT TESTS

The researcher analyzed using a test. The steps are as follows:

1. Checked the completeness of each test answer.
2. After viewing the exhibit, calculate the scores' mean (average) and standard deviation (S.D.) first.

The method for multiple-choice questions: Users' feelings were divided into five levels, represented by 1, 2, 3, 4, and 5. Users rated the items based on their feelings. Finally, the average score of all participants was calculated. The scores of the pre-test questionnaire and post-test questionnaire were compared to assess the participants' experience.

3.5.6 USER EVALUATION

The user evaluation is conducted based on Whitney Quesenbery's "5E" experience evaluation model (Effectiveness, Efficiency, Engagement, Ease to Use, Error Tolerance) (Quesenbery, 2004) and the analysis method of the Likert scale (Likert, 1932).

Evaluation Method: The user evaluation form used the Likert five-point scale for evaluation, setting each question's answer to five levels, from 1 to 5, based on the users' feelings during usage. The average score for each question was then calculated for assessment. A score above 3 indicated that the user feedback was positive. A score below 3 suggested that the user feedback was not favorable.

3.6 RESEARCH PROCESS

This section introduced the research process. The researcher divided the research process into 3 stages as follows:

1. Phase I study

The development process of the Jin Dynasty costume culture experience model for digital media art was as follows:

1) Researched relevant theoretical concepts and academic papers, conducted field investigations and interview analysis, and

comprehensively analyzed the elements and steps of the digital knowledge repository of the Jin Dynasty costumes culture experience prototype.

2) Obtained suggestions through expert interviews. Created a suitability evaluation form and drafted a preliminary model. The draft model's applicability using the Index of Item Objective Congruence. Interviewed nine experts in related disciplines to understand the elements of Jin Dynasty costume culture experience design and the creation of digital works, using open-ended questions to gain insights into how digital media art could enhance visitors' cultural experience of Jin Dynasty costumes. Then, the researcher used descriptive analysis methods to summarize the experts' suggestions.

3) Obtained data from analytical research and integrated relevant elements to develop the first version of the preliminary prototype. Outlined a prototype that enhanced the cultural experience of Jin Dynasty costumes through the digital knowledge repository, then designed and presented it.

2. Phase II Study

The expert evaluation of the first version of the digital knowledge repository of the Jin Dynasty costumes culture experience preliminary prototype followed the procedure below:

1) Allowed experts to experience the first version of the preliminary prototype.

2) Experts conducted a validity evaluation of the first version of the preliminary prototype and provided feedback on improvements.

Then, the researcher scientifically analyzed the expert evaluations and improved the preliminary prototype, presenting the second version of the test prototype.

3. Phase III Study

The user testing of the digital knowledge repository of the Jin Dynasty costumes culture experience preliminary prototype was as follows:

1) The researcher conducted a test on the second version of the test prototype with 30 target users.

2) The researcher set the questions as questions about pre-test and post-test experience feelings and evaluated the experience feelings through a 5-point Likert scale.

3) The researcher ensured consistency in the questionnaire content before and after the test to examine the differences in the user's feelings before and after experiencing the prototype as a way to validate the prototype.

4) During the testing period, the researcher used behavioral observation tools to collect information displayed by target users during the experience process.

4. Phase IV Study

The user evaluation of the testing prototype of the digital knowledge repository of the Jin Dynasty costumes culture experience, version 2, was as follows:

1) After testing and collecting information from 30 target users, the target user group was asked to complete an evaluation questionnaire to obtain further suggestions for improving the second version of the testing prototype.
2) The improved prototype was presented through scientific analysis of user evaluations and further improvement of the second version of the testing prototype.

CHAPTER 4

RESEARCH AND DEVELOPMENT OF THE DIGITAL KNOWLEDGE REPOSITORY OF THE JIN DYNASTY

4.1 RELATED THEORIES

This study combines many theoretical frameworks to create a knowledge repository of Jin Dynasty costumes. It aims to investigate the digital cultural experience of Jin Dynasty costumes, which represents a new and innovative technique in the field of traditional costume research.

1. The "4E" experience model developed by Pine and Gilmore.

The "4E" experience model, developed by Pine and Gilmore, had a substantial impact on forming the functional modules of the digital cultural experience product. The "4E" model was used to guide the design of this study, ensuring that the construction of a digital knowledge repository of Jin Dynasty costumes would be informative, immersive, emotionally engaging, and aesthetically pleasing (Pine & Gilmore, 1998).

2. Application of situation theory in contextual design

Situated cognition theory plays a crucial role in shaping digital information design. This methodology enables the research to generate visually captivating visuals and develop content featuring narrative-like characters and settings, providing viewers with a deep comprehension of the cultural and historical importance of the Jin Dynasty costumes (Beyer & Holtzblatt, 1999).

3. Theory of User Experience Elements by Garrett

Garrett's approach provided direction for the comprehensive planning and execution of this study's digital knowledge repository. His emphasis on user-centered design helped ensure that the digital experience is intuitive, easy to use, and engaging, enhancing the cultural experience for a broader audience (Garrett, 2000).

4. Evaluation using Quesenbery's 5E model

In the final evaluation phase, Quesenbery's model provided a comprehensive perspective for assessing the effectiveness of the digital experience. This evaluation focused on the digital knowledge repository's performance in user engagement, effectiveness, and efficiency, ensuring that it achieves its intended impact on user experience and cultural education (Quesenbery, 2004).

4.2 CURRENT STATUS AND CHALLENGES OF JIN DYNASTY COSTUMES

4.2.1 FIELDWORK

4.2.1.1 PREPARATION

Before conducting field research, the researcher himself collected and read a large amount of information and literature through online media and the China CNKI academic journal website. In addition, there are few relevant works and materials. Currently, there are two comprehensive works on the costumes of the Jin Dynasty on the market: one is written by Li Yanhong and published by China Textile Press in 2017, titled Regional Research on the National Costumes of the Jin Dynasty (Li, 2017); the other is written by Zhao Pingchun and Chi Benyi and published by the Cultural Relics Press in 1998, titled Costumes of the Jin Dynasty: Research on the Costumes Unearthed from the Tombs of Kings of Jin and Qi (Zhao & Chi, 1998). to a certain extent, gave the author a deeper understanding of the main cultural relics of Jin Dynasty clothing, and provided a strong empirical reference for the later design. However, the second book focuses more on the archaeological research of unearthed cultural relics and does not provide much reference for the author to understand the generalization of Jin Dynasty costumes comprehensively.

The regional study of ethnic costumes in the Jin Dynasty, written by Li (2017), mainly explores the regional characteristics of ethnic costumes in the Jin Dynasty. Firstly, it divides the ethnic composition of other ethnic regimes that were contemporary with the Jin Dynasty and the development of various ethnic groups in the Jin Dynasty and explored the cultural exchanges between the Jurchen and various ethnic groups. Secondly, it analyzes the costume system of the Jin Dynasty and the costume characteristics of the Jurchen, Han, and Khitai ethnic groups. It compares the costume systems of the Liao, Song, and Jin Dynasties to analyze further the characteristics of the development of ethnic costumes in the Jin Dynasty. Thirdly, it divides the costumes of the Jin Dynasty into regions and then analyzes the characteristics and development of ethnic costumes in each region. This book provides a comprehensive overview of the characteristics, changes, and development of costumes in the Jin Dynasty, which is of great help for the researcher to understand the relevant knowledge of costumes in the Jin Dynasty in the early stage.

According to the records of this book, the national costumes of the Jin Dynasty were divided into regions (Li, 2017). The Jurchens of the Jin Dynasty were mainly concentrated in the Jinyuan region in the northeast, which included the Shangjing Circuit (including the vast area of the Heilongjiang River Basin and the lower reaches of the Songhua River), the Beijing Circuit, and part of the Dongjing Circuit. It covered a vast area, including parts of Heilongjiang Province, Jilin Province, Liaoning Province, Inner Mongolia Autonomous Region, the vast area of Russia north of Heilongjiang, and parts of North Korea east of the Yalu River. In the 1980s and 1990s, with the emphasis on ancient costumes in China, some achievements were made in studying Jurchen costumes. Many Jin Dynasty tombs were unearthed in China, and

these cultural relics were mainly preserved in the birthplace of the Jin Dynasty, which is today's several major museums in Harbin, Heilongjiang Province. Therefore, it pointed out a clear direction for the following selected fieldwork.

4.2.1.2 SELECTED SITES

The destinations of this investigation are mainly divided into two directions. One is the investigation of historical monuments and cultural relics, mainly focusing on museums; the other is the investigation of the Jin Dynasty historical theme park, mainly focusing on the inheritance and modern application of Jin Dynasty costumes.

1. Heilongjiang Provincial Museum

The Heilongjiang Provincial Museum is a national first-class museum dedicated to collecting, preserving, and exhibiting the history, culture, natural resources, and art of Heilongjiang Province (Liping, 2005). The museum began in the early 20th century, with the opening of the Middle East Railway when a group of Russian historical scholars came to Harbin and proposed its establishment. The museum has a collection of more than 630,000 pieces, covering multiple fields such as history, nature, art, and literature. In particular, precious cultural relics related to the Jin Dynasty, such as the bronze dragon sitting on the throne of the Jin Dynasty, the landscape and figure story mirror, the seal of the Huli'ga Road, and the stone carving flying sky, all show the cultural integration of multiple ethnic groups and regions in China. In addition, the silk costume unearthed from the tomb of the Jin Dynasty's King of the Northern, Ma Wang Dui, is a valuable supplement to the history of costume in the Jin Dynasty. Therefore, the Heilongjiang Provincial Museum has special value in investigating and researching costume culture during the Jin Dynasty (Figure 53).

Figure 53

Museum of Heilongjiang Province

Note. Photographed by the author, August 2023.

2. Jin Dynasty History Museum

The Jin Dynasty History Museum is the only museum in China that collects and exhibits cultural relics from the Jin Dynasty. It has a collection of 3,016 cultural relics (sets), including 28 first-class cultural relics, 137 second-class cultural relics, and 953 third-class cultural relics. It has nine exhibition halls for basic exhibitions. The exhibition displays the political, economic, cultural, military, and developmental history of the Jin Dynasty with detailed pictures, textual materials, and precious historical relics. The collection of cultural relics gathers the essence of cultural relics in the Jin Shangjing area, including production and living utensils, combat weapons, court ritual vessels, official seals, religious instruments, gold and silver ornaments, etc., of the Jin Dynasty. The main collections can be divided into stone, jade, pottery, porcelain, bronze, ancient calligraphy and painting, and other various collections. The museum has 9 exhibition halls, showing the political, economic, cultural, military, and development history of the Jin Dynasty through pictures, textual materials, and historical relics, such as the bronze dragon on the emperor's imperial carriage, the round bronze mirror with the king of double carp pattern, the treasure of the world's monetary history, the silver ingot of "Cheng'an Baohuo", and a large number of cultural relics unearthed from the tomb of the king of Qi in the "Northern Mawangdui" (Museum, n.d.). The Jin Shangjing History Museum has distinctive regional, ethnic, and contemporary characteristics, and it is of indispensable value and significance for the preliminary field investigation and research on the current status of the Jin Dynasty costume culture experience in this article (Figure 54).

Figure 54

Jin Dynasty History Museum

Note. Photographed by the author, August 2023.

3. DA JIN GUCHENG

Da Jin Gucheng is an ancient city. It is a "tourism and performing arts valley" built by the Super League Group. There are four performing arts theaters indoors and outdoors, ensuring exciting performances throughout the year (News, 2024). This scenic spot focuses on marching performances and uses the unique "early Jin Dynasty" architecture as a backdrop. Through the fusion and innovation of art, the ancient city takes you into the history of the Jin Dynasty. It allows visitors to experience the combination of tourism and performing arts culture deeply. Its concept is: "Architecture is the form, and performing arts are the soul." The design inspiration for the ancient city comes from the book "The First Capital of the Jin Dynasty," which describes the daily life of the Jurchen ethnic group in the northern part of the Jin Dynasty. Here, visitors can see the authentic restoration of the architecture, tribal culture, village culture, shaman culture, emperor village culture, and urban market of the early Jin Dynasty. Visiting the ancient city is like shuttling back to the Jin Dynasty, truly realizing the feeling of "traveling for a day and crossing a thousand years" (Figure 55).

Figure 55

Jin Dynasty Theme Park

Note. Photographed by the author, August 2023. A group photo of Ms. Zhang Siqi, Mr. Nie Fankai, and the author.

4.2.1.3 VISIT TO THE MUSEUM OF HEILONGJIANG PROVINCE

1. The researcher observed the display content:

The researcher made observations during the visit. Upon entering the Heilongjiang Provincial Museum, the first thing to catch the observer's attention in the museum's first-floor central hall is this collection of one of the museum's top ten treasures: the silk costume from the tomb of the King of Qi in the Jin Dynasty. Artisans made this costume from brown-colored silk, featuring a yellow silk lining and a middle layer of silk wool. The silk robe's style includes a collar, narrow sleeves, a left lapel, and no button loops. The excavation of this silk costume relic offers valuable insights into the Song and Jin Dynasties' reeling technology, textile techniques, printing and dyeing processes, and types of looms, bridging the gap in the study of Chinese costume history due to a lack of Jin Dynasty costumes. It marks the most crucial discovery in China's archaeological study of the Jin Dynasty. Unfortunately, the Heilongjiang Provincial Museum displays only one piece of Jin Dynasty costume, with no other costume products unearthed from the tomb of the King of Qi in the Jin Dynasty. Additionally, the only displayed piece of the Jin Dynasty costume is a replica due to the museum's efforts to protect and maintain the authentic pieces. Thus, despite the strong regional and ethnic characteristics of the Jin Dynasty costume displayed in the Heilongjiang Provincial Museum, the exhibit types remain relatively limited (Figure 56).

Figure 56

Researcher Visit to the Museum of Heilongjiang Province

Note. Photographed by the author, August 2023.

2. The researcher observed the display form:

The researcher made observations during the visit. The display of silk costumes and accessories from the tomb of the Qi King in the Jin Dynasty combines physical and video displays. The physical display mainly involves placing the costume artifacts in a glass cabinet. In contrast, the physical exhibit accompanies the video display; a TV is installed on the side, which plays a stop-motion animation video specially narrated for the costume artifact. The content of the video mainly focuses on restoring the use scene of the costume artifact at that time, using stop-motion animation puppet-wearing effect models to explain the details of the costume. To a certain extent, the auxiliary video display adds a small quantity of cultural experience to the silent physical exhibit in the glass cabinet (Figure 57).

Figure 57

Display Forms of Jin Dynasty Costumes in the Museum of Heilongjiang Province

Note. Photographed by the author, August 2023.

3. The researcher observed the audience's response:

During the exhibition's observational study, the researcher noted that strategically placing costume relics in the central hall effectively captured most visitors' attention. Stop-motion animation video content slightly improved the attendees' viewing and learning experiences. However, the presentation's interactive elements needed to be improved, which reduced the viewers' interest in active exploration. This absence of interactivity made it challenging to keep visitors engaged for long periods, thus hindering the level of learning and understanding connected to the exhibited costume relics.

4.2.1.4 VISIT TO THE JIN DYNASTY HISTORY MUSEUM

1. The researcher observed the display content:

The researcher made observations during the visit. The Jin Dynasty History Museum is China's only professional exhibition hall with a Jinyuan culture theme. It is located in A-cheng District, Harbin City, Heilongjiang Province, China, where the site of the former capital of the Jin Dynasty, Shangjing Huining Prefecture, is located. The museum has two floors, including the ground floor and the basement. After several renovations and expansions, its design concept, the use of high technology, and multimedia assistance have all reached professional standards in China. Visiting the museum can provide a comprehensive understanding of the development process of the Jin Dynasty and Jinyuan culture and art, focusing on the historical evolution, economy, culture, transportation, and other developments of the Jin Dynasty in the area of Jin Shangjing from 1115 when the Jin Dynasty was founded to 1153 when the capital was moved. However, during the entire museum visit, only Qing Dynasty costumes, the cheongsam of the Republic of China, and the shamans' costumes were displayed. There was almost no physical exhibit of costumes of the Jin Dynasty (Figure 58) (Figure 59) (Figure 60).

Figure 58

Costumes of the Qing Dynasty on Display at the Jin Dynasty History Museum

Note. Photographed by the author, August 2023.

Figure 59

Republic of China Cheongsam on Display at Jin Dynasty History Museum

Note. Photographed by the author, August 2023.

Figure 60

Shaman's Costumes on Display at the Jin Dynasty History Museum

Note. Photographed by the author, August 2023.

2. The researcher observed the display form:

The researcher observed during the visit that the display form of costume in the Jin Dynasty History Museum is divided into physical display and digital experience. Among them, the physical display mainly displays not the traditional costume of the Jin Dynasty but some other costume relics related to the historical and cultural development of the Jin Dynasty. In addition, the digital experience is an exciting display form, which mainly combines a fixed screen device with an AR virtual dressing experience, allowing the audience to want to experience and interact during the visit actively. The main content of the interaction is about the armor of the Jin Dynasty (Figure 61). However, due to the relatively simple interactive experience, the digital experience only includes dressing up, and almost no cultural introduction related to armor exists. After the experience, the audience only wears a "virtual armor" once, without gaining more relevant knowledge.

Figure 61

Visitors Experienced Digital Dress-up with AR at the Jin Dynasty History Museum

Note. Photographed by the author, August 2023.

3. The researcher observed the audience's response:

The researcher made observations during the visit. Although the Jin Dynasty History Museum is the only professional exhibition hall in China with a theme of Jinyuan culture, there are almost no physical exhibits about Jin Dynasty costumes during the entire visit. Although the museum has made corresponding efforts in

digitalization, using the currently advanced AR dressing experience on the market has increased the audience's interest in the Jin Dynasty costume culture experience to a certain extent. However, due to the relatively single form of experience and the lack of corresponding physical exhibits and cultural explanations, there are areas for improvement in the depth and dimension of the experience.

4.2.1.5 STUDY OF CULTURAL THEME PARKS

1. Activities and Exhibitions:

Da Jin GuCheng is currently the only historical theme park in China with the theme of the Jin Dynasty history. Walking into the scenic spot, one can see that the early Jin Dynasty's history creates the overall atmosphere. As a historical theme park, the Jin Dynasty costumes are essential. In addition to actors wearing Jin Dynasty costumes for various performances, the scenic spot also provides Jin Dynasty costumes for experience and try-on. Overall, the scenic spot wants to create a sense of "time travel" through this multi-sensory cultural experience, allowing visitors to immerse themselves in the scenic spot from the visual, auditory, and tactile dimensions (Figure 62).

Figure 62

A Visitor was Dressed in Jin Dynasty Costume at the Jin Dynasty History Theme Park

Note. Photographed by the author, August 2023.

2. Tour Experience:

Throughout the entire tour, the researcher observed that the Jin Dynasty costume experience in the scenic area mainly fell into the following two categories: From the observation of multiple performances, although the types of costume worn by the actors were diverse, there was a mixed bag of both historical costumes related to the Jin Dynasty theme and performing costume unrelated to the Jin Dynasty theme, such as Mongolian costume, Xinjiang Uyghur costume (Figure 63). In the Jin Dynasty costume experience pavilion, the costume styles for tourists to experience were also relatively mixed, including costumes from the Jin Dynasty, the Song Dynasty, and the Tang Dynasty, and the costume styles for trying on in the Jin Dynasty were also single, that is, only one style was changed with different fabrics. These are detrimental to the overall cultural output and theme atmosphere created by the Jin Dynasty historical theme park (Figure 64).

Figure 63

The Cluttered Performance Costumes in the Jin Dynasty Theme Park

Note. Photographed by the Da Jin GuCheng.

Figure 64

Topical of Jin Dynasty Costumes in the Jin Dynasty History Theme Park

Note. Photographed by the author, August 2023.

4.2.1.6 SUMMARIZING EXISTING FORMS OF CULTURAL EXPERIENCE IN FIELDWORK ON JIN DYNASTY COSTUMES

Based on comprehensive fieldwork, the researcher has gained an in-depth understanding and collected information and data on the current status of the display and perception of Jin Dynasty costumes through field visits to museums and cultural theme parks such as the Museum of Heilongjiang Provincial and the Jin Dynasty History Museum in China.

Table 3 shows that the researcher learned about Jin Dynasty costumes' existing experience modes and pain points through fieldwork. First, current forms of cultural relic display generally need more in-depth cultural interpretation and interactive experiences. While some venues have attempted to integrate digital experiences, these efforts often need to convey the rich cultural context of Jin Dynasty costumes adequately. In addition, although some theme parks provide the experience of Jin Dynasty costumes and try them on, they often need more knowledge transfer and cultural background explanation. Although this experience enhances the audience's interactivity, it still appears weak regarding in-depth cultural experience and cognition.

This section set the stage for subsequent user needs analysis and strategic development of digital solutions to enhance the experience of Jin Dynasty costume culture.

Table 3

Current Status and Challenges of Cultural Experience in Jin Dynasty Costumes

Location	Museum		Historical theme park
Program	Cultural Presentation	AR Digital Dressup	Authentic Costume Dressup
Photograph			
Content	Interpretation of culture by museum professionals	On-site professionals guide visitors to have a simple AR dress-up experience at the museum	Visitors to the History Theme Park have the experience of dressing up in authentic costumes on their own
Difficulty of Experience	N/A	▲▲	▲▲▲
Length of experience	0.5-1h	5-10min	2-5h
People who experience	No crowd restrictions	People with digital experience	Costume Lover
Experience Pain Point	The experience is relatively homogenous, with visits and learning only through listening and watching	Digital experience but lack of cultural knowledge and learning, lack of depth of experience	There is an authentic costume experience, but the styles are cluttered, and visitors are almost completely unaware of Jin Dynasty costume

* ▲: Difficulty level of the experience

Note. This table summarizes the current status and challenges of cultural experience in Jin Dynasty costumes. All images in the table are organized and collected by the author.

4.2.2 FIELD INTERVIEW AND ANALYSIS

To further understand the public's perceptions and needs for Jin Dynasty costume culture experiences, as well as perceptions of digital design in Jin Dynasty costume culture experiences, The researcher selected 15 museums and theme park staff, as well as visitors and players (Figure 65) (Figure 66), to conduct field interviews, which were carried out in the following two ways:

1. Semi-structured interview: Design a series of semi-open questions in advance by using the Index of Item Objective Congruence, and respondents were given enough freedom to share their perspectives during the interviews.
2. Focus group: Invite a few representative visitors for in-depth discussions to obtain feedback from multiple perspectives.

Figure 65

Interviews with Museum and Theme Park Staff

Note. Photographed by the author

Figure *66*

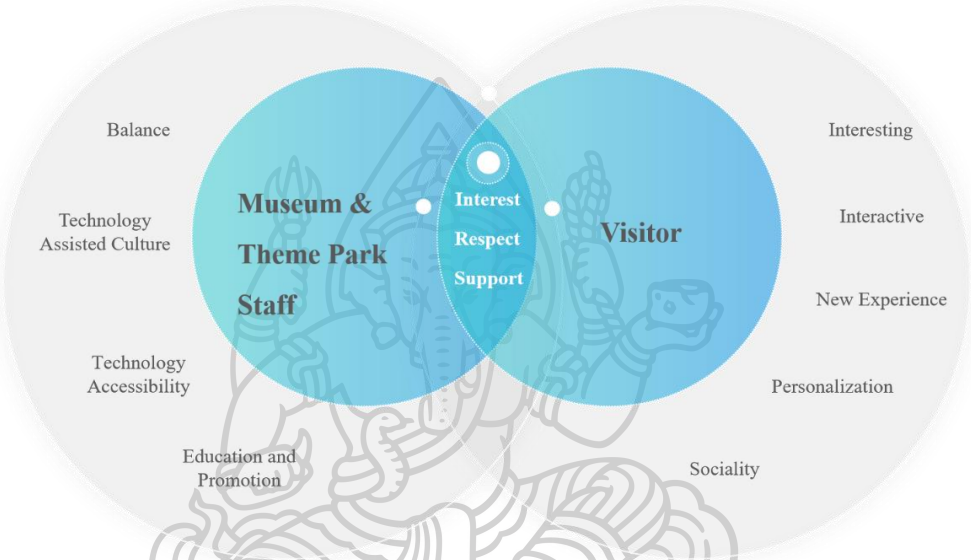
Interviews with Visitors and Players

Note. Photographed by the author.

Through in-depth interviews with museum and theme park staff, as well as visitors and players, the researcher analyzed and summarized the differences in their perceptions, needs analysis, and attitudes toward digitization, as shown in the following figure (Figure 67).

Figure 67

Field Interview Results and Analysis



Note. Produced and edited by the author.

1. Common points

Respect and interest: Both the Museum and theme park staff, as well as visitors and players, have shown interest and deep respect for Jin Dynasty costume culture, which is an obvious consensus that the historical and artistic value of Jin Dynasty costume culture has been generally recognized.

2. Differences

Differences in depth: The cultural understanding of visitors and players often stays on the surface and comes from simple media contacts, while the staff of museums and theme parks have professional backgrounds and more knowledge and understanding of culture.

Attitude towards exhibition forms: The museums and theme park staff want to meet the audience's experiential needs while ensuring the authenticity of cultural communication.

Attitudes towards new technologies: Visitors and players welcome new technologies and believe that they can enhance the visiting experience. Museum and

theme park staff are more interested in how technology can assist in the dissemination and presentation of culture.

4.3 CASE ANALYSIS OF CULTURAL EXPERIENCE DIGITAL PRODUCTS

Case analysis is a comparative analysis of the advantages and disadvantages of existing competitive products, and it is also an important part of strategic research. The case analysis of digital products for the Jin Dynasty costume culture experience has three purposes. First, comparing the positioning of traditional culture-based digital products on the market can avoid product homogenization. Second, drawing lessons from the past, the rich content of Jin Dynasty costume culture determines that its design process is a complex process full of detailed considerations. Through case analysis, the researcher can learn from experience, bring forth the new, and improve design efficiency. Third, through case analysis, the researcher can summarize the advantages and disadvantages of existing traditional culture-based digital product design, combine experience design and user experience theoretical models to improve design level, and provide a practical basis for Jin Dynasty costume culture experience digital product design.

4.3.1 CASE SELECTION

Choosing a product with similar core values is necessary to select a product that fits the research object for comparative analysis. Both should focus on the dissemination of culture and consider users' real demands. The user experience of the product should be put first. The main basis for case selection is the download volume, praise rate, and international influence of the same type of digital products. Using this as a clue to screen the cases, the selected cases will be preliminarily classified according to Pine and Gilmore's (4E) model of experience proposed by Pine and Gilmore (2011). They can be classified into the following four types of experience cases:

1. Cultural digital products for educational experience (Table 4)

Education experience is also an important way to experience culture. Users can feel knowledge and information through their own participation to satisfy their thirst for knowledge and enrich their understanding of traditional culture. See Figure 1."Mortise & Tenon" provides users with a wealth of information related to mortise and tenon craftsmanship through a series of detailed 3D animation materials, craftsman information, and communication communities; "Qing Dynasty Emperor's Costume" displays some of the crown clothes and accessories through exquisite 3D models, providing multi-angle, comprehensive and in-depth background knowledge, not only allowing users to appreciate the beauty of the crown clothes of the emperor, but also providing detailed analysis of the crown clothes system, production process, production cost, and the entire process from design proofing to wearing in the Qing Dynasty.

Table 4

Educational Experience Case Analysis

Case	Interfaces	Experience Mode	Experience content
Mortise & Tenon		Educational Experience	Users of knowledge are made more well-known through a variety of mortise and tenon video materials, artisans' information, communication networks, and other content. Realize you're learning and communication goals.
Qing Dynasty Emperor's Costume		Educational Experience	Users can enjoy the splendor and beauty of the emperor's crown and also analyze in detail the system of the Qing Dynasty's crown, the production process, the cost of production, and the entire process from the design of the prototype to the wearing of the body.

Note. This table summarizes the Educational Experience case analysis. All images in the table are screenshotted by the author in case.

2. Entertainment experience cultural digital products (Table 5)

Entertainment experience is the user's enjoyment of participating in gamified entertainment activities, achieving experiential effects through interactive participation, and immersing the user in deep-level perception and communication. See Figure 1." WOS U-THONG Kingdom" is a 3D game developed on mobile devices to enhance awareness of the ancient Thai city of U-Tong. U-Tong is one of the origins of Thai culture and creates a MOBA (multiplayer online battle

arena) game mode, allowing the public to enjoy the game while learning about the history and culture of U-Tong, especially for students looking for knowledge together. "TONG PAO" is a mobile application software themed on Hanfu culture. It is currently the most dynamic Hanfu social platform in the Hanfu circle. By weakening the direction of science popularization, it highlights the design of Hanfu, community communication, and registration for Hanfu activities, thus bringing a certain degree of entertainment and social experience to users.

Table 5

Entertainment Experience Case Analysis

Case	Interfaces	Experience Mode	Experience content
WOS U-THONG Kingdom		Entertainment Experience	This game is presented as a 3v3 MOBA with a map simulating the ancient city of U-Tong, which requires teamwork and understanding of the game to win. The game aims to spread knowledge of the U-Tong Ancient City, where players learn the history of the U-Tong Ancient City and promote the archaeological site through heroic stories.
Tong Pao		Entertainment Experience	By weakening the direction of science popularization, this APP highlights Hanfu design, community exchanges, and enrollment in Hanfu activities, thus bringing a certain entertainment experience to the users to a certain extent.

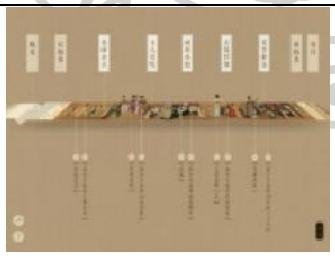
Note. This table summarizes the Entertainment Experience case analysis. All images in the table are screenshotted by the author in case.

3. Aesthetic experience cultural digital products (Table 6)

Aesthetic experience is also the most direct experience for users. Through visual participation, they can feel anticipation and pleasure for beautiful things and even have a sense of being there. Aesthetic experience can be based on the culture itself or the harmony and cleverness of the overall picture. Its main purpose is to make the whole experience process in a comfortable and natural environment, as shown in the figure. The Palace Museum's "Yinzhen's Beauties" and "The Night Revels of Han Xizai" combine ancient masterpieces with mobile media, using diversified interactive effects and sound effects to bring users ultimate visual enjoyment.

Table 6

Aesthetic Experience Case Analysis

Case	Interfaces	Experience Mode	Experience content
Yinzhen's Beauties		Esthetic Experience	Based on the original image of Yinzhen's beauty, the interfaces use Chinese colors and typography while also using excess movement from flowers, birds, and butterflies to create an aesthetic experience of traditional elegance and beauty.
The Night Revels of Han Xizai		Esthetic Experience	By displaying the entire Night Revels of Han Xizai to the user, clicking on the characters in the image causes real instrumental music to be restored, and its vivid character portraits are combined with classical sound effects to completely immerse the user in ancient paintings.

Note. This table summarizes the Esthetic Experience case analysis. All images in the table are screenshotted by author in case.

4. Cultural digital products for escapist experience (Table 7)

The experience of escaping from the world is when the user's psychological state is in a completely different environment from their daily life during the use of digital products, ultimately achieving a state of detachment from real life and merging with the environment they are experiencing to achieve spiritual liberation, as shown in Table 7. "Craftsman Wood" skillfully uses exquisite 3D rendering models to integrate the structure of mortise and tenon and highly realistic control sensations into the experience process, accompanied by realistic sound effects of cutting wood tools and natural bird sounds, falling flowers, and flowing water, allowing users to fully immerse themselves and even enter a flow state to achieve the effect of escaping from the world. "Folding Fan" from the Folk Art series also shows the production process and tools used for folding fans step by step through user interaction, with beautiful 3D models and fresh and natural background music allowing users to calm down and feel the beauty of traditional culture in their daily noisy living environment.

Table 7

Escapism Experience Case Analysis

Case	Interfaces	Experience Mode	Experience content
Jiang Mu		Escapism Experience	Because of the deft use of exquisite 3D rendering models, user interaction after triggering, accurate mortise and tenon joints, and a sense of control in the straightforward graphic introduction, along with real sound effects of cutting wood tools and the natural sound of birdsong, falling flowers, and running water, the user is completely immersed in it and even enters a state of flow to achieve the effect of escapism experience.

Folding Fan		Escapism Experience	The user may get calm enough to appreciate the beauty of traditional culture through interactive behavior, the step-by-step creation of the folding fan, the usage of tools, etc., beautiful 3D models, and fresh and natural background music.

Note. This table summarizes the Escapism Experience case analysis. All images in the table are screenshotted by the author in case.

4.3.2 CASE ANALYSIS

The content presented by cultural experience digital products directly affects users' perception of the cultural form. The richness of content in the summarized cultural experience digital products varies according to the different experience modes. For example, educational digital products mainly use text, pictures, and videos as the primary expression methods and do not use entertainment as the primary goal. Instead, they provide a profound and comprehensive interpretation of traditional culture, an essential tool for users to systematically understand and learn a specific traditional culture or skill. However, entertainment-oriented cultural experience digital products incorporate more story-based game plots or operational experiences, allowing users to form a preliminary understanding and interest in a particular traditional culture or craftsmanship in a fun and educational way to achieve the purpose of spreading culture or craftsmanship.

Table 8 shows the comparative analysis of the cases. From the perspective of frequency scores, the forms of presentation all use "Graphic" and "Sound" to visually display a particular traditional culture, and most of them use "3D Models" to present and reflect it, which also reflects the main presentation methods of cultural experience digital knowledge repository to some extent. Regarding product content, "History" and "Works" have become the focus of attention.

Table 8

Cultural Experience Digital Product Case Analysis

APPA		Mortise & Tenon	Qing Dynasty Emperor's Costume	WOS U-THONG Kingdom	Tong Pao	Yinzhen's Beauties	The Night Revels of Han	Jiang Mu	Folding Fan	Frequency
Topic		Mortise and Tenon	Emperor's Costume	Ancient City	Han Costume	Famous Painting	Famous Painting	Mortise and Tenon	Folding Fan	
Content Forms	Graphic	◉	◉	◉	◉	◉	◉	◉	◉	8
	Video				◉		◉			2
	3D Model	◉	◉	◉		◉	◉	◉	◉	7
	Game	◉		◉				◉	◉	4
	Sound	◉	◉	◉	◉	◉	◉	◉	◉	8
Main Contents	History	◉	◉	◉	◉	◉	◉	◉	◉	8
	Works	◉	◉		◉	◉	◉	◉	◉	7
	Technology	◉	◉					◉	◉	4
	Society				◉			◉		2

* ◉: Exhibit this characteristic

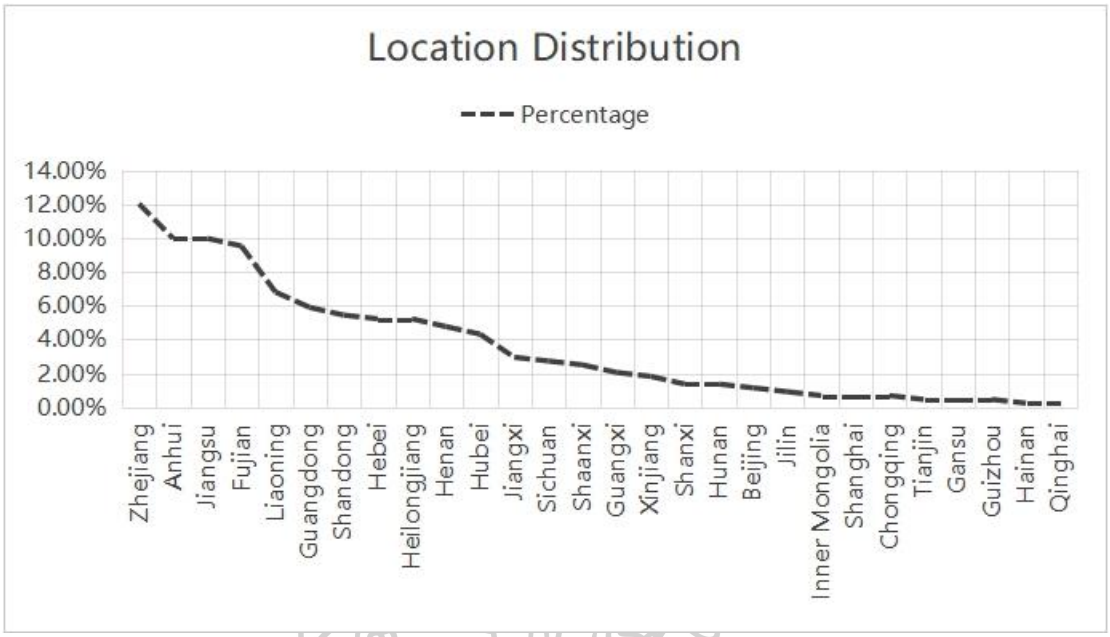
Note. This table summarizes the Cultural experience digital product case analysis.

4.4 PUBLIC KNOWLEDGE AND DEMAND FOR TRADITIONAL COSTUMES

The researcher visited many places in China, randomly issued 68 questionnaires, and distributed 432 questionnaires through online platforms, totaling 500 questionnaires. A total of 440 valid questionnaires were collected. The geographical distribution of the questionnaires includes most of the provinces in China, covering the southeast coast, northwest inland, and central regions, which matches the wide dissemination of cultural experience digital products to ensure the credibility and diversity of the questionnaire results (Figure 68). The main elements of the questionnaire are as follows:

Figure 68

Percentage of Regions where Questionnaires were Distributed



Note. Collected and edited by the author.

4.4.1 GENERAL INFORMATION ISSUES: GATHERS BASIC DEMOGRAPHIC DATA SUCH AS GENDER, AGE, AND EDUCATION LEVEL.

Table 9 shows that the target audience for the digital cultural experience of Jin Dynasty costumes is mainly women with a high level of education and an age range of 26 to 35 years old. This group may have a strong interest in history, culture, digital experiences, and a certain cognitive foundation. Therefore, when designing and promoting digital experiences related to Jin Dynasty costumes, it is important to focus on the characteristics and needs of this group while not neglecting potential users of other genders and age groups.

Table 9

General Information Profile

	Profile Variables		Frequency	Percentage
Gender	Male		176	40
	Female		256	58.18
	Other		5	1.1.4
	Prefer not to disclose		3	0.68
		Total	440	100
Age	Under 18 years old		31	7.05
	18-25 years old		69	15.68
	26-30 years old		119	27.05
	31-35 years old		99	22.5
	36-40 years old		58	13.18
	41-45 years old		31	7.05
	46-50 years old		20	4.55
	50 years old and above		13	2.95
		Total	440	100
Education Level	High school and below		80	18.18
	Junior college		128	29.09
	Bachelor degree		152	34.55
	Master degree		54	12.27
	Doctoral degree or above		26	5.91
		Total	440	100

* N = 440

Note. The authors counted the general information of the public in the 440 valid questionnaires received. The basic information of the public mainly contains gender, age, and education level.

4.4.2 RELEVANCE FACTORS FOR PUBLIC DEMAND

Table 10 shows that the relationship between age, education level, interest in traditional costumes, knowledge of Jin Dynasty costumes, and willingness to experience Jin Dynasty costume culture through digital technology. Through the Pearson product-moment correlation coefficient (PPMCC) (*SPSS TUTORIALS: PEARSON CORRELATION*, n.d.), we obtained the following analysis results:

Age showed a slight positive correlation ($r = 0.13$, $p < 0.01$) with education level, implying that there is a tendency for people's education level to increase as they get older in the population sample of this study. However, age had little effect on interest in traditional costumes ($r = -0.05$) and knowledge of Jin Dynasty costumes ($r = -0.04$), suggesting that the levels of interest and knowledge were roughly comparable across age groups. However, young people showed a stronger willingness to experience Jin Dynasty costume culture through digital technology ($r = -0.14$, $p < 0.01$), which may be related to their greater familiarity with and acceptance of new technologies.

The correlation between education level and interest in traditional costumes and perception of Jin Dynasty costumes, while present ($r = 0.06$ and $r = 0.03$, respectively), did not reach a significant level, which may mean that the more educated may be slightly more interested in traditional costumes.

Interest in traditional costumes significantly influenced perceptions of Jin Dynasty costumes ($r = 0.31$, $p < 0.01$), suggesting that the more people were interested in traditional costumes, the more they were inclined to learn about Jin Dynasty costumes. Similarly, this interest was positively correlated with the willingness to experience Jin Dynasty costume culture through digital technology ($r = 0.13$, $p < 0.05$).

Finally, there was a positive correlation between knowledge of Jin Dynasty costumes and willingness to experience Jin Dynasty costume culture through digital technology ($r = 0.15$, $p < 0.01$), suggesting that those who knew more about Jin Dynasty costumes were more likely to be willing to experience Jin Dynasty costume culture through digital technology.

In summary, there are complex relationships between age, education level, interest in traditional costumes, knowledge of Jin Dynasty costumes, and willingness to experience Jin Dynasty costume culture through digital technology. These relationships reveal the interplay between different factors and provide insights about promoting better and passing on Jin Dynasty costume culture. For example, considering the negative correlation between age and willingness to experience digital technology, we can consider developing more attractive digital technology experience programs for young people to promote their understanding of and interest in Jin Dynasty costume culture.

Table 10

Profile of Factors Related to Public Demand

Item	M	SD	Age	Education Level	Interest in Traditional Costumes	Knowledge of Jin Dynasty Costumes	Willingness to Experience Jin Dynasty Costume Culture Through Digital Technology
Age	3.73	1.66	1				
Education Level	2.59	1.1	0.13**	1			
Interest in Traditional Costumes	3.48	1.21	-0.05	0.06	1		
Knowledge of Jin Dynasty Costumes	2.45	1.17	-0.04	0.03	0.31**	1	
Willingness to Experience Jin Dynasty Costume Culture Through Digital Technology	3.86	1.12	-0.14**	-0.05	0.13**	0.15**	1

* p<0.05 ** p<0.01

Note. The authors generalized the public demand-related factors using Pearson product-moment correlation coefficient (PPMCC) analysis. In statistics, the PPMCC is a correlation coefficient that measures linear correlation between two data sets. It is the ratio between the covariance of two variables and the product of their standard deviations; thus, it is essentially a normalized measurement of the covariance, such

that the result always has a value between −1 and 1 (*SPSS TUTORIALS: PEARSON CORRELATION*).

4.4.3 RESULTS OF A QUESTIONNAIRE SURVEY ON PUBLIC PREFERENCES AND CONCERNS ABOUT DIGITAL KNOWLEDGE REPOSITORY APPLICATION FOR JIN DYNASTY COSTUMES

This study meticulously evaluates public engagement and preferences concerning applying a digital knowledge repository for Jin Dynasty costumes. Table 11 shows that the primary motivations driving public interest in traditional costumes include a robust sense of national identity, the allure of capturing aesthetically pleasing photographs, and a profound love for traditional culture, with scores indicating strong influences, particularly from national identity and photographic opportunities. These motivations underscore the cultural and aesthetic values that traditional costumes hold in contemporary settings. Moreover, the preferred channels for learning about Jin Dynasty costumes, historical theme park tours, internet searches, and museum exhibits highlight the varied and modern ways in which the public seeks to connect with historical attire, suggesting a blend of direct and digital engagement with cultural heritage. Furthermore, the study identifies a clear trend toward integrating digital technologies into traditional cultural experiences. Respondents express a significant inclination towards digital interactions, particularly during visits to historical sites and museums, suggesting an emerging demand for digital enhancements in traditional cultural settings. The functional needs for these digital experiences focus on more engaging content, enhanced interactivity, and a deeper educational understanding of the culture behind the costumes.

Table 11

Profile of Public Preferences for Digital Knowledge Repository Applications for Jin Dynasty Costumes

Question Type	The Main Factors	Data Results
Ranking	Public's Motivation	The three most important factors identified by the respondents as motivating them to wear traditional costumes were a sense of national identity (5.05), the ability to take a good picture (4.74), and a love of traditional culture (2.93).
	Current State	The three most important current channels respondents identified for learning about Jin Dynasty costumes were historical theme park tours (5.05), Internet searches (4.48), and museum exhibits or other cultural events (4.4).
	Digital Experience Needs	The three situations in which respondents felt they were most likely to digitize their cultural bodies were: historical theme park visits (3.31), museum visits (3.15), and city tours (3.02).
	Functional Needs	The top three factors' respondents cited as inspiring them to experience digital costumes were more interesting display content (4.1), more interactive experiences (3.87), and enhanced understanding of costume culture (3.75).
Multiple Choice	Art Style	The most popular art style for conducting virtual costume culture experiences with traditional costumes was identified by respondents as the traditional style, chosen by 323 people (73.41%), followed by the digital fantasy style (57.95%) and the minimalist surrealist style (37.05%).

* N = 440

Note. The authors collected public preferences for the digital knowledge repository application of Jin Dynasty costumes by means of four ranking questions and one multiple-choice question. These 5 questions corresponded to the following 5 factors: 1. Public's Motivation; 2. Current State; 3. Digital Experience Needs; 4. Functional Needs; 5. Art Style.

Additionally, the multiple-choice results show that respondents' aesthetic preferences are heavily skewed towards traditional styles, but there is also considerable interest in digital fantasy and minimalist surrealist styles. This indicates a diverse appetite for how digital technologies could be employed to reinterpret traditional costumes in ways that both preserve and innovate cultural expression. This points to a direction for the design style of the next digital knowledge repository of Jin Dynasty costumes.

4.5 DEVELOPMENT OF THE ART STYLE DRAFT VERSION

According to the preliminary researchers' study and analysis of the public's needs, the public is more inclined to choose traditional art styles. However, it is also interested in digital fantasy and minimalist surrealism. Therefore, the researcher developed the art-style draft.

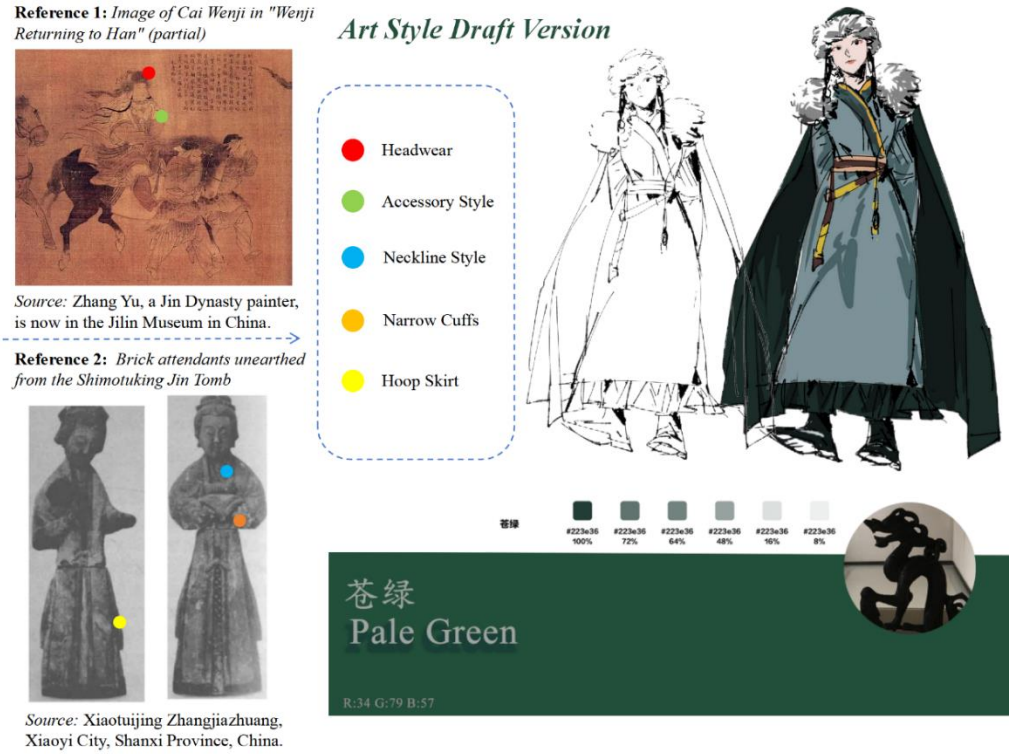
4.5.1 DESIGN THE FIRST DRAFT OF THE ART STYLE

Regarding styling, the researcher based on the literature review and fieldwork on Jin Dynasty costumes and synthesized and extracted the main features of Jin Dynasty costumes to design the first draft of the traditional style. As shown in Figure 69, the researcher did element extraction from five factors: headwear, accessory style, neckline style, narrow cuffs, and hoop skirt.

In terms of color, the author used pale green, a deep green, one of the traditional Chinese greens. The copper dragon, the imperial car decoration, represents culture in the history of the Jin Dynasty, representing a long and ancient history. Linking this cultural relic with pale green reflects the profound and far-reaching historical culture of the Jin Dynasty (Figure 69).

Figure 69

The Art Style Draft Version



Note. Created and edited by the author.

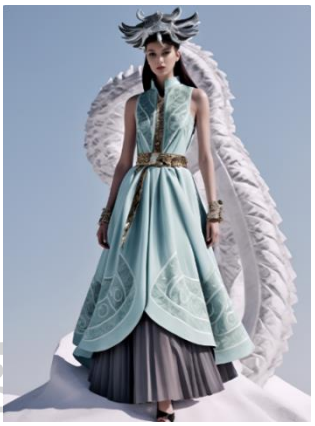
4.5.2 EXPERIMENTAL DEVELOPMENT OF DRAFT VERSIONS OF ART STYLES

Based on the generated art style draft, the researcher conducted experimental attempts at traditional, digital fantasy, and minimalist surrealist styles through AI tools. All three styles were selected based on the highest-ranked options from the user needs questionnaire in Table 11.

As shown in Table 12, the researcher implemented a series of art style experiments for each of the three styles through the drafts in Figure 69 using the AI tool (The AI tool here is CHIMER AI, which is an artificial intelligence tool specialized in fashion design. The website is: https://chimerai.cn/). These images, each in the context of the same theme, are derived from different artistic styles depending on the three styles.

Table 12

Experimentation with Art-style Draft Versions

Art Style		
Traditional Styles	Digital Fantasy Styles	Minimalist Surrealist Styles
		
		
		

Art Style		
Traditional Styles	Digital Fantasy Styles	Minimalist Surrealist Styles
		
		

Note. Using an AI tool, the authors experimented with draft versions of the public's choice of the top three ranked art styles. These three art styles are: 1. Traditional Styles; 2. Digital Fantasy Styles; 3. Minimalist Surrealist Styles.

4.6 EXPERT INTERVIEWS AND ANALYSIS

After developing experiments with draft versions of art styles, the researcher used the Index of Item Objective Congruence (IOC), and nine experts in related disciplines were interviewed to understand the elements of Jin Dynasty costume culture experience design and the creation of digital works (Figure 70). Using open-ended questions, they were asked how digital media art could enhance visitors' cultural experience of Jin Dynasty costumes. These nine experts represented three categories: 1. historical research experts, 2. costume design experts, and 3. technology and new media art experts. The expert interviews were divided into online and offline,

with an average interview time of 15-20 minutes. Table 13 shows that the details of the relevant interviews and analyses are provided below:

Figure 70

Interviews with Expert

Note. Photographed by the author. The photo depicts the author interviewing an expert on the history of Jin Dynasty costumes.

Table 13

Details and Analysis of Expert Interviews

Experts	Category	Field of Research	Summary Key Points
1	Historical Scholars	The professor is an expert in studying the costume history of the Jin Dynasty	1. Authenticity 2. Historical Accuracy 3. Interdisciplinary Cooperation
2		A three-level professor is an expert in studying art theory	
3		The Associate Professor is an expert in the study of costume history	

Experts	Category	Field of Research	Summary Key Points
4	Costume Design Experts	The associate professor is an expert in international stage costume design	1. Contextualization 2. Emotional Connection
5		Director of Costume Design is a rising Chinese fashion designer	
6		Associate Professor is an expert in clothing design	
7	Digital and Technology Experts	Director of Design at a famous tech company, UX design expert	1. User Center 2. Keep Improve
8		Technology company manager, digital design and technology expert	
9		The General Manager of the company is an expert in technology and new media art design	

Note. The authors collected *Details and Analysis of Expert Interviews* for the digital knowledge repository of Jin Dynasty costumes. These 5 questions corresponded to the following 5 factors: 1. Public's Motivation; 2. Current State; 3. Digital Experience Needs; 4. Functional Needs; 5. Art Style.

4.6.1 SUMMARY OF HISTORICAL SCHOLARS' INTERVIEWS

The interviews with historical scholars highlighted "Authenticity" and "Historical Accuracy" as central themes. The experts unanimously agreed that maintaining the authenticity of Jin Dynasty costumes is crucial for historical research and transmitting cultural heritage to modern and future societies. Authenticity here means a deep understanding of the characteristics, craftsmanship, and wearing occasions of Jin Dynasty costumes, as well as how these costumes reflect the social structure and cultural values of the time. Experts emphasized that while developing digital products, the latter should not be compromised despite the challenge of balancing modern aesthetic needs with historical accuracy. To achieve this, they advocate using scientific research methods and advanced technological tools such as

3D scanning and modeling, which can accurately restore every detail of the costumes, providing the public with a true cultural experience.

4.6.2 SUMMARY OF COSTUME DESIGN EXPERTS' INTERVIEWS

During the interviews with costume design experts, "Contextualization" and "Emotional Connection" were identified as core keywords. The experts emphasized the importance of traditional elements in contemporary society, noting that traditional costumes are carriers of cultural identity and history. When balancing traditional elements with modern fashion needs, experts suggest that traditional costumes must be "situated" within a framework that can tell stories and convey emotions, giving the costume a "soul." Their creative philosophy combines design with storytelling, allowing audiences to be naturally drawn into a story context and explore more history and culture. Experts also noted that the introduction of digital media represents a significant shift in the traditional costume design and production process, improving production efficiency and accuracy and providing innovative design and display methods.

4.6.3 SUMMARY OF DIGITAL AND TECHNOLOGY EXPERTS' INTERVIEWS

In interviews with digital and technology experts, "User Center" and "Continuous Improvement" were highlighted as core keywords. Experts pointed out that digital media has been widely applied in traditional costume displays and cultural experience projects, such as through virtual reality (VR) and augmented reality (AR) technologies, allowing audiences to experience Jin Dynasty costumes without temporal and spatial constraints. Additionally, while using digital media to display Jin Dynasty costumes, experts discussed achieving the goal of cultural dissemination and education. They suggested using storytelling and interactive content design to enhance the experience. If the target audience is younger, it is also necessary to consider incorporating popular digital peripheral products or personalized customization services. Experts expressed that design should be user-centered, meet the needs of different audiences, and continuously explore new user needs, combined with suitable new technologies, to provide users with the latest and most understandable cultural experience products.

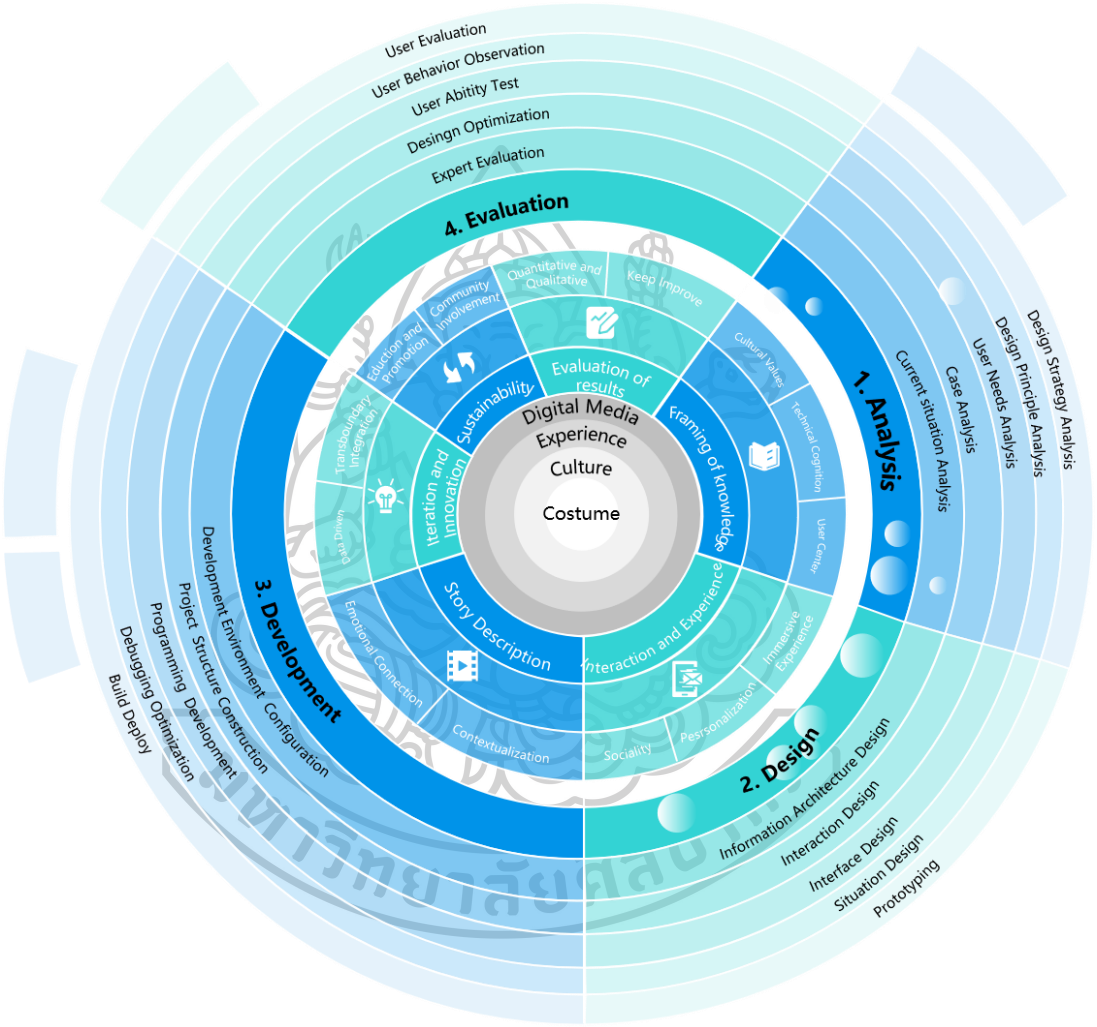
4.7 CREATION PROCESS OF THE DIGITAL REPOSITORY

This study presents a conceptual model that illustrates a comprehensive approach to creating a "user-centered digital knowledge repository for traditional costumes." Developed based on the insights gathered from expert interviews and the analysis of user data, this model integrates traditional costume culture with digital experiences in a user-centered manner. It aims to bridge the gap between historical authenticity and

modern digital interactivity, facilitating in-depth interaction with the audience and emphasizing their comprehensive, multi-dimensional experience and learning (Figure 71).

Figure 71

The Conceptual Model of a User-centered Digital Knowledge Repository for Traditional Costumes



Note. Produced and edited by the author.

4.7.1 LEVEL 1: THE CONCEPTUAL

The core of this conceptual model begins with understanding the intricate relationship between traditional costume, culture, digital media, and user experience. These four interconnected components are developed simultaneously through participatory methods that engage users in the cultural experience. The form and implementation may vary based on the specific attributes and requirements of the traditional costumes being represented.

4.7.2 LEVEL 2: THE FRAMEWORK

Framing of Knowledge: This stage embeds cultural values and technical cognition within the repository. It underscores the importance of a profound understanding of the cultural backgrounds and user needs, laying the groundwork for all subsequent design and interaction strategies.

Interaction and Experience: Emphasis is placed on creating immersive experiences that are personalized and shareable. This stage highlights how digital media can enhance user interaction and traditional culture, making the experience more engaging and meaningful.

Story Description: By utilizing storytelling techniques, the repository provides users with richer and deeper cultural narratives, facilitating a stronger emotional and contextual connection to the cultural artifacts.

Iteration and Innovation: Leveraging data-driven approaches and cross-disciplinary collaborations, this stage fosters continuous innovation and refinement of the repository, ensuring that the designs remain cutting-edge and practical.

Sustainability: The model promotes educational initiatives and community involvement to ensure cultural knowledge's enduring transmission and evolution.

Evaluation of Results: Both quantitative and qualitative methods are employed to continually assess and refine the effectiveness and quality of the interactive experiences provided by the repository.

4.7.3 LEVEL 3: THE DESIGN PROCESS

Analysis: A comprehensive analysis of the current cultural and digital landscape provides a solid foundation for all strategic design decisions, ensuring that they are relevant and effectively address user needs.

Design: This involves a detailed process covering information architecture, interaction design, interface design, situational construction, and prototyping, showcasing a methodical approach to digital repository development.

Development: The model details the complete development cycle from the configuration of the development environment to project construction, programming, debugging optimization, and deployment, ensuring a robust and user-friendly system.

Evaluation: Continuous evaluation mechanisms, including expert reviews, design optimizations, user ability tests, and behavior observations, are crucial for maintaining high design quality standards and user satisfaction.

By explaining the stages of the model, we can see how the conceptual model is a process of creating a digital knowledge repository of traditional costumes to build a thriving and multidimensional cultural experience. This approach aims to provide a comprehensive, interactive, and educational platform for a digital knowledge repository of Jin Dynasty costumes, enabling users to not only learn about Jin

Dynasty costumes but also to experience Jin Dynasty culture and history in-depth, contributing new insights to the field of digital humanities and costume studies.

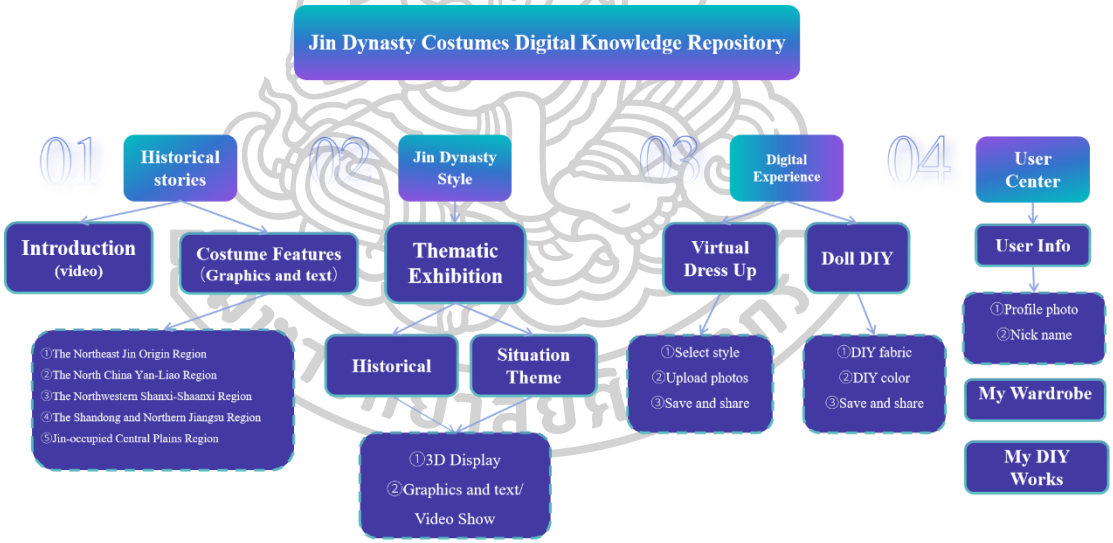
4.8 PROTOTYPING A USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY

4.8.1 INFORMATION ARCHITECTURE

The researcher created this information architecture diagram after the researcher's preliminary in-depth research, interviews, experiments, analysis, and summarization. The information architecture of the digital repository for Jin Dynasty costumes was strategically designed to offer a rich and interactive learning experience, integrating historical narratives, immersive thematic exhibitions, and engaging digital experiences (Figure 72).

Figure 72

Information Architecture for the Digital Knowledge Repository of Jin Dynasty Costumes



Note. Produced and edited by the author.

1. Historical Stories: This section addresses users' interest in historical depth and authenticity, as highlighted in expert interviews. It comprises two key components:
    1) Introduction: A video overview introducing the unique historical characteristics of Jin Dynasty costumes designed to captivate users and provide an intuitive learning experience.

2) Costume Features: Detailed visual and textual information about costumes from various regions, catering to users' curiosity about regional cultural characteristics and costume history.

2. Jin Dynasty Style: Reflecting users' preferences for interactive and immersive experiences, this section, "The Splendor of the Jin Dynasty," is divided into:
   1) Historical: With the theme of Jin Dynasty costumes unearthed from the tomb of the King of Qi in the Jin Dynasty, the researcher provided an immersive learning space to show the historical and cultural charm of Jin Dynasty costumes.
   2) Situation Theme: The researcher analyzed the suggestions from the preliminary expert interviews and the results of user needs, and with the support of the contextual design through situation theory, built different thematic scenarios by setting up the three critical elements of scene, story, and character, deepening the emotional connection with the users, and further promoting the exploration of Jin Dynasty costumes culture by the users.
3. Digital Experience: Through the analysis of user needs and field interviews, the main user groups in this study are young people aged 26–35. They all have high expectations for digital virtual dressing and, at the same time, pursue a personalized social experience. Therefore, the researcher set up the following two interactive experiences in this module:
   1) Virtual Dress-Up: Virtual Dressing allows users to experience the charm of traditional costume culture by allowing them to experience digital dressing.
   2) Doll DIY: This personalized experience is aimed at the target young users of this study, allowing users to DIY personalized dolls, encouraging creativity and participation, and providing the option to save and share their creations.
4. User Center: A personal space where users can manage their profiles, including avatars and nicknames. Additionally, it has a digital wardrobe for storing and exchanging virtual dress-ups and do-it-yourself creations, which enhances social engagement and personal satisfaction.

This information architecture aims to facilitate a seamless transition for users, enabling them to move from a historical understanding to individualized creation and sharing. This will ultimately enhance their overall engagement and pleasure. The researcher devised the architecture to enlighten people about the cultural aspects of Jin Dynasty costumes while simultaneously offering a platform for personalized interactive encounters.

4.8.2 INTERFACE DESIGN

4.8.2.1 TYPEFACE DESIGN

Founder Lanting black Simplified is a very good Chinese font developed by Founder Fonts (Beijing et al.). With rigorous and standardized pen strokes, the overall strokes look strong, clear, and easy to read. At the same time, Founder Lanting black Simplified is the earliest font specifically designed for screen reading in China, providing a comfortable and smooth reading experience with a distinctive sense of the times. Therefore, this font is in line with the needs of this project to some extent. Firstly, cultural apps should reflect a certain degree of standardization and rigor; secondly, the digital experience, mainly targeted at the younger generation aged 26-35, should not be too conservative but should reflect a certain sense of the times.

Founder Lanting black Simplified font is divided into 10 levels based on thickness, and three of them with a certain span are selected in this study for visual hierarchy division. They are Extra light, Demibold, and Heavy (Figure 73).

Figure 73

Typeface Design-Founder Lanting Black Simplified

Note. Designed by the author.

4.8.2.2 COLOR DESIGN

The choice of color is an important part of the material layer in constructing "form". In the survival and development of human beings, color is closely related to different emotions and cultures, so different colors can mobilize different emotions and arouse people's imagination about different cultures.

For the first main color, the researcher chose white. From the literature records, it can be known that the Jurchen ethnic group in the Jin Dynasty advocated white, which may be related to the living environment of snow all year round. In addition, white is widely used in modern digital products and is also more conducive to user habits, so it was selected as the main color of the entire project.

The second choice of color is magenta, which is an auxiliary color. From previous historical research on Jin Dynasty clothing, it can be concluded that due to the development of textiles in the Song Dynasty, magenta became a color word for textiles in the Song Dynasty. In addition, the Jurchen ethnic group in the Jin Dynasty was a nation that was good at learning. From the clothing artifacts unearthed from the tomb of the King of Qi in the Jin Dynasty, it is recorded that the burial robe of the tomb owner was purple. Therefore, this also reflects the multi-dimensional fusion characteristics of the ethnic clothing in the Jin Dynasty to a certain extent.

The third color is a pale green, which is also a secondary color. Pale green, one of the traditional Chinese green colors, is a deep and dark green. The copper dragon, the imperial car decoration, represents culture in the history of the Jin Dynasty, representing a long and ancient history. Linking this cultural relic with pale green reflects the profound and far-reaching historical culture of the Jin Dynasty (Figure 74).

Figure 74

Color Design

Note. Designed by the author.

4.8.2.3 ICON DESIGN

1. Startup Icon Design

The logo is crafted with a harmonious blend of tradition and modernity, centralizing the emblematic 'left-lapel' robe of the Jin Dynasty. This garment is not only a nod to the historical period but also serves as a symbol of the cultural richness the app seeks to convey.

Encircling the garment are various digital motifs. These include circuit board traces, pixelated designs, and abstract representations of binary code – the fundamental language of digital technology. Including these elements around the central figure symbolizes the digital wrapping around the core of traditional fashion, suggesting a seamless integration of the past with the digital era.

The monochromatic color scheme was deliberately chosen for its sleek and modern aesthetic. The simplicity of black and white ensures the logo's versatility across various platforms and mediums, whether it is displayed on a mobile app icon or printed on merchandise.

The overall circular form of the logo implies continuity and completeness. It suggests that the app offers a full-circle experience, from learning about Jin Dynasty costumes to interacting with them through digital means. It also makes the logo more recognizable and easier to brand across different formats (Figure 75).

Figure 75

Startup Icon Design

Note. Designed by the author.

2. Tab Bar Icon Design

Combined with the aforementioned font and color design principles, icon design has been integrated and coordinated in terms of form and color. With its geometric shape and precise lines, the icon reflects the rigorous norms of Founder Lanting's black Simplified font while using the pure background of the main color, white, and the auxiliary colors of magenta and pale green to add cultural depth and a sense of the times. Each icon conveys the most intuitive functionality with the simplest shape and the fewest lines, following the trend of modern digital product design while maintaining the solemnity and elegance that should be expected from cultural products.

1) The shape of the icon matches the font: The straight lines and curves of the icon reflect the stroke characteristics of Founder Lanting black Simplified font, as some stroke details of the icon correspond to the weight levels (Extra light, Demibold, Heavy) in the font.
2) Color usage: In terms of color usage, the main color, white, ensures the simplicity and readability of the icon, and the second auxiliary color, magenta, is selected as the main color of the icon. When users enter different modules, they are guided and informed of the area they are currently in through the changes in the thickness and level of the icon's color.
3) Integration of cultural elements: The icon design is ingeniously integrated with the cultural elements of the Jurchen people ethnic group. For example, the icon design of the second module, "Jin Dynasty style," in the project combines the most distinctive clothing feature, "left lapel," in Jin Dynasty clothing as the representative of this module. Combine the essence of Jin Dynasty clothing culture with modern design language, and show the blending of history and modernity in the form of icons (Figure 76).

Figure 76
Tab Bar Icon Design

Note. Designed by the author.

4.8.3 SITUATION CONSTRUCTION

4.8.3.1 CONTEXT CONSTRUCTION ELEMENTS

In digital media design, applying situational theory typically considers the interaction between people, objects (i.e., digital media content and interfaces), and the environment (the user's context and background) in the design process. Utilizing this theory helps create digital products that are more user-friendly and context-sensitive.

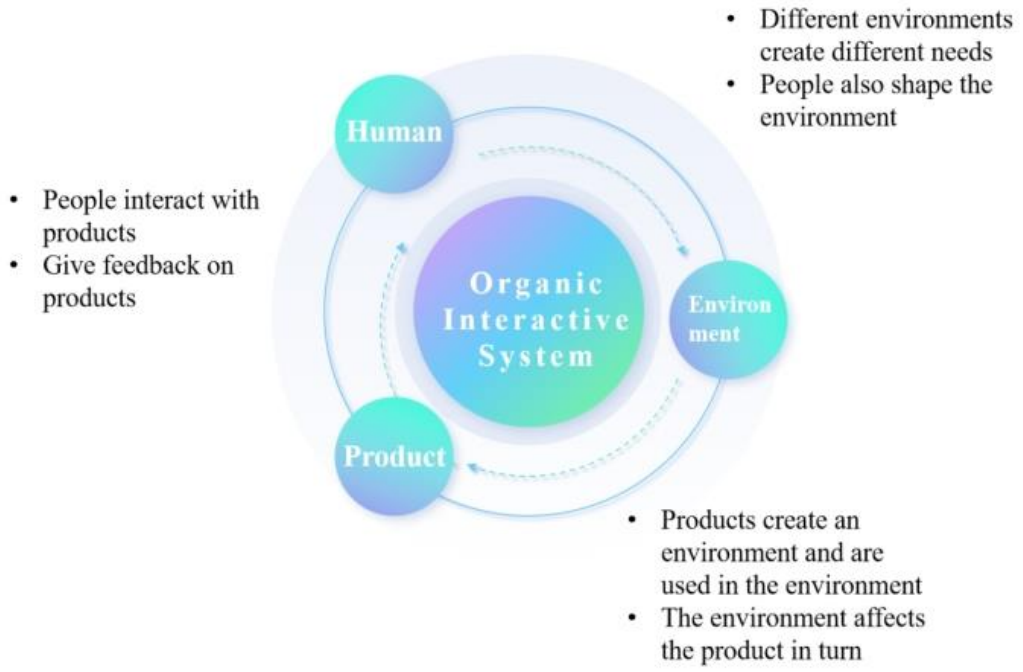
Contextual Design is a concept related to situational theory and is particularly important in digital media design. Hugh Beyer and Karen Holtzblatt introduced this approach in the early 1990s. Contextual Design emphasizes a deep understanding of how users work and live in their natural environments as the foundation for design. This method involves observing and interviewing users to gather data on how they interact, use tools and devices, and apply this information in the design process (Beyer & Holtzblatt, 1999).

In digital media design, this means that designers must thoroughly understand the specific scenarios, needs, and challenges of users to create interfaces and interaction experiences that meet the actual use contexts of different users. This includes understanding users' technological capabilities, cultural backgrounds,

physical conditions, and other factors to ensure that the design can adapt to the needs and environments of various users (Figure 77).

Figure 77

Situation Theory Constitutes Three Elements



Note. Summarized and edited by the author.

4.8.3.2 WAYS OF SCENARIO CONSTRUCTION

The key to applying situational theory in design lies in constructing the situation. The method of situational construction focuses on mobilizing all available elements, integrating them, and finally projecting them onto specific carriers. Situational construction is mainly carried out through the following methods:

1. Scenario Method

The so-called "scene" refers to a picture composed of specific spatial elements, which naturally form a situational mode (Jianyou, 2018).In the digital age, various high-techs have affected the formation of scenes, and the scope of application of scenes has expanded, not only limited to the natural environment in the past but also combined with real geographical space. Its form is often combined with technological forms, accompanied by the emergence of new interactive forms such as games. The introduction of the Internet into the scene forms a dynamic environment, and the current combination of the two is constantly innovating, becoming a hot topic of current multidisciplinary research. The combination of the two shows mutual promotion and coupling.

Integrating scene interaction design in a dynamic environment endows more attribute value to the product's form, content, and behavior layers. The form layer is

the primary way for a product to be presented, and both the visual expression and element composition affect the rendering ability of the scene. The content layer focuses more on the conveyance of scene information, while the behavior layer focuses more on its interactive form. The conversion of information and energy between the two systems completes the construction of the context. This form of construction produces products with stronger interactivity.

2. Story Method

Using storytelling to create context is a popular approach in design. Designers start from their own perspectives to explore design, tell a story, create an atmosphere, and design products with excellent functionality and minimal cognitive differences. In design, designers use people, events, time, place, and things (products) as the basic elements of the story to build the basic framework of the story. The information receiver integrates various information elements in their mind to present a corresponding context. This method can give users a stronger emotional experience and a deep experience of the product's additional attributes. At the same time, using storytelling to express context is more design-tensioning, changing the interactive form of the product and enhancing the user's perception of the product.

In short, the situational story method is a design method that helps designers focus on the product itself by mastering various elements and using creativity to demonstrate the product. This design method provides many insights for the researcher in their future research.

3. Role Method

User roles rely on real-life characters, extracting corresponding virtual roles, and using this virtual role for design reasoning, facilitating designers to extract new design points in role play. The value of the role method lies in its ability to guide design, which also helps designers develop their imagination. By substituting the virtual role, setting it into a well-established situation, and imagining its action pattern, the organizational structure of the product can be completed in reasoning.

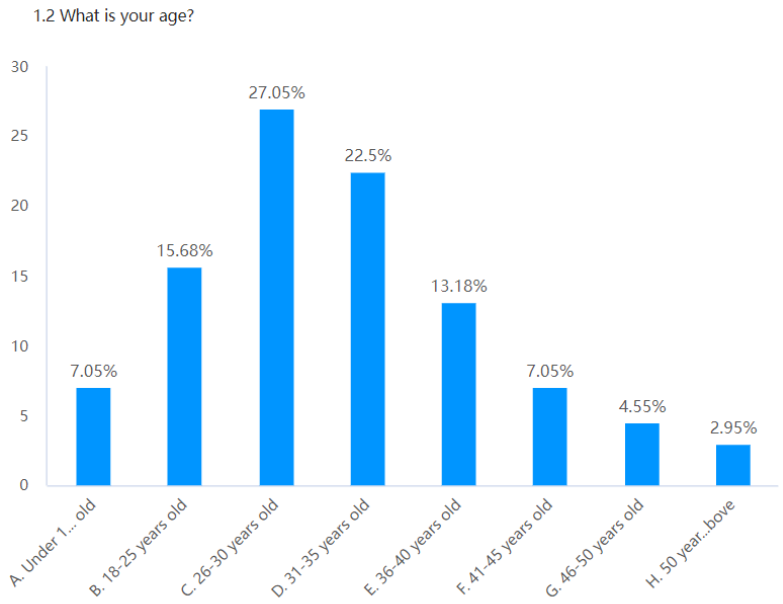
User roles contain the following information: first, the identity and status of the user, related social relationships, etc.; second, the user's thoughts and behavioral habits.

4.8.3.3 SCENARIO DESIGN

According to the theory of scenario construction mentioned above, and combined with the preliminary research results, this study's primary target audience is the 26-35-year-old user group, who like the style of traditional forms of innovative ways (Figure 78) (Figure 79). From Table 8, Cultural Experience Digital Product Case Analysis, it can be concluded that the "3D model" is a form of content expression used in most cases.

Figure 78

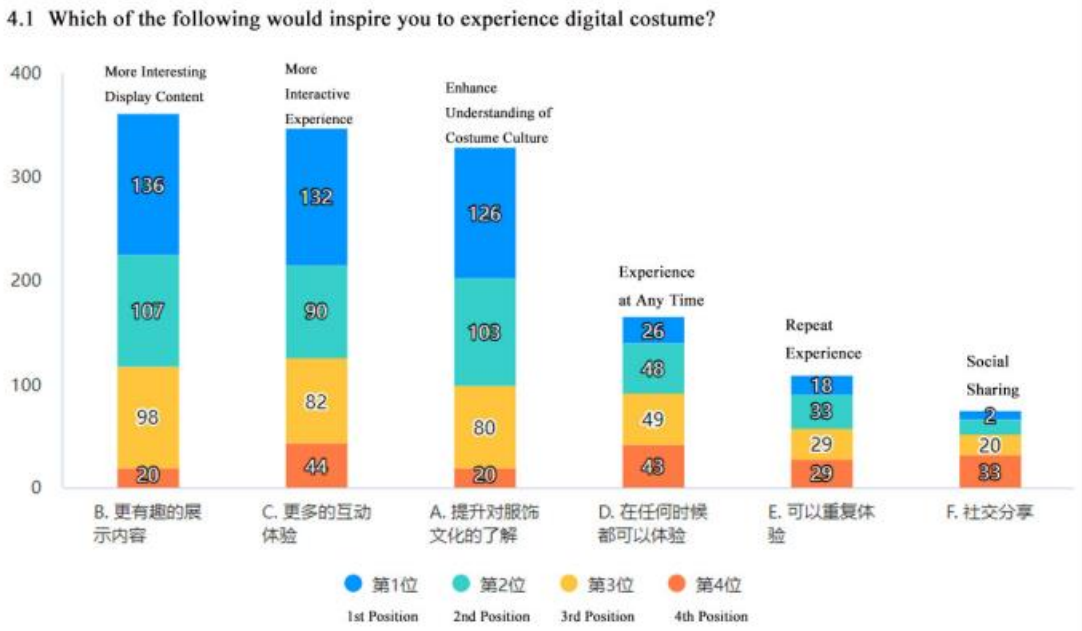
Main age Distribution of Respondents in the Questionnaire.



Note. Collected and edited by the author.

Figure 79

Factors that Motivate Users to Use Digital Costume Products to Enhance

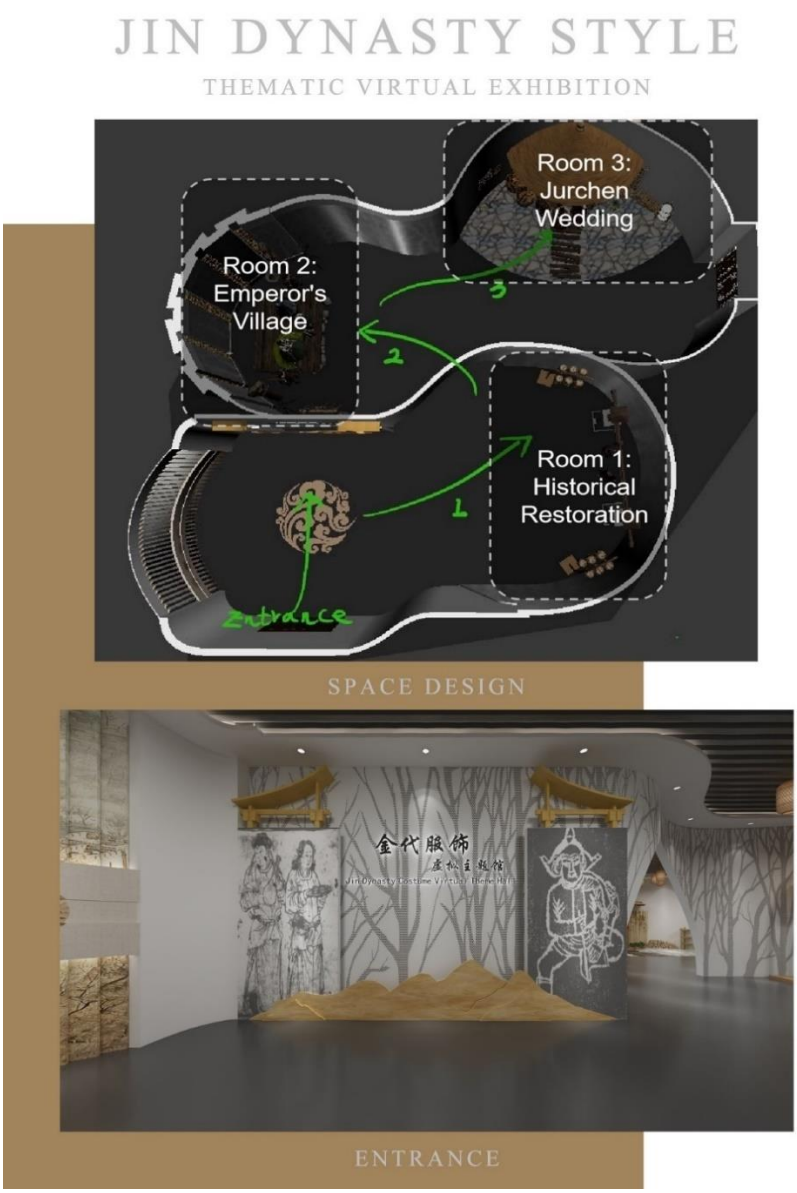


Note. Collected and edited by the author.

In constructing the scene design for a project, the researcher initially endeavored to create a 3D virtual exhibition hall. For the exhibition hall's content and spatial planning, the researcher, informed by scenario theory and insights from observations and interviews during 4.2 fieldwork research, developed a thematic exhibition hall program focused on the experience of Jin Dynasty costume culture. This program comprises three thematic areas: 1. Historical Restoration, 2. Emperor's Village, and 3. Jurchen Wedding. Each of these themes showcases several representative scenarios of Jin Dynasty costume use. The details of these sections are as follows: (Figure 80)

Figure 80

Planning of a 3D Virtual Costume Exhibition Hall on the Theme of the Jin Dynasty



Note. Designed and edited by the author.

4.8.3.4 SITUATION STORY

Dividing the story into three separate paragraphs, each corresponding to a background story of a scene, allows users to learn relevant background information when entering each scene selectively. Here is the story design for each scene:

1. Stories original Jin Dynasty style: " Historical Restoration "

1) Story introduction:

This theme focuses on restoring the two main pieces of costume culture heritage unearthed from the tomb of a couple of the King of Qi in the Jin Dynasty, restoring the most original look of Jin Dynasty costumes.

2) Story content:

After entering the virtual exhibition hall of Jin Dynasty costumes, the audience can see a pair of gorgeously dressed men and women standing in the center of the exhibition hall. They are welcoming the audience and communicating with each other. This theme exhibition hall guides the audience in further experiencing the virtual exhibition hall of Jin Dynasty costumes (Figure 81).

2. Story of Emperor Village: The Founding Ceremony

1) Story introduction:

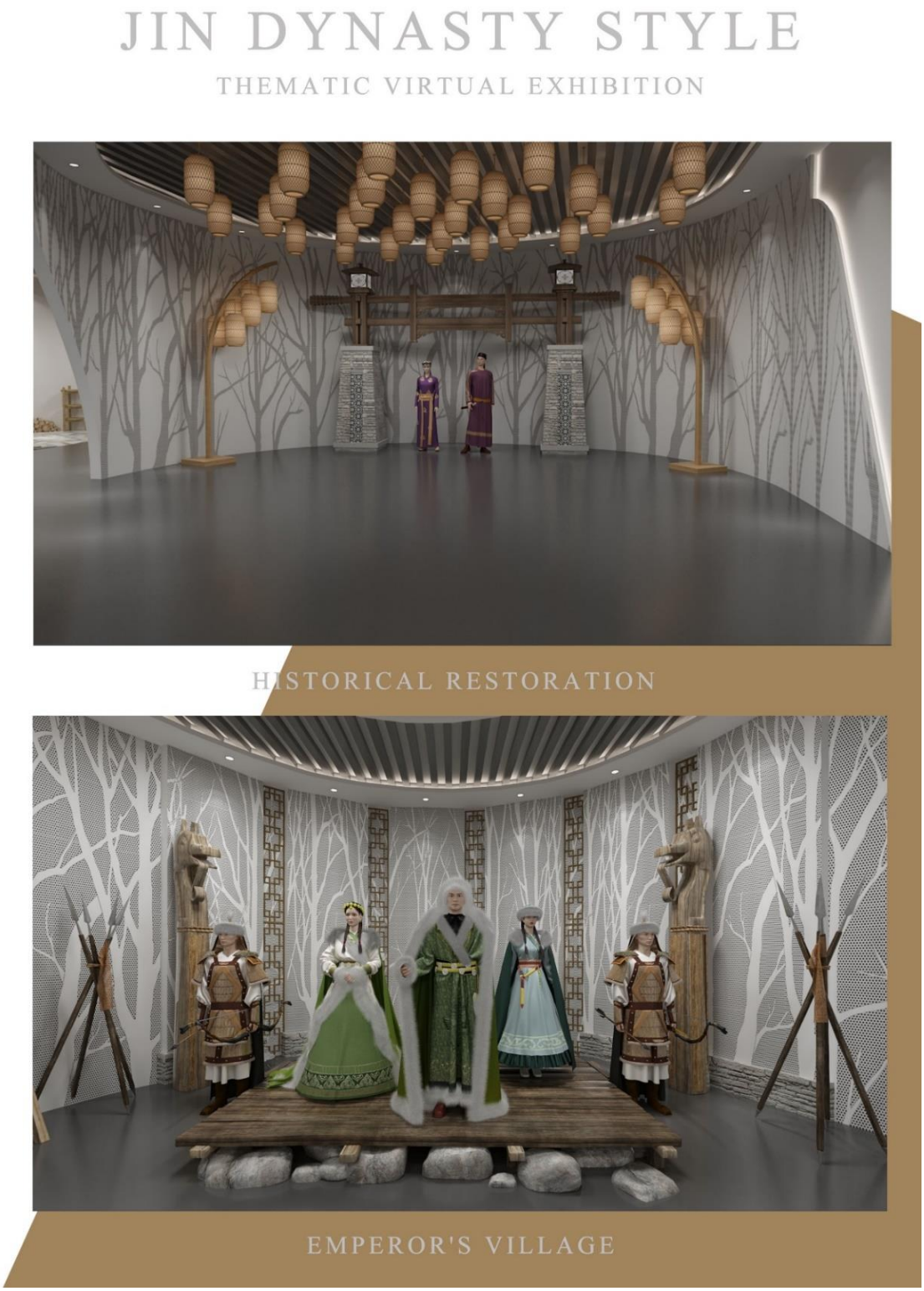
This story tells the historical scene of the founding ceremony of the Jin Dynasty held in Emperor Village by the founding emperor Wanyan Aguda. Through this story, users can learn about the establishment of the Jin Dynasty, the emperor's image, and the clothing characteristics at that time.

2) Story content:

In Emperor Village, a grand founding ceremony takes place Wanyan Aguda is wearing a magnificent imperial robe, surrounded by his loyal generals and supporters. The crowd wearing various costumes represents the social classes of the early Jin Dynasty, from nobles to ordinary people. At this moment, the history of the Jin Dynasty begins a new chapter (Figure 81).

Figure 81

3D Virtual Exhibition Halls of "Historical Restoration" and "Emperor Village"



Note. Designed and edited by the author.

3. Story of Jurchen wedding: "Jurchen wedding"

1) Story introduction:

This story revolves around a Jurchen wedding ceremony during the Jin Dynasty. Users can learn about the wedding customs and wedding dresses of the Jurchen people through this story.

2) Story content:

Amid laughter and joy, a Jurchen wedding ceremony is taking place. The bride wears traditional wedding clothes and unique accessories, while the groom dresses in traditional early Jurchen clothes. The guests around them also wear early Jurchen clothes from the Jin Dynasty. The wedding ceremony is a union of two people and displays traditional Jurchen culture and costumes (Figure 82).

Figure 82

3D Virtual Exhibition Halls of " Jurchen Wedding "

Note. Designed and edited by the author.

4.8.3.5 ROLE DESIGN

Character design is a crucial aspect of designing within a scenario context. It involves creating characters one by one based on the settings established in the early

story content. During character design, it is important to fully interpret the environment, background, and relationships of the character with others. This interpretation is made with full respect for the historical and background context, aiming to create visually interesting and story-rich characters for the users.

Therefore, character design is not about imitating history but integrating and innovating. This innovation is based on history and background, not a drastic leap. In terms of expression, the pursuit often leans more towards an "aesthetic intention expression".

This study created a series of key characters based on the division of early situational scene themes and story content.

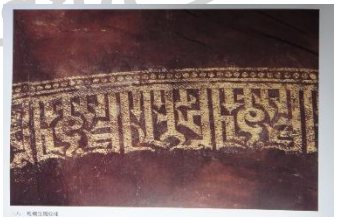
1. Historical Restoration

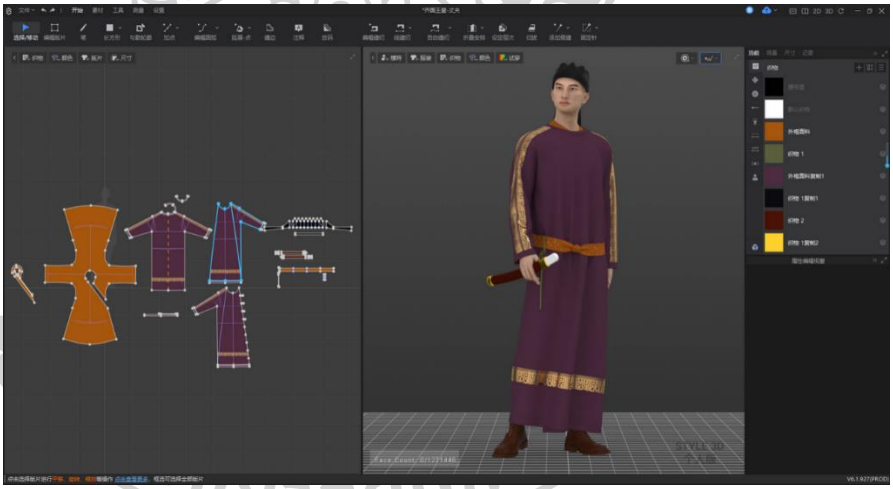
In this section, based on the definition of the theme, the character design focuses on restoring the two primary costume artifacts unearthed from the tomb of the King of Qi in the Jin Dynasty. The first is a purple gold brocade cotton robe suit worn by the male tomb owner and the turban he wore (Table 14). The second is a purple gold brocade cotton robe with a cloud and crane pattern worn by the female tomb owner and the scarf with gold threads she wears (Table 15).

The researcher mainly extracted the character design elements from the referenced costume artifact materials, followed by a restoration analysis of the colors, and finally drew a draft drawing and modeled the 3D model with CLO 3D software.

Table 14

Theme "Historical Restoration": Male restoration in the Tomb of the King of Qi in the Jin Dynasty

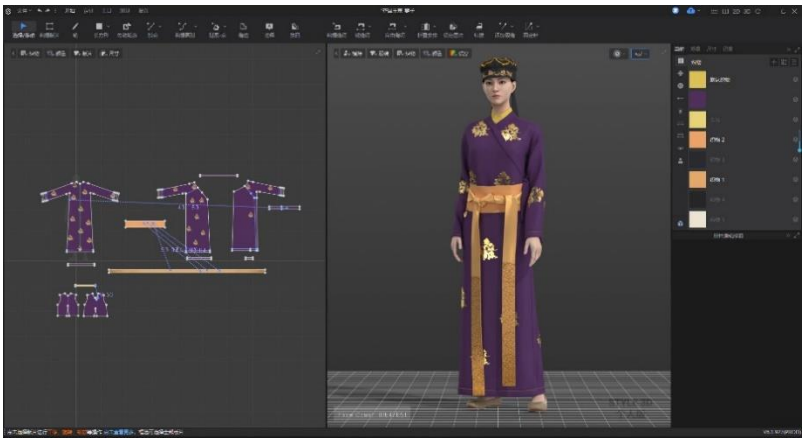
Theme "Historical Restoration": Male restoration in the Tomb of the King of Qi in the Jin Dynasty	
Reference Element	  
Colors	

Theme "Historical Restoration": Male restoration in the Tomb of the King of Qi in the Jin Dynasty	
Role Design	
3D Model	

Note. Designed and edited by the author. This table shows the author's whole process, from data collection, element extraction, color selection, character draft drawing, and character 3D modeling.

Table 15

Theme "Historical Restoration": Female Restoration in the Tomb of the King of Qi in the Jin Dynasty

Theme "Historical Restoration": Female restoration in the Tomb of the King of Qi in the Jin Dynasty	
Reference Element	
Colors	
Role Design	
3D Model	

Note. Designed and edited by the author. This table shows the author's whole process, from data collection, element extraction, color selection, character draft drawing, and character 3D modeling.

2. Emperor's Village

By definition of theme, given that it's set during the early establishment of the Jin Dynasty, the depicted characters and architecture all exhibit a more primitive and simplistic state. The overall attire style of Table 16 mainly reflects the distinct northern minority style, such as the "left-overlap robe," "round collar," "wearing boots," and "narrow sleeves."

In terms of fabric selection for the attire, due to the limitations in textile technology and the long-standing primitive hunting and fishing lifestyle of the era, the costume was primarily made of animal hides and rough cotton cloth. Thus, in the early period of the Jin Dynasty's establishment, costume had no strict class distinction. The main purpose of the attire was rudimentary: modesty and protection from the cold (Table 16).

Table 16

Theme " Emperor's Village": Royalty and Soldiers Role Design

Note. Designed and edited by the author. This table shows the author's whole process, from data collection, element extraction, color selection, and character draft drawing.

With this, the author uses Style 3D software to model the character's costumes and uses 3D MAX and MAYA software when dealing with the design of some hairstyles. The specific model is as follows: (Figure 83) (Figure 84) (Figure 85) (Figure 86) (Figure 87)

Figure 83

Role Design-3D Model-Wanyan Aguda

Note. Created and designed by the author.

Figure 84

Role Design-3D Model-Wanyan Aguda's Wife

Note. Created and designed by the author.

Figure 85

Role Design-3D Model-Princesses of the Early Jin Dynasty

Note. Created and designed by the author.

Figure 86

Role Design-3D Model-Soldier of the Jin Dynasty

Note. Created and designed by the author.

Figure 87

Role Design-3D Model-Character Hair Modeling

Note. Created and designed by the author.

3. Jurchen Wedding

In terms of style, all characters are adorned in the traditional costume of the Jurchen, including features like the left-overlap robe, slits, standing collars, narrow sleeves, and boots.

In terms of design, the bride's attire incorporates the distinctive skirt support of Jurchen women, markedly different from the traditional attire of the Han people from central China at the time.

As for patterns, they mainly reflect the traditional Jurchen lifestyle of fishing, hunting, and gathering. This is evident in motifs of natural flora, cloud patterns, and more primitive designs made from animal teeth or cotton ropes.

Color-wise, a combination of red and white is used. While the Jin Dynasty favored white and the Jurchen traditionally liked white, their interactions with the Song Dynasty and the influence of central Han culture introduced the use of red in weddings (Table 17). It is also modeled in 3D (Figure 88).

Table 17

Theme " Jurchen Wedding ": The Bride and Groom Role Design

Note. Designed and edited by the author. This table shows the author's whole process, from data collection, element extraction, color selection, and character draft drawing.

Figure 88

Role Design- 3D Model-Bride and Groom at a Jurchen Wedding

Note. Created and designed by the author.

4.8.4 PROTOTYPING

During the prototyping process, the researcher developed detailed and accurate designs for the digital media, clearly defining the functionalities of each module. This method encompassed a thorough digital experience to educate consumers about the cultural aspects of the Jin Dynasty costumes. The prototype utilized interactive storytelling, educational content, augmented reality (AR) technology, and user engagement features to establish a fully immersive learning experience. The design was organized and structured, with a coherent progression that guided users from informative material to hands-on activities, resulting in an immersive and user-friendly learning experience.

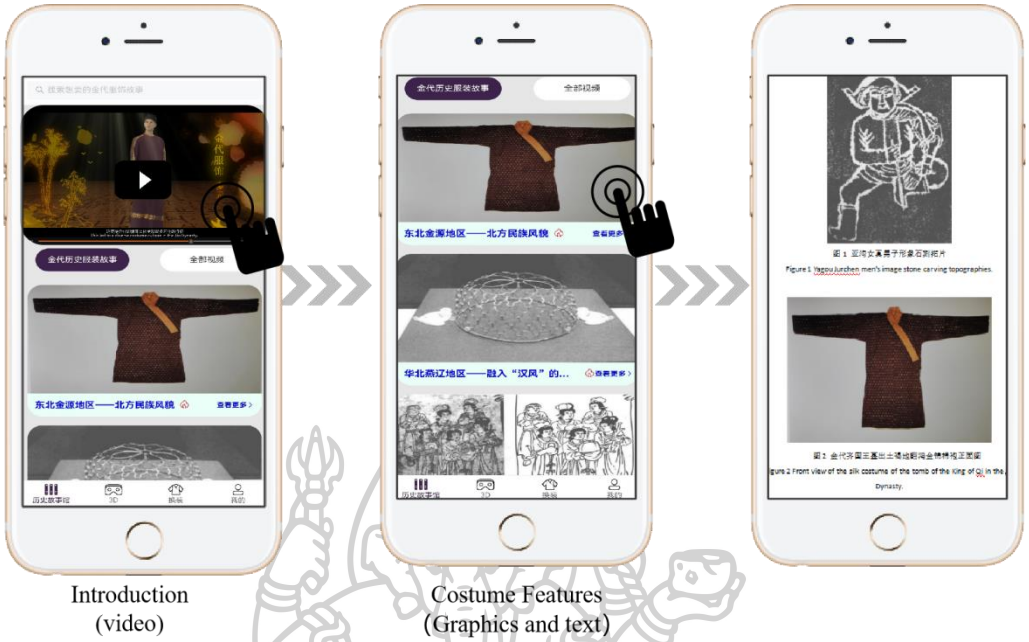
4.8.4.1 DETAILED EXPLANATION OF EACH FUNCTIONAL MODULE

According to the "4E" model (Pine & Gilmore, 1998), the digital product is segmented into four essential modules, each catering to distinct elements of the user experience:

1. Historical Stories Module (Educational Experience): Serving as the initial interaction, this module acquaints visitors with Jin Dynasty costumes through a video overview and comprehensive sub-modules containing graphics and text. It is a foundation for users to gain a preliminary understanding and further explore the costumes' characteristics and history (Figure 89).

Figure 89

"Historical Stories" Interface and Functions

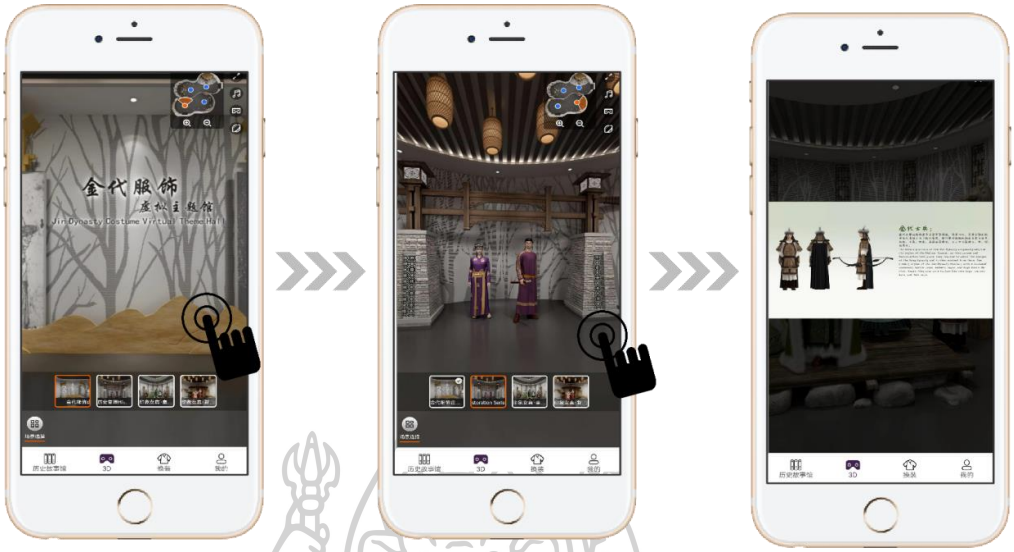


Note. Created and designed by the author.

2. Jin Dynasty Style Module (Aesthetic and Escapism Experience): This module allows users to delve deeper into the costume culture, presenting situational scenes for immersive exploration. It covers hierarchical divisions, craftsmanship, and material details of the costumes, providing an 'immersive' escapism experience (Figure 90).

Figure 90

"Jin Dynasty Style-3D Virtual Exhibition Hall" Interface and Functions

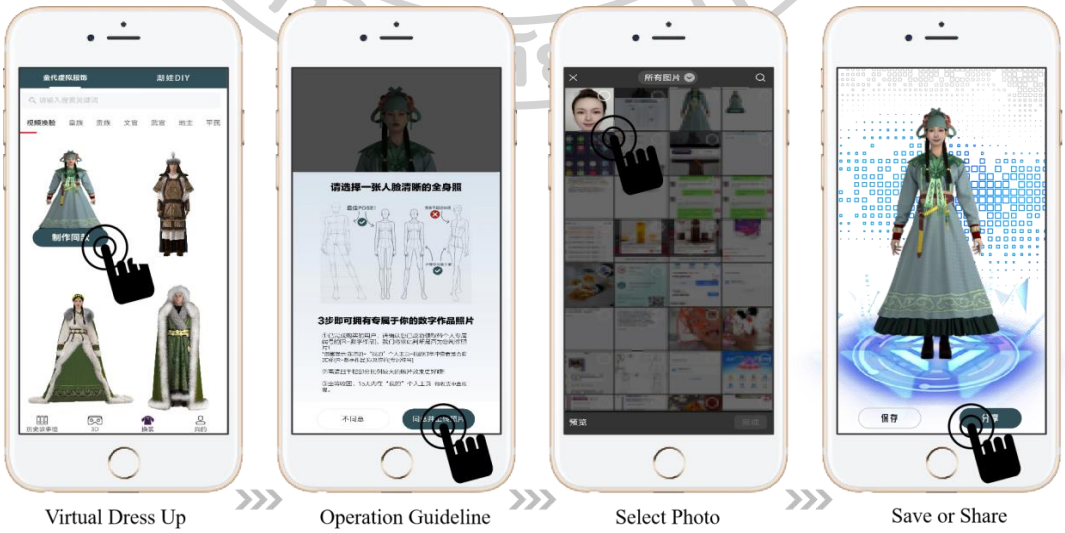


Note. Created and designed by the author.

3. Digital Experience Module (Entertainment and Escapism Experience): After the educational and immersive experiences, this module offers interactive options like virtual dressing experiences. These activities aim to enhance user engagement and encourage sharing, thus attracting a broader audience (Figure 91).

Figure 91

"Digital Experience-Virtual Dress Up" Interface and Functions

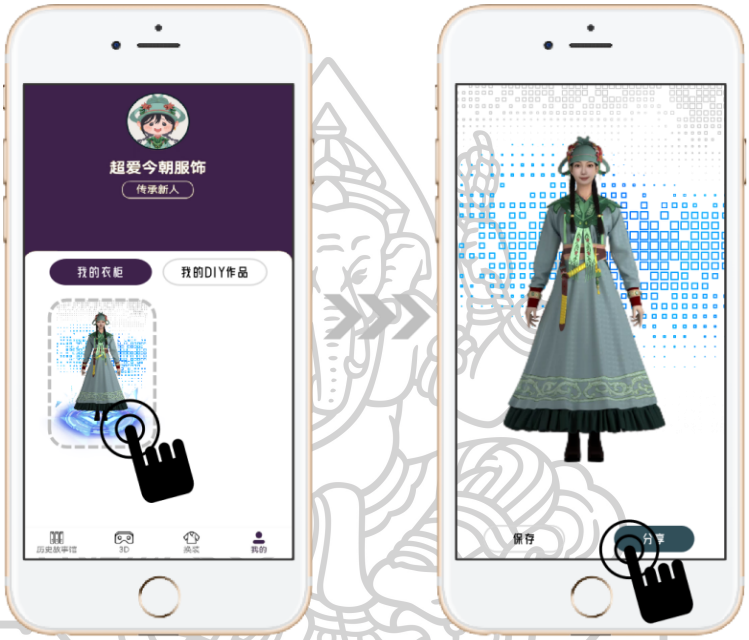


Note. Created and designed by the author.

4. User Center Module (Information Management): This module facilitates efficient management of personal and product-related information within the mini-program. It includes personal information management like avatar customization and product feature management, such as accessing the 'Virtual Wardrobe'. This module simplifies the user's interaction with the app's features (Figure 92).

Figure 92

"User Center" Interface and Functions



Note. Created and designed by the author.

4.9 TECHNOLOGICAL TOOLS AND PLATFORMS USED

4.9.1 DEVELOPMENT PLATFORM SELECTION

As the preliminary stage of the project, the researchers first chose to configure the development environment on the WeChat Mini Program developer platform for the following reasons:

Broad user base: As a widely used social media platform, WeChat will have over 1.2 billion active users worldwide by December 2021, making it the social software with the most active users in the Chinese Mainland. Developing WeChat Mini Programs allows projects to reach hundreds of millions of potential users directly, which has tremendous advantages for promotion and dissemination.

Convenient and user-friendly: WeChat Mini Programs eliminate the need for downloading and installing, distinguishing them from conventional smartphone programs. Users may effortlessly locate and access them on WeChat, enabling fast

utilization. Implementing this point-and-click functionality significantly lowers users' difficulty getting started (Wan et al., 2019).

Social function: Mini applications can utilize WeChat's social networking capabilities, such as sharing and suggesting to friends, to increase user involvement and improve the spread of information.

Development efficiency and cost: The WeChat Mini Program developer platform offers many development tools and documentation, facilitating accelerated development and cost reduction. In addition, the platform offers features such as data analysis and payment interfaces, which enhance the process of creating and managing Mini Programs (Hao et al., 2018).

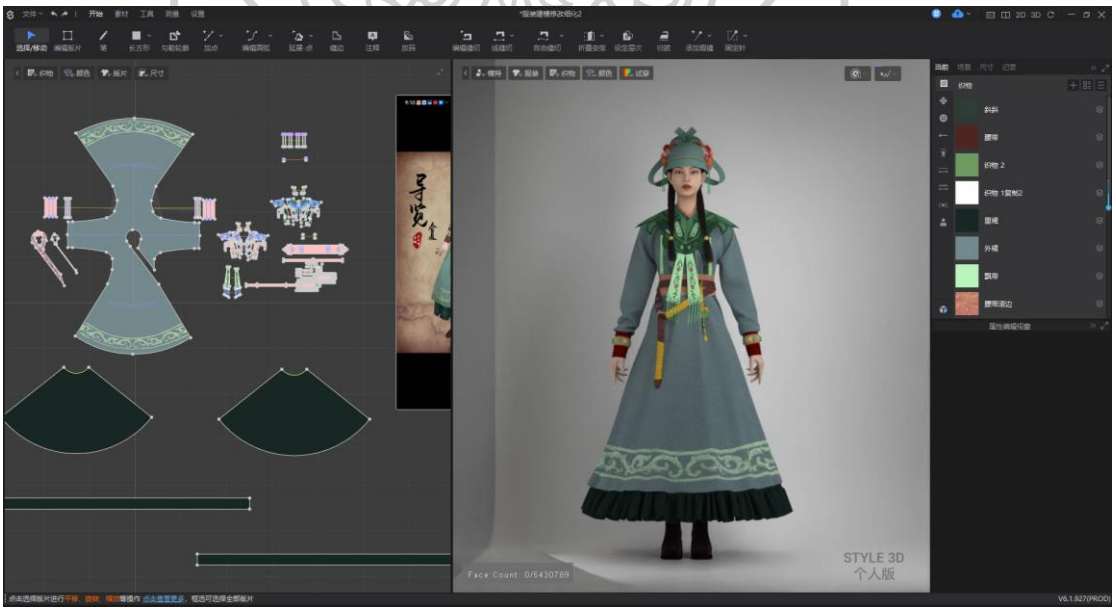
4.9.2 TECHNOLOGICAL INSTRUMENTS FOR DEVELOPMENT

The researchers opted for 3D Max and Maya, renowned for their exceptional 3D modeling and animation production performance, to create 3D exhibition halls and model hairstyles. After finishing the construction of the 3D display halls, the research team began the process of importing them into the 720 Cloud VR panorama creation platform. This phase was essential for creating accessible virtual links, allowing the integration of these halls into the Mini Program to boost browsing capabilities.

The researcher utilized Style 3D, a specialized software for costume modeling and interactive design. This software is specifically developed to simulate and showcase costumes' realistic texture and fluidity (Figure 93).

Figure 93

Simulation Modeling of Jin Dynasty Costumes Using Style 3D Software



Note. Created and designed by the author.

The research team completes video content production using Adobe After Effects and Adobe Premiere. These tools assist in the creation of visually appealing and educational video materials.

The research team primarily creates graphic content using Adobe Photoshop and Illustrator, the most commonly utilized graphic software. This approach facilitates the creation of visually appealing and informative visual presentations.

By combining these tools, the researchers have established a powerful and versatile development environment to present the cultural essence of Jin Dynasty costumes to users in a digital form (Figure 94).

Figure 94

Technological Tools and Platforms Used

Note. Created by the author.

4.10 CHAPTER SUMMARY

In this chapter, the researcher conducted a comprehensive study and developed a digital knowledge repository on Jin Dynasty costumes.

Firstly, the researcher conducted research work, which included:

1. Relevant theoretical studies,
2. Existing problems and challenges of Jin Dynasty costumes,
3. Case studies,
4. Public demand research, and

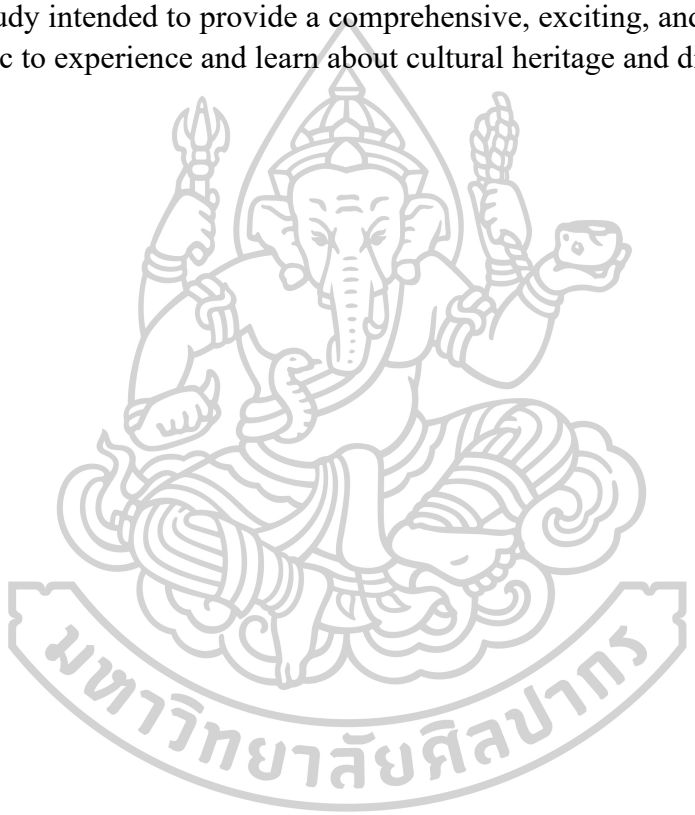
5. Expert interviews.

These elements provide adequate preparation for creating an effective digital knowledge repository of Jin Dynasty costumes.

At the same time, the researcher conducted development work, which included:

1. Developing a draft visual of the art style and visiting experts for suggestions,
2. Creating a model of the development process of a digital knowledge repository of traditional costumes and
3. Developing a user-centered digital knowledge repository of Jin Dynasty costumes.

This study intended to provide a comprehensive, exciting, and engaging platform for the public to experience and learn about cultural heritage and digital culture.



CHAPTER 5

RESULTS OF THE DIGITAL KNOWLEDGE REPOSITORY OF THE JIN DYNASTY

5.1 EXPERTS AND VISITORS' EVALUATIONS

The researchers invited nine experts in related fields to evaluate a prototype digital knowledge repository through offline interviews and online discussions. The nine experts are: (Figure 95)

1. Expert Group 1: Historical Scholars, three people
    1) Expert 1 - The Professor is an expert in studying the costume history of the Jin Dynasty.
    2) Expert 2 - A three-level professor is an expert in studying art theory.
    3) Expert 3 - Associate Professor is an expert in the study of costume history.
2. Expert Group 2: Costume Design Experts, three people
    1) Expert 4 - Associate professor, an international stage costume design expert.
    2) Expert 5 - Director of Costume Design, is a rising Chinese fashion designer.
    3) Expert 6 - Associate Professor is an expert in clothing design.
3. Expert Group 3: Digital Technology Expert, three people
    1) Expert 7 - Director of Design at a famous tech company, UX design expert.
    2) Expert 8 - Product Director, product design expert.
    3) Expert 9 - The company's General Manager is an expert in technology and new media art design.

Figure 95

Expert Evaluations

Note. Photographed by the author. The author invited an expert in the history of Jin Dynasty costumes (Figure 1, left), a manager of a technology company, and an expert in digital design and technology (Figure 3, left) to conduct an offline evaluation and discussion of a prototype of a digital knowledge repository for Jin Dynasty costumes.

Meanwhile, the researchers also visited the Da Jin GuCheng theme park and invited 12 visitors to experience and evaluate the digital knowledge repository prototype of Jin Dynasty costumes (Figure 96).

Figure 96

Evaluations by Visitors at the Theme Park

Note. Photographed by the author. The author invited 12 visitors to experience and evaluate a digital knowledge repository prototype of Jin Dynasty costumes in the Da Jin GuCheng theme park.

5.1.1 SCORING QUESTIONS

The researcher used the Likert five-point scale assessment method to design an expert and visitors' evaluation form with five questions. Additionally, there was one multiple-choice question and two open-ended questions. The assessment results are as follows: (Table 18)

Table 18

Experts and Visitors Evaluation Form Results

Expert	Q1	Q2	Q3	Q4	Q5
1	4	5	4	4	5
2	4	5	4	5	4
3	3	4	4	4	3
4	5	4	2	5	4
5	5	4	3	5	4
6	5	5	4	4	4
7	5	4	4	5	5
8	4	5	2	5	5
9	5	4	4	5	5
10	4	4	3	4	5
11	4	5	4	5	4
12	3	3	3	4	3
13	5	4	2	5	4
14	3	4	3	5	5
15	5	5	4	4	4
16	5	4	4	4	4
17	4	5	3	5	5
18	5	4	4	5	5
19	3	3	3	4	4
20	4	4	4	3	5
21	3	4	3	4	5
Average score	4.10	4.20	3.40	4.40	4.40

Note. Collected and edited by the author. The five questions were on:

Q1: Impact of the Digital Knowledge Repository of Jin Dynasty Costumes on Audience Cultural Experience.

Q2: Presentation of Cultural History by the Digital Knowledge Repository of Jin Dynasty Costumes.

Q3: User Interface and Overall Design of the Digital Knowledge Repository of Jin Dynasty Costumes.

Q4: Potential of the Digital Knowledge Repository of Jin Dynasty Costumes as a Tool for Enhancing Audience Cultural Experience.

Q5: Effectiveness of Incorporating Virtual Clothing Experiences into the Digital Knowledge Repository of Jin Dynasty Costumes

5.1.1.1 DATA ANALYSIS:

1. Impact of the Digital Knowledge Repository of Jin Dynasty Costumes on Audience Cultural Experience

Score: 4.1

   1) Positive Effects: Experts and visitors generally believe that the design has a significant positive impact on enhancing the audience's cultural experience.
   2) Rich Content: A score of 4.1 indicates that the design effectively combines educational content and entertainment elements, providing a rich cultural experience.

2. Presentation of Cultural History by the Digital Knowledge Repository of Jin Dynasty Costumes

Score: 4.2

   1) Cultural Conveyance: The slightly higher score suggests that the design is particularly effective in presenting the cultural history of Jin Dynasty costumes.
   2) Historical Accuracy and Details: The high score may be attributed to the design providing detailed and accurate historical information and cultural details, enhancing its educational value.

3. User Interface and Overall Design of the Digital Knowledge Repository of Jin Dynasty Costumes

Score: 3.4

   1) Design Considerations: This relatively low score may reflect the need to consider further user experience and usability in the user interface and design.
   2) Visual Appeal: The visual appeal of the interface and design is essential in increasing user engagement and satisfaction.

4. Potential of the Digital Knowledge Repository of Jin Dynasty Costumes as a Tool for Enhancing Audience Cultural Experience

Score: 4.4

   1) High Potential Assessment: This high score emphasizes the experts' and visitors' strong recognition of the design's potential as a tool for enhancing the audience's cultural experience.
   2) Fusion of Education and Entertainment: The design may have successfully integrated education and entertainment, providing a deep and engaging cultural learning experience.

5. Effectiveness of Incorporating Virtual Clothing Experiences into the Digital Knowledge Repository of Jin Dynasty Costumes

Score: 4.4

   1) Enhancement of Cultural Experience: Similar to the previous question, the high score highlights the significant role of virtual experiences in enhancing the cultural experience.

2) Interaction and Immersion: Virtual experiences increase user interaction and immersion, which may be vital to improving the user experience.

5.1.2 MULTIPLE CHOICE QUESTION

1. Characteristics of digital products compared to traditional costume exhibitions

A few of the most frequently selected items by experts and visitors are 1) engaging, 2) convenient, 3) interactive, 4) flexible, and 5) attractive. This result may indicate:

1) Diverse Advantages: These characteristics highlight the advantages of digital products in increasing audience engagement, convenience of access, interactive experiences, adaptability to different audience needs, and capturing audience attention.
2) New Era Display Methods: Experts' and visitors' evaluations reveal the importance and diversity of digital displays in the modern cultural education and exhibition field.

5.1.3 OPEN-ENDED QUESTIONS

1. What improvements would you recommend for the Digital Knowledge Repository of Jin Dynasty Costumes to enhance its cultural experience?
2. From the perspective of experts, here is the evaluation and feedback on the Digital Knowledge Repository of Jin Dynasty Costumes:

The researcher summarized the responses from 9 experts and 12 visitors:

1) User Interface: The system interface design is intuitive and friendly and can effectively guide users' exploration. However, there still needs to be more unity in the art style, which can be further optimized.
2) Interactive elements: The system effectively combines AR technology to realize the interactive function of virtual dressing-up, but due to technical problems, there still needs to be more experience, which can be further optimized and strengthened in the future.
3) Diversity of costumes: Through the current exploration of virtual theme pavilions, a certain number of Jin Dynasty costumes are displayed according to the thematic divisions, providing the audience with a rich and diverse perspective. However, the diversity in the display of costumes can be further increased to show a more comprehensive Jin Dynasty costumes.

5.2 DESIGN OPTIMIZATIONS

After the first round of expert assessment, the researcher optimized the initial version of the primary model based on the improvement suggestions proposed by the experts. The main optimizations are summarized as follows:

1. Unification and coordination of the overall artistic style: This mainly addresses the issues raised in question 3 of the expert assessment regarding the need for further consideration of the overall user interface and design.
2. Increasing the diversity of virtual clothing experiences: This mainly addresses the issue raised in question 7 of the expert assessment about the importance of diverse clothing experiences.

5.2.1 UNIFICATION OF THE OVERALL ARTISTIC STYLE

1. Optimize the UI design to harmonize with the "Virtual Theme Hall" design style.

This content mainly addresses the issue of the initial prototype's UI design, which needs enhancement in beauty, and updates the layout of the graphic content. It primarily modifies the color design of the initial prototype UI to match the "Virtual Theme Hall" color (Figure 97). Additionally, it adjusts the overall style of the graphics in the "History Story" module and beautifies the layout (Figure 98).

Figure 97

Optimized the UI Design to Harmonize with the "Virtual Theme Hall" Design Style.

Note. Designed and produced by the author.

Figure 98

Optimized Graphic Layout

Note. Designed and produced by the author.

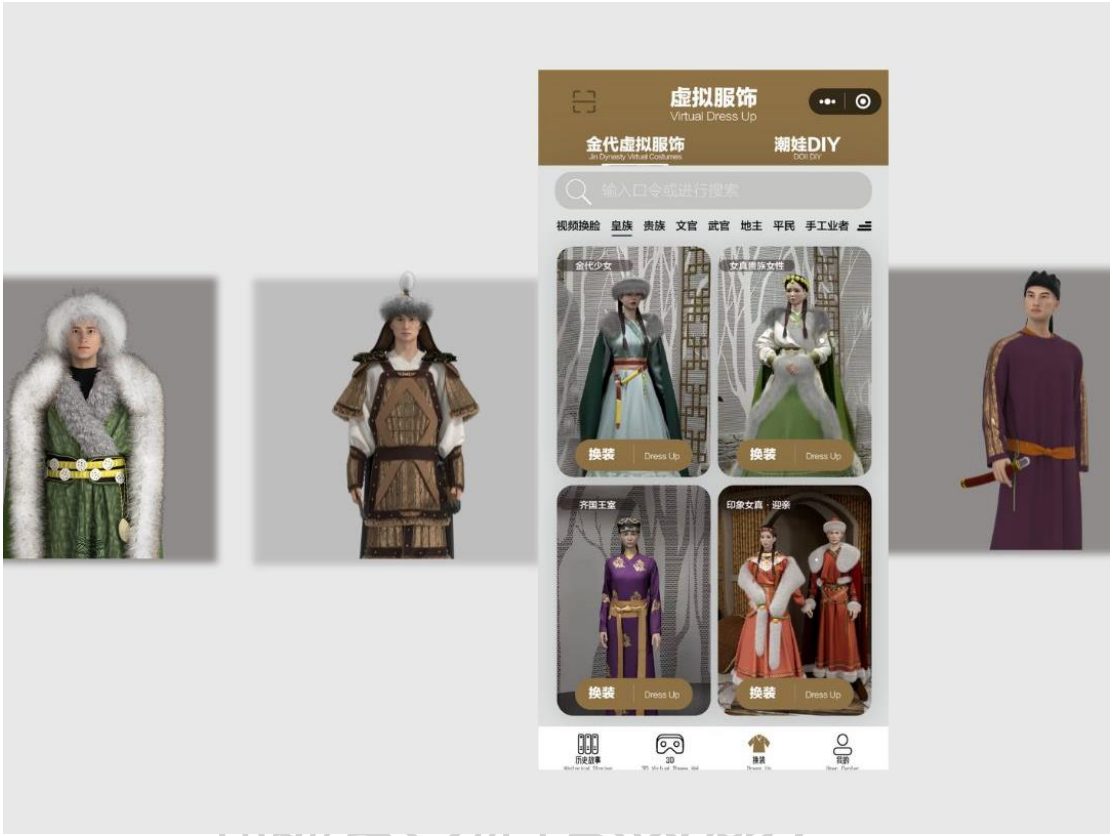
5.2.2 INCREASING THE DIVERSITY OF VIRTUAL COSTUME EXPERIENCES

1. Increase the variety of "Virtual Dress-Up" costume sets

In the original primary model, the "Virtual Dress Up" experience had only four sets of clothing, which was insufficient to showcase the rich diversity of Jin Dynasty attire. This could impact users' interest in the "Virtual Dress Up" experience. Adding more styles to the virtual dressing options, such as representative costumes for different statuses, ranks, and special situations, increases the diversity of the virtual dressing experience, thus offering users more choices, as shown in Figure 99.

Figure 99

Optimized the Number of Costumes for the Virtual Dress-up Experience



Note. Designed and produced by the author.

5.3 USER ABILITY TESTING

The researcher developed a questionnaire that users tested to assess their impressions of how digital knowledge repositories can improve the cultural experience of costumes. Its main purpose was to evaluate the influence of digital knowledge repositories on education, participation, cultural heritage, innovation, and public interest.

The researchers asked participants to complete a questionnaire before and after using the Jin Dynasty costumes digital knowledge repository prototype. The pre-test questionnaire contains seven perception questions, using the Likert five-point scale for evaluation. The post-test questionnaire also has seven perception questions, employing the same Likert five-point scale for evaluation (Figure 100).

Figure 100

Target Users Test the Digital Knowledge Repository of Jin Dynasty Costumes

Note. Photographed and edited by the author.

5.3.1 EVALUATION METHODS

Likert Five-Point Scale Assessment Method: This method categorizes users' feelings into five levels represented by 1, 2, 3, 4, and 5. Users rate the questions based on their feelings. Finally, the researcher calculated the average score of all participants. The scores from the pre-test and post-test questionnaires are then compared to assess participants' experiences.

5.3.2 TEST QUESTIONNAIRES SETUP

The test questions are set up as follows:

1. Pre-Test Questionnaire:

Description: Please rate the following statements based on your expectations, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

1) I look forward to digital media enhancing my interest in costume culture.
2) I believe digital tools will enhance my understanding of costume culture.
3) I hope this product will help me better understand the history and design of the Jin Dynasty's costumes.
4) I expect this product to inspire my new interest in traditional culture.
5) I think digital experiences will make costume culture easier to understand and accept.
6) I hope to see innovation and modernization of traditional costume culture through this product.
7) I anticipate this product will offer a highly interactive fun learning experience.

2. Post-Test Questionnaire

Description: Please rate the following statements based on your actual experience, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

1) This product enhanced my interest in learning about costume culture.
2) Digital tools in this product enhanced my understanding of costume culture.
3) This product helped me better understand the history and design of the Jin Dynasty's costume.
4) This product stimulated my new interest in traditional culture.
5) This product made costume culture easier to understand and accept.
6) This product displayed innovation and modernization in traditional costume culture.
7) This product provided a highly interactive fun learning experience.

The test results are as follows: (Table 19)

Table 19

Individual Assessment Results of Target Users Before and After Experiencing the Digital Knowledge Repository of Jin Dynasty Costumes

Users	Public interest		Participation		Education		Heritage		Deepening Cultural Understandin		Innovation		Digital Interactive Experiences	
	Before	After	Before	After	Before	After	Before	After	before	After	Before	After	Before	After
1	2	4	2	5	1	4	2	5	3	4	2	4	1	5
2	3	5	2	3	1	5	3	4	2	5	2	5	2	5
3	1	4	2	4	3	4	3	3	2	3	2	3	3	4
4	2	3	3	4	2	3	2	5	1	5	2	5	3	4
5	3	4	1	5	1	3	1	4	1	4	3	4	2	5
6	2	4	3	3	1	3	1	5	3	5	1	4	1	4
7	3	5	3	4	3	5	3	3	2	3	2	5	2	3
8	1	4	2	5	1	4	2	4	1	5	1	3	1	5
9	3	4	1	3	4	3	1	5	3	4	4	4	3	4
10	4	3	3	4	2	5	1	3	1	5	2	5	2	5
11	3	4	1	5	4	4	1	5	2	3	3	4	1	4
12	2	4	3	3	2	5	2	4	1	4	1	3	3	5
13	1	3	4	4	1	4	3	5	3	5	2	4	2	4
14	4	5	2	5	1	3	2	3	2	5	1	4	3	3
15	2	3	2	3	1	4	1	4	2	4	4	5	2	4
16	1	4	2	4	1	5	2	5	2	3	2	3	1	5
17	3	5	1	4	2	5	3	3	1	5	1	4	2	5
18	2	5	3	3	3	4	1	3	3	4	3	5	3	4
19	1	4	1	5	1	3	3	5	2	4	2	4	1	5
20	4	5	2	4	1	4	1	4	3	5	1	5	1	3
21	2	3	1	5	3	5	1	5	1	4	1	3	2	4
22	3	4	4	3	2	5	3	5	3	5	1	4	1	5
23	1	5	1	4	1	4	2	4	2	3	3	5	2	3
24	2	4	2	5	3	5	1	5	1	4	2	4	3	4
25	4	5	3	3	2	4	2	5	3	5	1	3	2	5
26	2	3	2	4	1	4	3	5	2	5	4	5	1	4
27	1	4	1	4	2	5	1	4	1	4	1	4	3	5
28	2	5	3	5	2	3	2	4	3	5	2	5	1	3
29	3	5	2	3	2	4	1	4	2	3	3	3	2	4
30	2	4	1	4	1	5	3	5	1	4	2	5	3	4

Users		Public interest		Participation		Education		Heritage		Deepening Cultural Understandin		Innovation		Digital Interactive Experiences	
	Before	After	Before	After	Before	After	Before	After	before	After	Before	After	Before	After	After
Average score	2.30	4.13	2.10	4.00	1.83	4.13	1.90	4.26	1.96	4.23	2.03	4.13	1.96	4.23	

Note. Collected and edited by the author. Details of what was asked in the test are below:

1. Pre-Test Questionnaire:

Description: Please rate the following statements based on your expectations, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

Q1: I look forward to digital media enhancing my interest in costume culture.

Q2: I believe digital tools will enhance my understanding of costume culture.

Q3: I hope this product will help me better understand the history and design of the Jin Dynasty's costumes.

Q4: I expect this product to inspire my new interest in traditional culture.

Q5: I think digital experiences will make costume culture easier to understand and accept.

Q6: I hope to see innovation and modernization of traditional costume culture through this product.

Q7: I anticipate this product will offer a highly interactive fun learning experience.

2. Post-Test Questionnaire:

Description: Please rate the following statements based on your actual experience, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

Q1: This product enhanced my interest in learning about costume culture

Q2: Digital tools in this product enhanced my understanding of costume culture.

Q3: This product helped me better understand the history and design of the Jin Dynasty's costume.

Q4: This product stimulated my new interest in traditional culture.

Q5: This product made costume culture easier to understand and accept.

Q6: This product displayed innovation and modernization in traditional costume culture.

Q7: This product provided a highly interactive fun learning experience.

Table 20

Average Score Before and After Testing the Digital Knowledge Repository of Jin Dynasty Costumes

Assessment	Average score	
	μ	SD
Before testing the prototype	2.01	0.88
After testing the prototype	4.16	0.75

Note. Table 20 shows the mean and standard deviation of the target users' scores before and after using the digital knowledge repository. Before using the digital knowledge repository, the mean was 2.01, and the standard deviation was 0.88; after using the digital knowledge repository, the mean increased to 4.16, and the standard deviation was 0.75. These two data validate the validity of the digital knowledge repository of Jin Dynasty costumes as a learning tool.

5.3.3.3 DATA ANALYSIS

Table 19 shows the progress of the target users on seven questions about the cultural experience of costumes after experiencing the digital knowledge repository. The analysis of the experience assessment shows that:

1. Before experiencing the digital knowledge repository, target users scored an average of 2.30 out of 5 on public interest questions, or 46%. After experiencing the digital knowledge repository, the average score of target users on public interest questions was 4.13 out of 5, or 82.6%.
2. Before experiencing the digital knowledge repository, target users scored an average of 2.10 out of 5 on the participation questions, or 42%. After experiencing the digital knowledge repository, the average score of the target users on the participation questions was 4.00 out of 5, or 80%.
3. Before experiencing the digital knowledge repository, the average score of the target users on educational questions was 1.83 out of 5, or 36.6%. After experiencing the digital knowledge repository, the average score of the target users on academic questions was 4.13 out of 5, or 82.6%.
4. Before experiencing the digital knowledge repository, the average score of the target users on the cultural heritage questions was 1.90 out of 5, or 38%. After experiencing the digital knowledge repository, the average score of the target users on the cultural heritage questions was 4.26 out of 5, or 85.2%.
5. Before experiencing the digital knowledge repository, target users scored an average of 1.96 out of 5, or 39.2%, on the deepening cultural understanding questions. After experiencing the digital knowledge repository, the average

score of the target users on the deepening cultural understanding questions was 4.23 out of 5, or 84.6%.

6. Before experiencing the digital knowledge repository, the average score of the target users on the innovation questions was 2.03 out of 5, or 40.6%. After experiencing the digital knowledge repository, the average score of the target users on the innovation questions was 4.13 out of 5, or 82.6%.
7. Before experiencing the digital knowledge repository, the average score of the target users on the digital interaction experience questions was 1.96 out of 5, or 39.2%. After experiencing the digital knowledge repository, the average score of the target users on the digital interaction experience questions was 4.23 out of 5, or 84.6%.

Table 20 shows the mean and standard deviation of the target users' scores before and after using the digital knowledge repository. Before using the digital knowledge repository, the mean was 2.01, and the standard deviation was 0.88; after using the digital knowledge repository, the mean increased to 4.16, and the standard deviation was 0.75. These two data validate the validity of the digital knowledge repository of Jin Dynasty costumes as a learning tool.

5.4 USER BEHAVIOR OBSERVATIONS

The user observation form consists of 4 rating questions and one multiple-choice question to observe user performance during the experience. The rating questions utilize the Likert five-point scale, ranging from 1 to 5, where 1 represents the worst experience, and 5 illustrates the best experience. The researcher used this multiple-choice question to assess the most popular segment among the users (Table 21).

Table 21

User Behavior Observation Results after Users Experienced the Jin Dynasty Costumes Digital Knowledge Repository.

User	Q1	Q2	Q3	Q4
1	4	5	4	5
2	5	4	3	4
3	4	5	4	5
4	4	4	3	4
5	5	5	4	5
6	4	4	3	5
7	5	5	2	4
8	4	4	3	5
9	5	5	4	4
10	5	4	3	5

User	Q1	Q2	Q3	Q4
11	5	5	4	4
12	5	4	3	5
13	4	5	4	4
14	5	5	3	5
15	4	5	4	4
16	4	4	3	5
17	5	5	4	4
18	4	4	3	5
19	5	5	4	4
20	4	4	3	5
21	5	5	4	4
22	4	4	4	5
23	5	5	2	4
24	4	4	4	5
25	5	5	3	4
26	4	4	4	5
27	5	5	3	4
28	4	4	4	5
29	5	5	3	4
30	4	4	4	5
Average score	4.50	4.53	3.43	4.53

Note. Collected and edited by the author. Details of the content of the User Behavior Observations are listed below:

Description: The researcher observed and recorded the user experience process. Ratings were made based on observations of the user experience process on a scale of 1 to 5, where one means "the highest" and five means "the lowest."

Q1: Audience's interest in this digital experience project.

Q2: How excited is the audience when they are having a digital experience?

Q3: Is the audience experience smooth?

Q4: The overall length of time while experiencing the project.

Q5: Which part did the user spend the longest time in?

5.4.1 DATA ANALYSIS

1. User Interest in the Digital Experience Project
   1) High Interest: The high score of 4.5 indicates that users are intensely interested in the digital experience project.
   2) Attractiveness: This may imply that the project is highly appealing regarding visual presentation, content richness, and interactivity.

3) User Engagement: High interest suggests that users are more likely to actively engage with and explore the project content.

2. User Excitement During the Experience
   1) Intense Excitement: Users feel very excited during the digital experience.
   2) Experience Effect: This high excitement may be due to the project's interactive design, educational content, and technological innovations.
   3) Emotional Connection: High excitement may reflect a solid emotional connection between users and the content of the digital experience.
3. Smoothness of User Experience
   1) Smooth Experience: This item scored the lowest, indicating that users felt the overall experience was not very fluid, primarily due to the slow loading speeds of some modules.
   2) User Interface and Navigation: This may suggest that while the digital experience's user interface is intuitive and user-friendly with clear navigation, the technical performance lacks fluidity.
   3) Reducing Frustration: A smooth experience helps minimize user frustration and enhances overall satisfaction.
4. Total Duration of the Experience Project
   1) Moderate Duration: A score of 4.5 may indicate that users perceive the total duration of the experience to be around 9-12 minutes.
   2) Sustained Engagement: An appropriate duration for the experience helps maintain user interest and participation, avoiding fatigue or boredom.
5. Where Users Spend the Most Time
   1) Users generally stay longer time at "Experience of digital costumes of the Jin Dynasty". This indicates that users are more interested in interactive experiences and interesting ways of displaying digital costumes.

5.4.2 SUMMARY

The analysis indicates that users exhibit high interest and engagement in the digital Jin Dynasty costume display project. The project's interactivity, educational content, and technological innovations are likely key factors in attracting users and making them feel excited and satisfied. However, users showed some concerns about the smoothness of use, which may be related to the loading speed of the system modules, and this is a direction that needs to be strengthened in further optimization and improvement.

5.5 USER EVALUATION

5.5.1 QUESTIONNAIRE SETTING

The researchers also invited these 30 target groups of users to conduct a digital knowledge repository assessment at the same time. The assessment questionnaire is designed based on Whitney Quesenbery's "5E" experience evaluation model (Effective, Efficient, Engaging, Easy to Use, Error Tolerant) and the Likert scale method of analysis (Quesenbery, 2004). The results of the user assessment of the digital knowledge repository are as follows:

Description: Please rate the following statements based on your experience using a scale from 1 to 5, where 1 represents "Strongly Disagree," and 5 represents "Strongly Agree."

1. Effective
    1) Q1. This mini-program does a great job of conveying the culture and history of Jin Dynasty costumes.
    2) Q2. I can obtain comprehensive and accurate information about Jin Dynasty costumes through this mini-program.
2. Efficient
    3) Q3. I quickly locate the information I want while using this mini-program.
    4) Q4. The operation process and response speed of this mini-program meet my expectations.
3. Engaging
    5) Q5. The content and design of this mini-program are interesting and engaging to me.
    6) Q6. I feel pleased and involved when using this mini-program.
4. Easy to Use
    7) Q7. This mini-program is easy to understand and use, even for beginners.
    8) Q8. The interface layout and navigation logic of this mini-program are comfortable for me.
5. Error Tolerant
    9) Q9. I can easily find a solution when encountering problems or errors using this mini-program.
    10) Q10. This mini-program provides clear guidance and feedback when I make a mistake.

The user assessment form utilizes the Likert five-point scale assessment method, where each question's answers are set on a scale from 1 to 5 based on the user's experience. Finally, the researcher calculated the average score for each question for assessment. A score exceeding 3 indicates that the user's feedback is positive, while a score below 3 suggests that the user's feedback is negative.

The evaluation results are as follows (Table 22):

Table 22

Evaluation of the Digital Knowledge Repository of Jin Dynasty Costumes by Target Users Using Whitney Quesenbery's "5E" Experience Evaluation Model

User	Users Evaluations									
	Effective 1	Effective 2	Efficient 1	Efficient 2	Engaging 1	Engaging 2	Easy to Use	Easy to Use	Error Tolerant	Error Tolerant
1	5	5	3	4	5	5	5	5	4	5
2	3	5	4	3	2	5	5	4	5	3
3	3	5	5	5	5	2	5	4	4	5
4	5	3	5	1	3	5	5	5	3	3
5	5	5	5	4	5	5	5	4	5	3
6	5	5	3	2	5	3	4	3	1	3
7	5	3	1	3	5	4	4	4	1	5
8	5	5	5	5	4	5	3	3	4	3
9	4	5	4	2	5	4	4	3	5	5
10	5	4	3	4	3	4	2	5	5	3
11	4	3	5	3	5	5	4	2	3	4
12	4	3	4	3	5	5	2	2	3	1
13	4	1	3	4	4	5	5	4	4	5
14	5	5	5	4	5	3	2	5	3	5
15	3	1	4	4	4	4	5	5	4	5
16	3	4	5	3	3	4	3	3	3	2
17	3	4	4	3	2	4	4	3	2	3
18	3	4	3	4	4	4	2	3	4	2
19	4	4	2	3	4	3	3	4	2	3
20	4	4	3	3	5	4	3	3	5	2
21	4	4	4	2	4	5	4	3	3	4
22	5	3	2	1	3	3	4	4	2	4
23	4	3	4	2	4	4	5	4	4	2
24	5	5	4	3	5	4	3	5	3	3
25	5	4	3	2	4	3	4	2	4	1
26	4	4	1	5	4	4	5	2	2	5
27	5	4	2	4	5	4	4	4	2	3
28	3	3	4	2	4	5	3	2	1	4
29	3	5	5	3	5	4	3	5	5	2
30	4	3	1	5	4	5	5	3	3	4

User	Users Evaluations									
	Effective 1	Effective 2	Efficient 1	Efficient 2	Engaging 1	Engaging 2	Easy to Use	Easy to Use	Error Tolerant	Error Tolerant
Average score	4.13	3.86	3.53	3.2	4.16	4.13	3.83	3.60	3.3	3.4
Score	4.0		3.4		4.1		3.7		3.4	

Note. Collected and edited by the author. Details of what was asked in the evaluation are below:

Description: Please rate the following statements based on your experience using a scale from 1 to 5, where 1 represents "Strongly Disagree," and 5 represents "Strongly Agree."

1. Effective

Q1: This mini-program does a great job of conveying the culture and history of Jin Dynasty costumes.

Q2: This mini-program provides comprehensive and accurate information about Jin Dynasty costumes.

2. Efficient

Q3: I quickly locate the information I want while using this mini-program.

Q4: This mini-program operation process and response speed meet my expectations.

3. Engaging

Q5: The content and design of this mini-program are interesting and engaging to me.

Q6: I feel pleased and involved when using this mini-program.

4. Easy to Use

Q7: This mini-program is easy to understand and use, even for beginners.

Q8: This mini-program's interface layout and navigation logic are comfortable for me.

5. Error Tolerant

Q9: I can easily find a solution when encountering problems or errors sing this mini-program.

Q10: This mini-program provides clear guidance and feedback when I make a mistake.

5.5.2 DATA ANALYSIS

Based on the user assessment data, The researcher conducted a detailed analysis using Whitney Quesenbery's 5E experience evaluation model (Effective, Efficient, Engaging, Easy to Use, Error Tolerant)

1. Effective

Average Score: 4.0

Interpretation: Users generally find the mini-program quite effective in conveying the culture and history of Jin Dynasty costumes. The mini-program excels in educating users and providing information, with users expressing satisfaction with the quality of content in this aspect.

2. Efficient

Average Score: 3.4

Interpretation: The efficiency score is lower compared to effectiveness. This could indicate that users find the speed of locating information in the mini-program insufficient or the operation process and response time do not fully meet their expectations. This suggests the need for improvements in search functionality, user interface optimization, or server response times.

3. Engaging

Average Score: 4.1

Interpretation: This is the highest score among all dimensions, indicating that users generally find the content and design of the mini-program interesting and engaging, providing a pleasant user experience. This suggests that the mini-program is successful in maintaining user interest and engagement.

4. Easy to Use

Average Score: 3.7

Interpretation: While not low, it points to room for improvement in usability. Users find the learning curve and difficulty of using the mini-program acceptable, but there may be issues with interface design or navigation logic affecting the user experience.

5. Error Tolerant

Average Score: 3.4

Interpretation: Tied as one of the lowest scores with efficiency, this indicates that users may struggle to find solutions when encountering errors or problems, or the feedback provided by the mini-program in error handling is not clear enough. This highlights significant room for improvement in error messaging, help documentation, and user support.

5.5.3 SUMMARY

Table 22 shows that the target users showed high satisfaction with the effectiveness and engagement of the digital knowledge repository. However, its efficiency and error tolerance performance could have been more satisfactory.

Researchers need to consider optimizing the user interface and search function in subsequent iterations, improving response time, and enhancing error handling mechanisms and user guidance to enhance the overall user experience (Figure 99).

Figure 101

Results of the Target Users' Assessment of the Digital Knowledge Repository of Jin Dynasty Costumes

Note. Created and edited by the author.

5.6 CHAPTER SUMMARY

In this chapter, the researcher comprehensively assesses the digital knowledge base of Jin Dynasty costumes. The evaluation consisted of 1) expert assessment, 2) design optimization, 3) user capability testing, 4) user behavior observation, and 5) user evaluation. This phase aims to validate the effectiveness of the research, development, and design work in Chapter 4 and provide directions for improvement. Feedback from users and experts is essential for optimizing the product.

In conclusion, Chapter 5 demonstrates the process of applying digital technologies to cultural heritage preservation and education through evaluation. This approach has deepened users' understanding of Jin Dynasty costume culture to a certain extent and facilitated the application of digital technologies in cultural heritage preservation and education.

CHAPTER 6 CONCLUSIONS DISCUSSION AND RECOMMENDATION

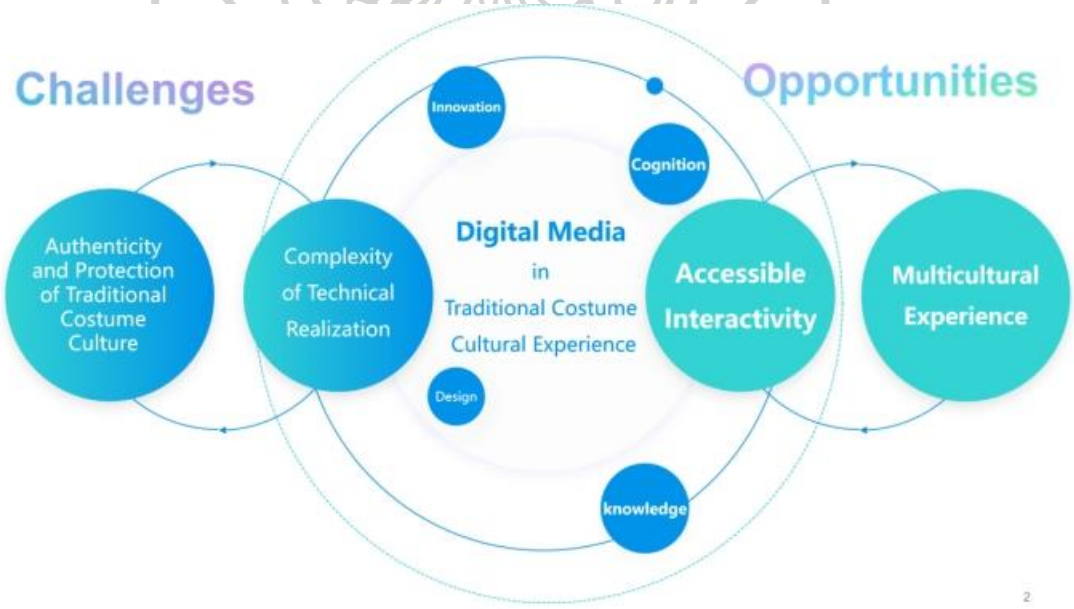
6.1 CONCLUSIONS

6.1.1 TO ANALYZE THE CHALLENGES AND OPPORTUNITIES OF DIGITAL KNOWLEDGE REPOSITORY IN THE EXPERIENCE OF TRADITIONAL COSTUME CULTURE.

This study delves into the critical role that digital media plays in experiencing traditional costume culture, shedding light on the challenges and opportunities it presents. The challenges encompass ensuring the culture's authenticity, preserving traditions, and navigating the complexities of technological implementation. Conversely, the opportunities reside in utilizing digital media to amplify the accessibility and interactivity of cultural experiences. This approach offers users a richer, diverse, and engaging cultural learning experience (Figure 100).

Figure 102

Challenges and Opportunities of Digital Media in Traditional Costume Cultural Experience



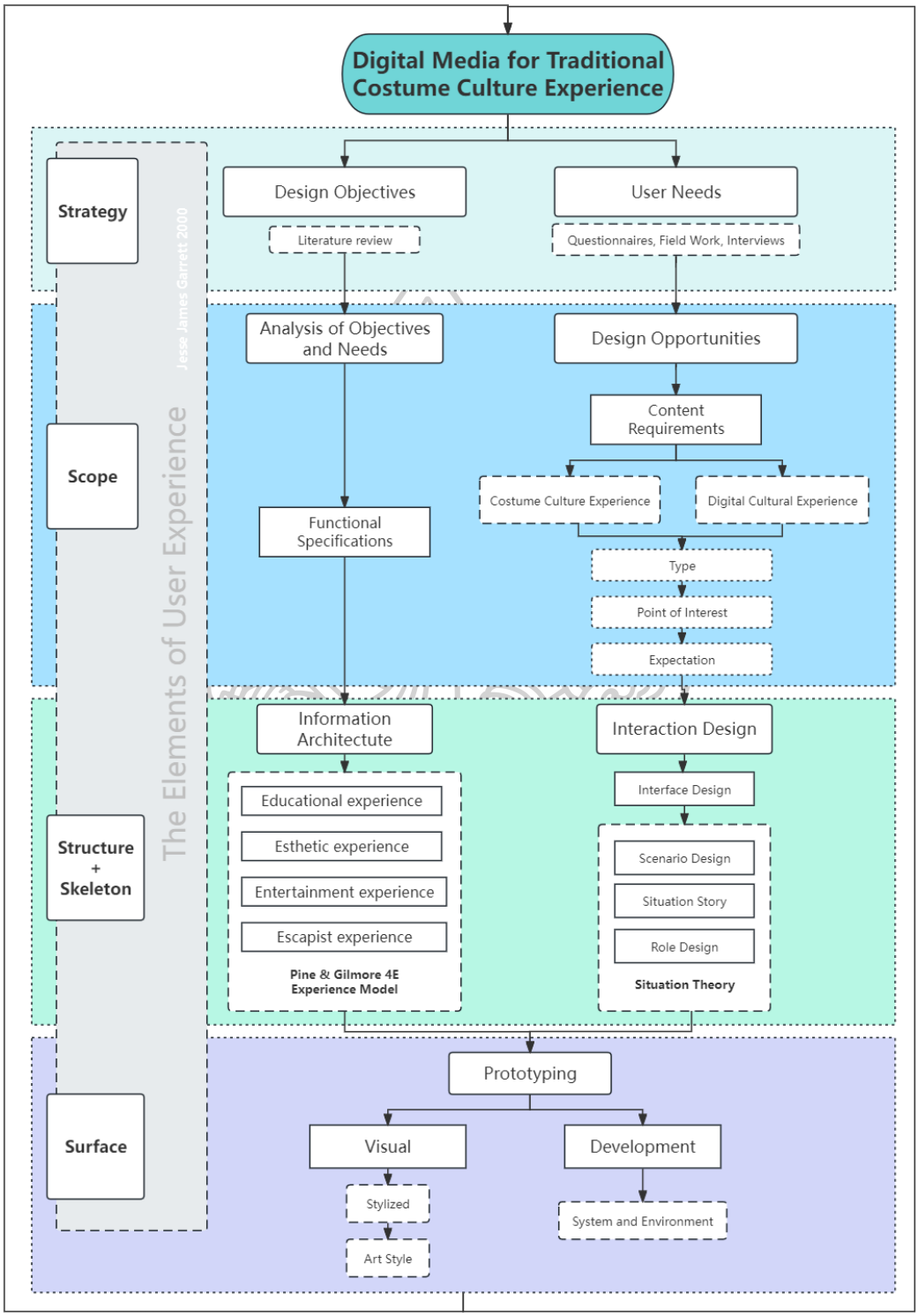
Note. Created and edited by the author.

6.1.2 TO EXPLORE THE DESIGN STRATEGIES AND METHODS OF JIN DYNASTY COSTUMES' USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY

The study explores innovative design strategies and methods for creating a user-centered digital knowledge repository focusing on Jin Dynasty costumes. This study includes the use of augmented reality technology to craft immersive experiences, along with the application of situational design to amplify educational and interactive elements. The work demonstrates that these strategies and methods can render traditional costume culture more vivid and appealing (Figure 101).

Figure 103

Design Strategies and Methods of Digital Media in Traditional Costume Cultural Experience



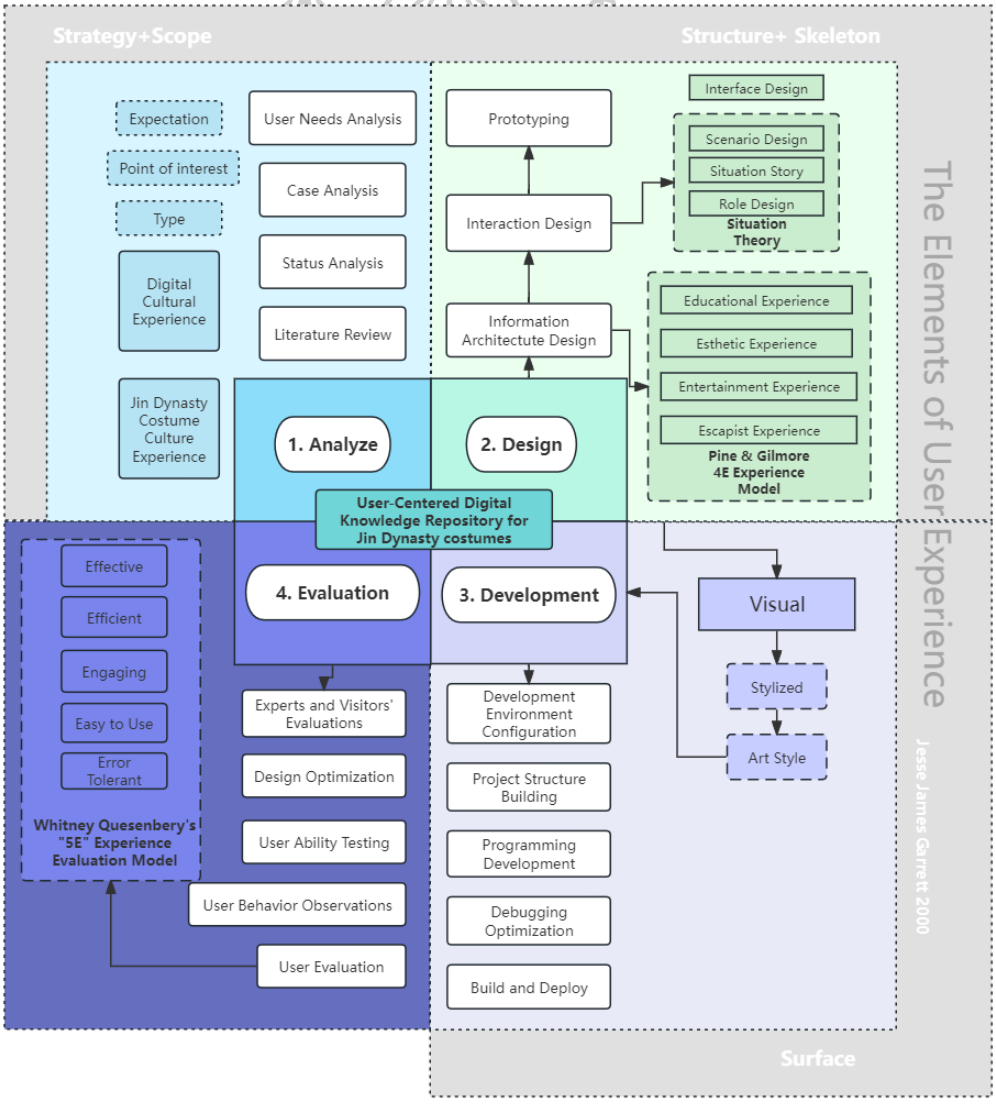
Note. Created and edited by the author.

6.1.3 TO CONSTRUCT A NEW MODEL FOR JIN DYNASTY COSTUMES' USER-CENTERED DIGITAL KNOWLEDGE REPOSITORY AND EVALUATE ITS USER EXPERIENCE.

The study successfully develops a new model for Jin Dynasty Costumes' user-centered digital knowledge repository and evaluates its user experience. Through user feedback and engagement analysis, the new model improves users' understanding of Jin Dynasty culture, increases participation, and enhances the efficiency of cultural value transmission (Figure 102).

Figure 104

The New Conceptual Model of a User-centered Digital Knowledge Repository for Jin Dynasty Costumes



Note. Created and edited by the author.

This study concentrates on enhancing the preservation of digital cultural heritage and the design of user experiences, with a particular emphasis on the role played by digital tools in the realm of cultural education. Present efforts are directed towards enhancing the user interface and its interactivity. This approach maintains the repository's dynamism and its capacity to engage users effectively as an educational tool. Such initiatives are essential for amplifying the repository's contribution to cultural education and ensuring its ongoing relevance and attractiveness to users.

6.2 DISCUSSIONS

6.2.1 COMPARISON WITH OTHER RESEARCHERS

1. Jin Dynasty Costumes Comparative Study

Unlike historical research on traditional costumes of similar dynasties or regions, Jin Dynasty costumes' historical evolution and diversity showcase distinct cultural integrations and regional characteristics. Jin Dynasty costumes reflect the fusion of ethnic exchanges and innovation in clothing art. The representative features of northern minority ethnic costumes in the Jin Dynasty distinctly differ from the Hanfu of the Central Plains area. These characteristics profoundly influenced the clothing of the later Qing Dynasty and Chinese modern and contemporary fashion.

2. Digitalization and Virtual Design of Traditional Costumes Digital Design Trends

This study emphasizes a multi-level approach to integrating digital media with traditional costume culture, focusing on user engagement and immersive experience. This approach contrasts with findings primarily focused on digital archiving and virtual exhibitions with limited user interaction (Shuyuan & Xia, 2021; Zhu et al., 2022). Unlike these studies, the conceptual model incorporates advanced interaction techniques and storytelling, which are crucial for deepening user engagement and enhancing educational outcomes. Moreover, the emphasis on continuous iteration and sustainability aligns with the digital cultural heritage platform advocated by Wang et al. (2023)for raising public awareness of cultural heritage.

3. Enhancement of Audience Cultural Experience in the Digital Age Digital Media Trends

This study's focus on the audience's needs for cultural experiences in the digital era aligned with current trends in digital media and audience engagement research. It highlighted the potential of digitalization in enhancing participation and accessibility.

6.2.2 COMPARISON WITH THE THEORY

This study integrated multiple theoretical frameworks to construct a knowledge repository of Jin Dynasty costumes to explore the digital cultural experience of Jin Dynasty costumes, which was a novel approach in traditional costume research.

1. B. Joseph Pine and James H. Gilmore's "4E" experience model

The "4E" experience model by B. Joseph Pine and James H. Gilmore played a significant role in shaping the functional modules of the digital cultural experience product. Each dimension of the "4E" model (Entertainment, Education, Escapism, and Aesthetics) guided specific aspects of this study's design, ensuring that the construction of a digital knowledge repository of Jin Dynasty costumes would be not only informative and immersive but also emotionally engaging and aesthetically pleasing (Pine & Gilmore, 1998).

2. Contextual design through situation theory

The design of digital content heavily relies on situated cognition theory. This approach allows the study to create visually appealing images and construct content with story-like characters and scenes, offering users a profound understanding of Jin dynasty costumes' cultural and historical significance (Beyer & Holtzblatt, 1999).

3. Jesse James Garrett's user experience elements theory

Garrett's framework guided the overall planning and implementation of this study's digital knowledge repository. His emphasis on user-centered design helped ensure that the digital experience is intuitive, easy to use, and engaging, enhancing the cultural experience for a broader audience (Garrett, 2000).

4. Evaluation using Whitney Quesenbery's 5E model

In the final evaluation phase, Quesenbery's model provided a comprehensive perspective for assessing the effectiveness of the digital experience. This evaluation focused on the digital knowledge repository's performance in user engagement, effectiveness, and efficiency, ensuring that it achieves its intended impact on user experience and cultural education (Quesenbery, 2004).

The combination of these theories provided a solid foundation for this study. Unlike mainstream fashion studies, which primarily focus on aesthetics or trends, this study's approach emphasizes the cultural and historical narrative of costumes. By integrating these diverse theoretical perspectives, a digital cultural experience was created that was not only innovative but also deeply rooted in the rich cultural heritage of the Jurchen dynasty.

This comparative analysis highlighted the uniqueness of the theoretical approach of this study, contributing new insights to the fields of digital humanities and traditional costume research. It demonstrated how a multidimensional theoretical framework could effectively connect traditional cultural elements with modern digital experiences.

6.2.3 COMPARISON WITH OTHER WORKS

In this study, the application of experience design and cultural experience theory, compared to significant works in other fields of cultural research, presented new perspectives and methods. This was mainly reflected in the following aspects:

1. Definition of Experience Design and Cultural Experience

The study provided a detailed exploration of the definition of experience design, closely linking it to the cultural experience of traditional costumes. This definition

went beyond the traditional boundaries of experience design, emphasizing the importance of cultural elements and historical context in creating experiences.

2. Cultural Experience Models

The user-centered design highlighted in the conceptual model addresses a critical gap identified in previous studies, such as those by Maietti (2023), which noted the lack of deep user engagement in existing digital heritage platforms. By continuously integrating user feedback and employing immersive technologies like AR, the conceptual model enhances user interactions and builds a new paradigm of engaging digital experiences that meet user interests and learning expectations.

3. Connection Between Traditional Costumes and Cultural Experience

In this study, traditional costumes were regarded as a core element of cultural experience, emphasizing their role in conveying cultural values and historical education. This perspective differed from other studies focusing more on aesthetics, fashion, or market trends.

4. Cross-Disciplinary Collaboration and Innovation

The study for cross-disciplinary collaboration, particularly in the iteration and innovation stage, sets a new standard for digital knowledge repositories. It suggests that continuous technological and design innovations, driven by user data and cross-disciplinary expertise, can significantly improve the cultural experience. This approach aligns with (Murphy, 2023), who calls for innovative approaches to digitize and popularize cultural heritages but further details the mechanisms and processes for ongoing innovation and community engagement.

Indeed, through these detailed comparative analyses, it is evident that this study provides new insights into the research of traditional costumes and cultural experiences. It integrates historical research, experience design theory, and the application of digital technology, crafting a unique research perspective. This multidimensional approach not only enriches existing academic discussions but also paves new paths for future research, particularly in the field of combining traditional cultural elements with modern technology. This innovative approach demonstrates the potential for traditional cultural studies to evolve and adapt in the context of the digital era, offering a valuable template for future research in this and related fields.

6.3 RECOMMENDATIONS

1. Deeper Cultural and Historical Research

This study recommends for consideration the conduction of more in-depth research on the cultural and historical background of Jin Dynasty costumes. Utilize historical archives, literature, and artworks to enrich understanding of the role of costumes in Jin Dynasty society.

2. Expanding the Theoretical Framework of Experience Design

In the realm of experience design, it is recommended that new methods combine traditional costume culture with modern experience design theories. This includes

studying how costumes influence individual and collective cultural identities from psychological, sociological, and anthropological perspectives.

3. Technological Innovation and Application

Investigation of the innovative approaches in the application of digitalization and virtual technologies. For example, the latest augmented reality (AR) and virtual reality (VR) technologies can be used to create more immersive and interactive user experiences.

4. User Experience and Feedback

Regular collection of user feedback to understand their perceptions and suggestions regarding digital experiences. This will help optimize the design and content of experiences to ensure they meet the needs and expectations of the target audience.

5. Interdisciplinary Collaboration

This study recommends consideration of further interdisciplinary collaborations with historians, anthropologists, artists, and technology experts. Such collaborations can help integrate more expert knowledge and innovative perspectives in designing and implementing digital experiences.

6. Sustainability and Cultural Heritage Preservation

Investigation on how digital experiences can contribute to the sustainability and preservation of traditional costume culture. This can be done by exploring ways to convey the importance of cultural heritage preservation through digital media. This involves not just the preservation of physical artifacts but also the digitization and dissemination of cultural knowledge and practices, ensuring they endure for future generations.

7. Public Engagement and Educational Programs

The development of public engagement and educational programs to increase societal awareness and interest in Jin Dynasty costume culture. This can be achieved through organizing workshops, exhibitions, and interactive activities. Such programs could involve collaborations with schools, cultural institutions, and community groups, offering a range of educational resources and experiences that make the culture accessible and engaging for diverse audiences.

6.4 CHAPTER SUMMARY

In this study, researchers focused on exploring how digital media can enhance the cultural experience of traditional costumes, particularly the rich history and presentation of Jin Dynasty costumes. The study aimed to analyze the challenges and opportunities presented by digital media in this field, investigate effective design strategies and methods, and construct and evaluate digital cultural experience models for Jin Dynasty costumes.

The main findings and arguments of the study include:

1. Application of Digital Media

The study found that digital media is crucial in providing rich, interactive, and educational experiences of traditional costume culture. Through digital technology, the historical and cultural value of traditional costumes is transformed into engaging educational experiences.

2. Design Strategies and Methods

The study emphasized the importance of innovative design strategies in enhancing cultural experiences. It explored the potential use of augmented reality technology and the role and methods of situational construction in digitalizing the traditional costume cultural experience.

3. Construction and Evaluation of the Digital Cultural Experience Model for Jin Dynasty Costumes

This study successfully constructed a digital knowledge repository for Jin Dynasty costumes and evaluated its effectiveness. The digital knowledge repository proved significantly effective in enhancing public understanding of Jin Dynasty culture, increasing participation, and disseminating cultural values.

In terms of theory and practice, the study provides a new perspective on integrating digitalization with traditional culture and introduces innovative thinking in the field of experience design. Practically, the study offers innovative methods and technical guidance for digitally presenting traditional costumes, aiding in the more effective preservation and popularization of traditional culture.

In summary, this research breaks down the barriers between traditional culture and modern technology, paving new ways to disseminate traditional costume culture digitally. In the future, the study plans to expand this work in several areas, including further optimizing user experience design, expanding the scope of technological applications, and exploring more innovative digital applications that integrate with traditional culture. Through these efforts, the study aims to promote the protection and dissemination of cultural heritage and spark new interest and deeper understanding of traditional costume culture among the public.

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APPENDIX

Appendix 1: *Letter of Introduction to IOC Review for Miyoung Seo, Ph.D.*

No.8610/ 2515

Faculty of Decorative Arts, Silpakorn University
Na Phra Larn Rd., Phra Borom Maha Ratchawang
Phra Nakhon, Bangkok 10200 Thailand

13th June, 2023

Subject: Invitation to be an inspector of research tool quality

Dear Professor Dr. Miyoung Seo

Mrs.Oulu YUE is a graduate student ID 630430042 in Design Program at Graduate School, Silpakorn University. Currently, he is conducting his thesis study entitled: A New Paradigm for Digital Explore the Cultural Experience of Jin Dynasty Costumes. In this regard, Graduate School, Silpakorn University would like to invite you to inspect the quality of research tools for the student.

Your kind assistance and academic contribution is much appreciated.

T. Jiarakun

(Dr. Thanatorn Jiarakun)
Dean of Faculty of Decorative Arts,
Silpakorn University

Contact to : info.decsu@gmail.com
Tel. +662-221-5874, +662-221-5832

Appendix 2: *Letter of Introduction to IOC Review for Associate Professor Kriangsak Khiaomang, Ph.D.*

ที่ อว 8610 / 2510

คณะมัณฑนศิลป์ มหาวิทยาลัยศิลปากร
31 ถนนหน้าพระลาน แขวงพระบรมมหาราชวัง
เขตพระนคร กรุงเทพฯ 10200

13 มิถุนายน 2566

เรื่อง ขอเชิญเป็นผู้ตรวจคุณภาพเครื่องมือวิจัย

เรียน รองศาสตราจารย์ ดร.เกรียงศักดิ์ เขียวมั่ง

ด้วย Mrs.Oulu YUE รหัสประจำตัว 630430042 นักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการออกแบบ คณะมัณฑนศิลป์ มหาวิทยาลัยศิลปากร หัวข้อดุษฎีนิพนธ์ เรื่อง A New Paradigm for Digital Explore the Cultural Experience of Jin Dynasty Costumes โดยมี ผู้ช่วยศาสตราจารย์ ดร.อดิเทพ แจ้ดนาลาว เป็นอาจารย์ที่ปรึกษาวิทยานิพนธ์ นั้น

ในการนี้ คณะมัณฑนศิลป์ จึงขอเรียนเชิญท่านเป็นผู้เชี่ยวชาญตรวจเครื่องมือวิจัยให้กับนักศึกษา เพื่อนักศึกษาจะได้นำข้อเสนอแนะที่ได้ไปปรับปรุงคุณภาพเครื่องมือการวิจัยให้มีความเหมาะสมต่อไป

จึงเรียนมาเพื่อโปรดพิจารณา คณะฯ หวังเป็นอย่างยิ่งว่าจะได้รับความอนุเคราะห์จากท่าน และขอขอบพระคุณเป็นอย่างสูงมา ณ โอกาสนี้

ขอแสดงความนับถือ

(อาจารย์ ดร.ธนาทร เจียรกุล)
คณบดีคณะมัณฑนศิลป์

สำนักงานคณบดี
โทร 0-2221-5832
โทรสาร 0-2225-4350

Appendix 3: Letter of Introduction to IOC Review for Professor Wattana Jutavipard.

ที่ อว 8610 / 2511

คณะมัณฑนศิลป์ มหาวิทยาลัยศิลปากร
31 ถนนหน้าพระลาน แขวงพระบรมมหาราชวัง
เขตพระนคร กรุงเทพฯ 10200

13 มิถุนายน 2566

เรื่อง ขอเชิญเป็นผู้ตรวจคุณภาพเครื่องมือวิจัย

เรียน ศาสตราจารย์เกียรติคุณวัฒนะ จูฑะวิภาต

ด้วย Mrs.Oulu YUE รหัสประจำตัว 630430042 นักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการออกแบบ คณะมัณฑนศิลป์ มหาวิทยาลัยศิลปากร หัวข้อดุษฎีนิพนธ์ เรื่อง A New Paradigm for Digital Explore the Cultural Experience of Jin Dynasty Costumes โดยมี ผู้ช่วยศาสตราจารย์ ดร.อดิเทพ แจ้ดนาลาว เป็นอาจารย์ที่ปรึกษาวิทยานิพนธ์ นั้น

ในการนี้ คณะมัณฑนศิลป์ จึงขอเรียนเชิญท่านเป็นผู้เชี่ยวชาญตรวจเครื่องมือวิจัยให้กับนักศึกษา เพื่อนักศึกษาจะได้นำข้อเสนอแนะที่ได้ไปปรับปรุงคุณภาพเครื่องมือการวิจัยให้มีความเหมาะสมต่อไป

จึงเรียนมาเพื่อโปรดพิจารณา คณะฯ หวังเป็นอย่างยิ่งว่าจะได้รับความอนุเคราะห์จากท่าน และขอขอบพระคุณเป็นอย่างสูงมา ณ โอกาสนี้

ขอแสดงความนับถือ

(อาจารย์ ดร.ธนาทร เจียรกุล)
คณบดีคณะมัณฑนศิลป์

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Appendix 4:

INDEX OF ITEM OBJECTIVE CONGRUENCE (IOC)

Consideration, Evaluation, Suggestions

Research topic:
Digital Explore the Cultural Experience of Jin Dynasty Costumes

The researcher:

Mrs. Yue Oulu（Ph. D student of Silpakorn University）Phone: +8613701386563，

E-mail：yueoulu@foxmail.com

Asst. Prof. Dr. Atithep Chaetnalao Phone: 081-269-2697，

E-mail：chaetnalao@hotmail.com

Research objectives:

1. To analyze the challenges and opportunities of digital technology in traditional costume culture's heritage and innovative design.
2. To explore the strategies and methods of digital technology in the heritage and innovative design of traditional costume culture, especially in the context of the display of costumes of the Jin Dynasty.
3. To construct a new model for digital display and experience of Jin Dynasty costumes and to evaluate its effectiveness.

This research tool is used to answer the following research Questions:

1. To study and analyze the popularity and attention of the costumes of the Jin Dynasty.
2. To study and analyze the cultural connotations and elements of the costumes of the Jin Dynasty.
3. To study the popularity of digital technology among the public.
4. To study the respondents' perceptions of digital costumes, cultural experiences, and style preferences.
5. To study experts' opinions on Jin dynasty costumes, costume design experts, and digital technology experts on digital Jin dynasty costume cultural experiences.

Clarification:

Accuracy evaluation of a research tool for new paths of digital exploration of Jin Dynasty costume display and experience (IOC): a mixed-method study combining Jin Dynasty costume display and experience with digital technology. Using it as a research data collection tool by identifying accuracy criteria is appropriate.

+1=ensure the problem is correct

0=Not sure whether the problem is appropriate.

-1=ensure that the problem is inappropriate

Tick (✓)in your comment box and write down suggestions for further improvement.

1. Visitor Questionnaire
    1.1 Part 1: General information issues
        1.1.1 Gender
            [Select One Answer Choice] *
                (1) Male.
                (2) Female.
                (3) Other.
                (4) Prefer not to disclose.
        1.1.2 What is your age?
            [Select One Answer Choice] *
                (1) Under 18 years old.
                (2) 18-25 years old.
                (3) 26-30 years old.
                (4) 31-35 years old.
                (5) 36-40 years old.
                (6) 41-45 years old.
                (7) 46-50 years old.
                (8) 50 years old and above.
        1.1.3 Your education level:
            [Select One Answer Choice] *
                (1) High school and below.
                (2) Junior college.
                (3) Bachelor degree.
                (4) Master degree.
                (5) Doctoral degree or above.
    1.2 Part 2: "Jin Dynasty costumes" issues
        1.2.1 On a scale of 1-5, how interested are you in traditional costumes?
            [Select One Answer Choice] *
            1=lowest, 2=low, 3=medium, 4=high, 5=highest.
                (1) 1.
                (2) 2.
                (3) 3.
                (4) 4.
                (5) 5.
        1.2.2 Please rank the following factors that inspire you to wear traditional dress in order of importance.
            [Please fill in the numbers in the middle brackets in order] *
                (1) Love of traditional culture.
                (2) Sense of national identity.
                (3) Can take great photos.
                (4) Novelty and individuality.
                (5) Can socialize "circle".

(6) Recommended by good friends around me.
(7) Need to wear traditional costumes.

1.2.3 Please rank the following scenario factors that inspire you to wear traditional costumes in order of their importance.

[Please fill in the numbers in the middle brackets in order] *

(1) Traveling.
(2) Shopping, commuting.
(3) Performances and photo shoots.
(4) Festive events.
(5) Ceremonial occasions.

1.2.4 Please rank the following factors that influenced your choice of traditional costume style in order of their importance.

[Please fill in the numbers in the middle brackets in order] *

(1) Style/appearance.
(2) Form/Dynasty.
(3) Symbolic meaning of the pattern.
(4) Price.
(5) Historical rank.
(6) Fabric.

1.2.5 On a scale of 1 to 5, how much do you know about Jin dynasty costumes?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

The Jin Dynasty, which ruled from 1115 until 1234, lasted 119 years. The Jurchen, predecessors of the later Manchus, created the Jin Dynasty in northeastern China and progressively moved southward, eventually defeating the Liao and Northern Song dynasties and uniting northern China. Northern China saw significant economic and cultural development, as well as numerous political and social upheavals, throughout the Jin Dynasty's reign. The Jin Dynasty was a vibrant and inventive time in Chinese history that had a significant effect on China's development and evolution. The Mongol Empire finally toppled the Jin Dynasty. Although the Jin Dynasty was only in power for a brief time, it had a significant impact on Chinese history.

1.2.6 If you know about Jin Dynasty costumes, through which channels did you learn about them?

[Select One or More Answer Choices] *

(1) Books.

(2) Internet search.
(3) Museums, exhibitions, and other cultural events.
(4) Academic research.
(5) Social media platforms.
(6) Historical Theme Park Tour.
(7) Others. Please specify: _____

1.3 Part 3: "Digital experience" issues

1.3.1 On a scale of 1-5, how important do you think digital technology is to the future of cultural experience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.3.2 Have you experienced the technology associated with Digital cultural experience?

[Select One Answer Choice] *

(1) Never.
(2) Rarely.
(3) Sometimes.
(4) Often.
(5) Always.

1.3.3 In what situations do you typically experience digital culture?

[Select One Answer Choice] *

(1) Museum visits.
(2) Historical theme park visits.
(3) Literature reading and research.
(4) Other. Please specify: _____

1.3.4 On a scale of 1-5, are you interested in a digital cultural experience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4 Part 4: "Jin Dynasty costumes and Digital experience" issues

1.4.1 Please rank the following factors that inspire you to experience digital costume in order of importance.

[Please fill in the numbers in the middle brackets in order] *

(1) Interesting cultural presentation.
(2) More interactive experience.
(3) More detailed viewing of displays.
(4) Experience at any time.
(5) Repeat experience.

1.4.2 Have you heard of "virtual Clothing"?

[Select One Answer Choice] *

(1) Yes.
(2) No.

Virtual clothing, also known as digital apparel or digital garments, refers to the use of virtual reality technology to create digital garments that can be worn by a virtual avatar in a digital space. Virtual clothing allows designers and consumers to explore different styles, colors, and materials without the need for physical production (Petit et al., 2019).

1.4.3 On a scale of 1-5, how likely are you to experience virtual costumes to enhance your cultural experience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4.4 Please rank the following styles of virtual costume design in order of priority according to your interests, and select up to 3 items.

[Please fill in the numbers in the middle brackets in order] *

Traditional Style.

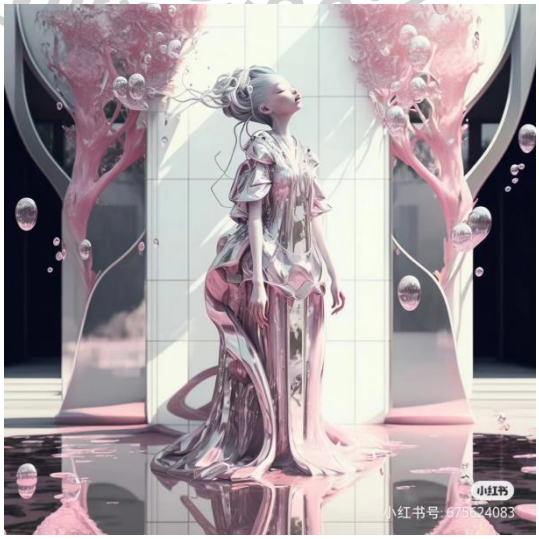
Traditional Mixed Modern Style.

Minimalist mixed Surrealist Style.

Traditional Mixed Digital Fantasy Style.

Anime/game style.

Surrealist Style.



Abstract Art Style.

1.4.5 On a scale of 1-5, would you like to try to experience Jin Dynasty costume culture through digital technology?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

2. Field Interview

1.1 Gender

[Select One Answer Choice] *

(1) Male.
(2) Female.
(3) Other.
(4) Prefer not to disclose.

1.2 What is your age?

[Select One Answer Choice] *

(1) Under 18 years old.
(2) 18-25 years old.
(3) 26-30 years old.
(4) 31-35 years old.
(5) 36-40 years old.
(6) 41-45 years old.
(7) 46-50 years old.
(8) 50 years old and above.

1.3 On a scale of 1–5, how interested are you in the traditional costumes of the Jin Dynasty?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4 On a scale of 1–5, how much do you know about Jin dynasty costumes?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.5 What do you think are the problems in the current Jin Dynasty costume culture experience?

[Open-ended question]

1.6 On a scale of 1–5, how interested are you in the digital Jin Dynasty costume culture experience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.

(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.7 What do you think of the role of digital technology in disseminating costume culture in the Jin Dynasty?
[Open-ended question]

1.8 How do you think digital technology can be better applied to the Jin Dynasty costume culture experience?
[Open-ended question]

3. Expert Interview

1.1 Part 1: Open questions, methods, and techniques on Jin Dynasty costumes

1.1.1 As an expert in the field of Jin Dynasty costumes, what do you think is the status and influence of Jin Dynasty costumes in Chinese history? What is the importance of the historical background and characteristics of the costumes of the Jin Dynasty to contemporary society?
[Open-ended question]

1.1.2 Which features or elements do you think distinguish the costumes of the Jin Dynasty from other historical periods? In the design and production of Jin Dynasty costumes, what factors do you think are essential to reflect the characteristics of Jin Dynasty costumes?
[Open-ended question]

1.1.3 How to balance historical accuracy and the aesthetic needs of modern audiences when presenting the costumes of the Jin Dynasty? Do you have corresponding experiences and suggestions?
[Open-ended question]

1.1.4 What methods or tools are particularly valuable for data collection, analysis, and presentation in studying Jin Dynasty costumes? Please share your experiences and opinions.
[Open-ended question]

1.1.5 What is your opinion on the digital presentation of Jin Dynasty costumes? How do you think the relationship between digitalization and the presentation of Jin Dynasty costumes can be effectively balanced in the digital presentation of Jin Dynasty costumes? To maximize the cultural experience of the public. Please provide your thoughts and suggestions.
[Open-ended question]

1.1.6 Any further suggestions?
[Open-ended question]

1.2 Part 2: Open questions, methods, and techniques on costume design

1.2.1 As an expert in the field of traditional costume design, how do you view the status and influence of traditional costumes in contemporary society?
[Open-ended question]

1.2.2 How do you balance traditional elements and the needs of modern fashion when designing traditional costumes? Please share your creative philosophy and approach.
[Open-ended question]

1.2.3 How do you think digital technology has changed traditional costumes' design and production process? Please share your views on the future of digital technology in the field of traditional costumes.
[Open-ended question]

1.2.4 When promoting and spreading traditional costumes, what cultural elements must be preserved and passed on?
[Open-ended question]

1.2.5 As an expert in traditional costume design, what do you think should be done to increase the visibility and international influence of traditional costumes? Please provide your views and recommended strategies.
[Open-ended question]

1.2.6 Any further suggestions?
[Open-ended question]

1.3 Part 3: Open questions, methods and techniques on digital technology design

1.3.1 In the current development of digital technology, what do you think are some mature applications in traditional costume displays or cultural experience projects? Please give some specific examples.
[Open-ended question]

1.3.2 To the best of your knowledge, how do you think digital technology can be used to create visual interest and interactive experiences in digital displays? Please share some of your creative examples and technical suggestions.
[Open-ended question]

1.3.3 What do you think is the contribution of digital technology to cultural heritage and development? Please share your views and reasons.
[Open-ended question]

1.3.4 If digital technology is to be used to showcase Jin Dynasty costumes, how can the goals of cultural transmission and education be achieved? Please share your views and specific suggestions on digital cultural heritage.
[Open-ended question]

1.3.5 What are your expectations or desired functions for the digital display and experience of Jin Dynasty costumes?
[Open-ended question]

1.3.6 Any further suggestions?
[Open-ended question]

4. Experts and Visitor's Evaluation Form

1.1 On a scale of 1–5, how would you rate the effect of the digital knowledge repository of Jin Dynasty costumes on the cultural experience of the audience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.2 On a scale of 1–5, does the digital knowledge repository of Jin Dynasty costumes better present the cultural history and display experience of Jin Dynasty costumes?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.3 On a scale of 1–5, how would you rate the user interface and overall design of the digital Jin Dynasty costume display system?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4 On a scale of 1–5, how would you rate the potential of a digital knowledge repository of Jin Dynasty costumes as a tool for enhancing the cultural experience of the audience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.5 On a scale of 1–5, do you think that the inclusion of virtual costume experience in the digital knowledge repository of Jin Dynasty costumes has had the effect of enhancing the cultural experience?

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.6 Compared with the traditional costume exhibition, the digital product is characterized by?

[Select One or More Answer Choices] *

(1) Interesting.
(2) Convenience.
(3) Interactivity.
(4) Flexibility.
(5) Attractive.

1.7 What improvements would you suggest to the digital knowledge repository of Jin Dynasty costumes to enhance its cultural experience?

[Open-ended question]

1.8 What are your comments and feedback on the digital knowledge repository of Jin Dynasty costumes from an expert's perspective?

[Open-ended question]

5. Pre-Test Questionnaire

Instructions: Please rate the following statements based on your expectations, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

1.1 I look forward to digital media enhancing my interest in costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.2 I believe digital tools will enhance my understanding of costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.3 I hope this product will help me better understand the history and design of the Jin Dynasty's costumes.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4 I expect this product to inspire my new interest in traditional costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.5 I think digital experiences will make costume culture easier to understand and accept.
[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.6 I hope to see innovation and modernization of traditional costume culture through this product.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.7 I anticipate this product will offer a highly interactive fun learning experience.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

6. User Ability Test: User Observation (For Researcher)
   The status of the audiences and the record of the experience process.

   1.1 Audience's interest in this digital experience project.
   [Select One Answer Choice] *
   (1) Highly uninterested.
   (2) Uninterested.
   (3) Neutral.
   (4) Interested.
   (5) Highly interested.

   1.2 How excited is the audience when they are having a digital experience?
   [Select One Answer Choice] *
   (1) Very unexcited.
   (2) Not excited.
   (3) Neutral.
   (4) Excited.
   (5) Very excited.

   1.3 Is the audience experience smooth?
   [Select One Answer Choice] *
   (1) Very unpleasant.
   (2) Not smooth.
   (3) Neutral.
   (4) Smooth.
   (5) Very smooth.

   1.4 Overall length of time while experiencing of the project.
   [Select One Answer Choice] *
   (1) 0-3 min.
   (2) 3-6 min.
   (3) 6-9 min.
   (4) 9-12 min.
   (5) More than 12 min.

   1.5 Which part did the user spend the longest time in?
   [Select One Answer Choice] *
   (1) Study of the history of traditional costumes of the Jin Dynasty.
   (2) Presentation of traditional costumes of the Jin Dynasty.
   (3) Experience of digital costumes of the Jin Dynasty.

7. Post-Test Questionnaire

Instructions: Please rate the following statements based on your actual experience, using a scale from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

1.1 This product enhanced my interest in learning about costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.2 Digital tools in this product enhanced my understanding of costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.3 This product helped me better understand the history and design of the Jin Dynasty's costume.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.4 This product stimulated my new interest in traditional costume culture.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.5 Through this product, costume culture became easier to understand and accept.
[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.6 This product displayed innovation and modernization in traditional costume culture.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

1.7 This product provided a highly interactive fun learning experience.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8. User Ability Test: Users Evaluation

The assessment questionnaire is designed based on Whitney Quesenbery's "5E" experience evaluation model (Effective, Efficient, Engaging, Easy to Use, Error Tolerant) and the Likert scale method of analysis. The content of the user evaluation questionnaire is as follows:

8.1 This mini-program does a great job in conveying the culture and history of Jin Dynasty costumes

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.2 I can obtain comprehensive and accurate information about Jin Dynasty costumes through this mini-program.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.3 I find it quick to locate the information I want while using this mini-program.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.4 The operation process and response speed of this mini-program meet my expectations.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.5 The content and design of this mini-program are interesting and engaging to me.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.6 I feel pleased and involved when using this mini-program.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.7 This mini-program is easy to understand and use, even for beginners.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.8 The interface layout and navigation logic of this mini-program are comfortable for me.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.
(5) 5.

8.9 When I encounter problems or errors while using this mini-program, I can easily find a solution.
[Select One Answer Choice] *
1=lowest, 2=low, 3=medium, 4=high, 5=highest.
(1) 1.
(2) 2.
(3) 3.
(4) 4.

(5) 5.

8.10 This mini-program provides clear guidance and feedback when I make a mistake.

[Select One Answer Choice] *

1=lowest, 2=low, 3=medium, 4=high, 5=highest.

(1) 1.

(2) 2.

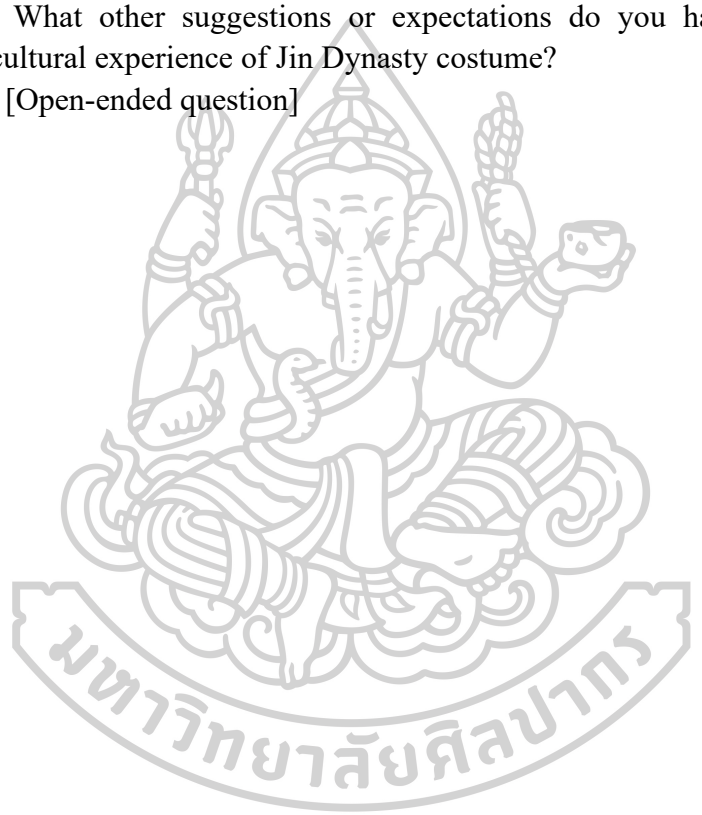
(3) 3.

(4) 4.

(5) 5.

8.11 What other suggestions or expectations do you have for the digital cultural experience of Jin Dynasty costume?

[Open-ended question]



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PUBLICATION	Yue, O., & Chaetnalao, A. (2024). User-Centered Digital Knowledge Repository of Jin Dynasty Costumes as a Learning Tool for Cultural Experience. International Journal of Arts and Technology. (Accepted). Yue, O., & Chaetnalao, A. (2024). Analyzing User Needs for Digital Learning Platform in Cultural Heritage: A Case Study on Jin Dynasty Costumes. International Journal of Technology Enhanced Learning. (Accepted).