Digital Narrative and Interaction Design of Lingnan Intangible Cultural Heritage from the Perspective of the Maritime Silk Road

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Abstract. Lingnan intangible cultural heritage (ICH) digital display currently faces challenges such as fragmented cultural contexts and homogenized experiential approaches, urgently requiring the expansion of value interpretation pathways through digital narrative and interaction design. Taking the Maritime Silk Road as its historical context, this study selects three ICH items—Xiangyun silk dyeing, Guangzhou colored porcelain, and Lingnan tea culture—along with the dragon boat as research objects, aiming to address three core questions: How to reconstruct the "original context" of ICH techniques in digital space? How to utilize AIGC to achieve semantic translation of ICH visual elements? How to establish a "synaesthesia" between the audience's body and techniques through differentiated interaction design? To this end, the study constructs a five-element digital narrative structure model comprising narrative subject, narrative space, narrative time, narrative clues, and narrative perspective, and proposes three interaction design strategies: authenticity interpretation, cultural projection, and immersive experience. At the methodological level, it explores an AIGC-driven visual generation path for ICH as a tool for cultural semantic translation, as well as an interactive closed-loop mechanism from perception input to instruction triggering to visual feedback. At the practical design level, it completes the design and implementation of an immersive experience space titled "Maritime Silk Road Scroll: Lingnan Craftsmanship." This study provides an operable reference scheme for the digital display of Lingnan ICH, promoting the transformation of cultural heritage from "static preservation" to "living transmission."

Keywords: Maritime Silk Road, Lingnan Intangible Cultural Heritage, Digital Narrative, Interaction Design, AIGC

1 Introduction

With the iteration of digital media technology, the digital preservation of cultural heritage is undergoing a transformation from "static recording" to "dynamic activation." Lingnan ICH, nourished by the Maritime Silk Road culture, has developed a unique technical system and profound spiritual connotations. However, current digital

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displays generally suffer from fragmented cultural contexts and homogenized experiential approaches, failing to convey the spatiotemporal context and embodied knowledge behind ICH techniques. How to reconstruct the "original context" of ICH techniques and guide the audience from passive observers to active participants has become a core issue to be addressed.

This study takes the Maritime Silk Road as its narrative coordinate, focusing on three ICH items—Xiangyun silk, Guangzhou colored porcelain, and Chaozhou Gongfu tea—along with the dragon boat, exploring innovative pathways for their digital activation. Specifically, it aims to answer three questions: How to construct an ICH narrative system with historical depth and cultural authenticity in digital space? How to utilize AIGC to achieve semantic translation of ICH visual elements? How to establish a "synaesthesia" between the audience's body and techniques through differentiated interaction design? Through theoretical construction and design practice, this paper seeks to provide solutions for the digital transmission of Lingnan ICH.

2 Lingnan ICH Digital Narrative Framework and Design Strategies

2.1 Lingnan ICH Digital Narrative Framework

Digital narrative is a new narrative form that has emerged with the development of digital media. Ryan proposed that the core characteristics of digital narrative are interactivity, spatiality, and immersion[1]; Kenderdine further proposed the concept of "embodied narrative," emphasizing that the audience's physical participation is the core dimension of digital heritage experience[2]. Domestic scholars Duan Peng and Zhang Ding proposed the "interaction, interembedding, intermolding" framework[3]; Zhang Aipeng proposed the "cultural decoding → symbol extraction → visual reconstruction" translation pathway[4]. Synthesizing the above theories, the core role of digital narrative in the ICH field is to transform static technical knowledge into a perceptible story world and transform the audience from passive observers to active participants.

The Maritime Silk Road provides a unique narrative coordinate for Lingnan ICH. As a core hub of the Maritime Silk Road, Lingnan has played a significant role in Sino-foreign trade and cultural exchange since the Qin and Han dynasties, with over two thousand years of uninterrupted maritime trade nurturing an open, inclusive, and pioneering spirit. Different from inland ICH, the formation and development of Lingnan ICH have always accompanied Maritime Silk Road trade and Sino-foreign exchange, with its techniques embedded in a cross-cultural flow landscape. Therefore, the digital narrative of Lingnan ICH cannot be separated from this historical context and must take it as the basic framework for understanding its cultural connotations.

Based on the Maritime Silk Road's historical context and digital narrative theory, this study constructs a digital narrative structure model comprising five core elements. The narrative subject is condensed as "Lingnan ICH from the Perspective of the Maritime Silk Road," covering three ICH items—Xiangyun silk, Guangzhou colored

porcelain, and tea culture—along with the dragon boat. The narrative space takes the Maritime Silk Road route as its geographical main line, extending from Guangzhou to Southeast Asia and Europe, presenting a cultural flow picture "from Lingnan to the world." The narrative time spans from the Maritime Silk Road's prosperous period to the present, forming a "history-present" timeline. The narrative clues set three parallel clues corresponding to the three ICH items, centering on the main lines of technique dissemination, technique integration, and technique transmission. The narrative perspective adopts a third-person objective perspective, telling the stories of the Maritime Silk Road and ICH as a "historical witness," allowing the audience to autonomously perceive cultural connotations in the immersive experience.

The five narrative elements are interrelated and progressively layered, jointly constituting a complete digital narrative structure model.

2.2 Design Strategies for Lingnan ICH Digital Narrative

Authenticity Interpretation Strategy. This strategy addresses the cultural distortion commonly present in ICH digital display, advocating for adherence to the authenticity of ICH culture during digital translation[5]. Specifically, the application of AIGC in ICH visual translation should not be simplistically regarded as style transfer but rather as semantic translation based on cultural extraction[6]—that is, before AI generation, a holistic decoding of cultural elements should be conducted first to ensure that the generated content possesses cultural authenticity and narrative coherence.

Cultural Projection Strategy. This strategy emphasizes that digital imagery should fulfill the function of transmitting cultural value[7]. Digital narrative theory demonstrates that the core of digital narrative lies in transforming the audience from passive readers into active participants, establishing cultural contexts and emotional connections through stories[8]. Image narrative needs to establish a deep connection between Maritime Silk Road history and ICH techniques, guiding the audience's cognitive experience toward emotional resonance.

Immersive Experience Strategy. This strategy advocates using interaction design to enhance the audience's immersion and participation[9]. The key to forming an immersive experience lies in establishing a "perception input → trigger mapping → feedback response" interactive closed loop, ensuring that each of the user's actions receives an immediate response, thereby enhancing their sense of control and participation.

3 System Construction and Implementation of Lingnan ICH Digital Narrative

3.1 Narrative System Architecture

Based on the five-element digital narrative structure model, this study completed the narrative design of the "Maritime Silk Road Scroll: Lingnan Craftsmanship" immersive experience space. The narrative subject centers on the Maritime Silk Road and Lingnan ICH, selecting the dragon boat, Xiangyun silk, Guangzhou colored porcelain, and tea culture as narrative content, with the dragon boat serving as the opening symbolic image and the three ICH items representing technique dissemination, technique integration, and technique transmission respectively. The narrative space takes the Maritime Silk Road as its background, extending from Lingnan water towns to the open ocean, forming a spatial logic from Lingnan to the world. The narrative time unfolds in a linear sequence of setting sail, flowing, converging, and concluding, presenting narrative nodes in the form of unfolding scrolls. The narrative clues set three parallel clues: Xiangyun silk dyeing technique, Guangzhou colored porcelain painting technique, and tea culture brewing technique. The narrative perspective adopts a third-person objective perspective, presented through the slow unfolding of scrolls. The overall narrative structure takes the form of a "continuously unfolding scroll," with the three ICH items gradually appearing and transforming within the same visual space (Figure 1).

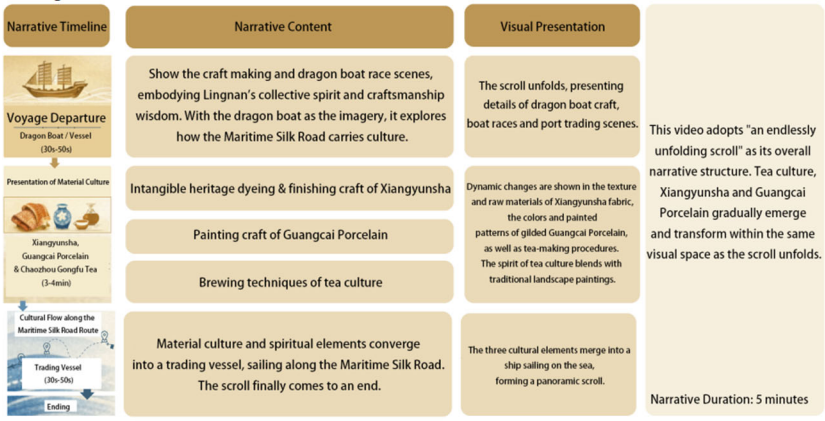

Fig. 1. Narrative Framework of ICH Digital Narrative(Source: Drawn by the author)

3.2 Narrative Interaction Mechanism

Based on the digital narrative theory discussed, this study constructs a three-layer system architecture of "narrative layer—interaction layer—space layer." The narrative layer is responsible for constructing the cultural context, the interaction layer drives physical participation, and the space layer creates an immersive atmosphere. The three layers support and organically integrate with each other, jointly forming an interaction design system for Lingnan ICH digital narrative.

For the different technical characteristics of the three ICH items, this study designed three differentiated interaction methods:

Xiangyun Silk: Hand Recognition Simulating the Dyeing Process. The main process of Xiangyun silk is immersion dyeing, including steps such as pounding the yarn, air-drying the yarn, and applying river mud. This study sets the interaction for the Xiangyun silk screen such that the audience uses hand recognition to control a virtual hand on the screen, following on-screen prompts to perform the dyeing steps sequentially (Figure 2).

Fig. 2. Xiangyun Silk Interaction Design(Source: Drawn by the author)

Guangzhou Colored Porcelain: Head Movement and Gesture Pinch Exploring Patterns. The main characteristic of Guangzhou colored porcelain is its "patterns," requiring careful observation of the Chinese-Western elements on the porcelain. This study selected three representative Guangzhou colored porcelain pieces as interactive content, combining head movement and gesture pinch, allowing the audience to understand the transformation and integration of Guangzhou colored porcelain patterns within the Maritime Silk Road context during exploration (Figure 3).

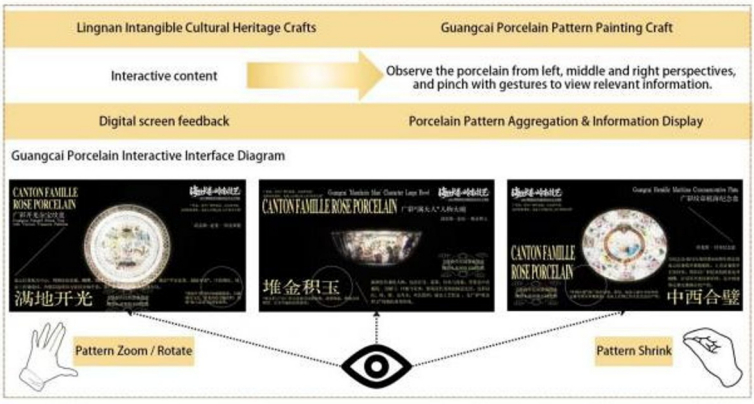

Fig. 3. Guangzhou Colored Porcelain Interaction Design(Source: Drawn by the author)

Tea Culture: Gesture Height Control Triggering Ritual Animation. The central ritual of tea culture is "tea pouring," with main actions including low pouring, "Guangong Patrolling the City," and "Han Xin Counting Soldiers." This study designs the interaction such that the audience uses gestures to control the height of the teapot, with different heights triggering different tea-pouring ritual animations, allowing the audience to experience the layering and spiritual connotations of tea ceremony rituals during interaction (Figure 4).

Fig. 4. Tea Culture Interaction Design(Source: Drawn by the author)

The three screens operate independently, each equipped with operation guide graphics to reduce users' learning costs.

3.3 Design Implementation

AIGC Image Generation. A storyboard of the image sequences was designed according to the narrative structure. The entire film consists of 68 shots with a total duration of approximately 5 minutes. The generation process follows the technical route of "cultural extraction → prompt design → AI generation → post-production synthesis." First, prompts for each segment were developed based on the cultural extraction results and narrative characteristics[10]. Then, dynamic images were generated shot by shot using Jimeng AI to ensure narrative coherence. Finally, post-production synthesis and color grading were carried out in PR and CapCut, with music and ambient sound effects added to form a complete image sequence (Figure 5). The visual style of the images takes the Lingnan School of Painting as its overall tone, integrating the visual style of each segment into Lingnan landscape painting techniques, forming a visual style that has both cultural roots and visual unity.

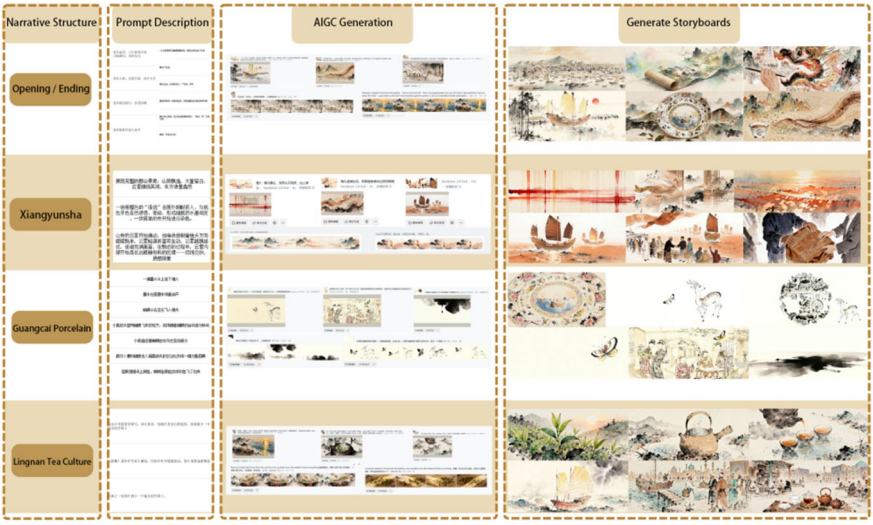

Fig. 5. AIGC Image Generation Process(Source: Drawn by the author)

Experience Space Exhibition Design. Following immersive experience theory, the design guides the audience through a linear flow to complete the experience according to the progressive logic of "cognition → participation → immersion → deepening" (Figure 6). The space is divided into seven functional zones: work explanation area, entrance, viewing area, science popularization panel area, interaction experience area, material area, and exit. The spatial flow is one-way, ensuring that the audience completes their visit in the order of "understand the design → watch the images → learn about ICH → hands-on experience → take away memories." The visual tone of the panels and materials is consistent with the images. The work overview panel presents the design logic, the technique visualization panels introduce the technical characteristics and cultural connotations of the three ICH items, and the digital screen border panels guide user operation with step-by-step instructions. Auxiliary materials include Maritime Silk Road-themed postcards, guide signs, and questionnaire QR codes.

Fig. 6. Immersive Experience Space Site Photo(Source: Drawn by the author)

4 Conclusion

This study takes the Maritime Silk Road as its historical context and explores the digital display of Lingnan ICH from the two dimensions of digital narrative and interaction design. The study constructs a five-element digital narrative structure model, providing a referable theoretical framework for the organization of ICH digital content. For the different technical characteristics of Xiangyun silk, Guangzhou colored porcelain, and tea culture, it designs three differentiated interaction methods, validating the design principle that "craft characteristics determine interaction logic." Meanwhile, the study finds that the application of AIGC in ICH visual translation should be based on systematic cultural extraction rather than simple style transfer. The study completes the design and implementation of the "Maritime Silk Road Scroll: Lingnan Craftsmanship" immersive experience space, providing an operable reference scheme for the digital display of Lingnan ICH.

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