

RECONSTRUCTING LIVING HERITAGE THROUGH DIGITAL MEDIA: AN EMPIRICAL STUDY OF LUOSHAN SHADOW PUPPETRY*

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Abstract

Luoshan shadow puppetry, a national intangible cultural heritage with over 450 years of history, currently faces significant survival challenges due to modernization, digital transformation, and a declining audience base. To address these issues, this study explores how digital media can reconstruct the living nature of heritage by integrating living heritage theory, cultural meme theory, and communication theory into a revitalization model that links cultural element extraction, digital interaction design, and embodied participation. Using a mixed-method design with stratified sampling combined with voluntary participation (n = 330), the study implemented and evaluated a digital exhibition platform, an H5 interactive system, and offline experiential activities. Questionnaire responses, behavioral indicators, and interview evidence consistently suggested improvements in cultural understanding, interaction depth, and willingness to participate. Overall, the findings indicate that digital media can support the living-

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state reconstruction of heritage when online dissemination is connected to offline practice through a feedback-based circulation mechanism.

Keywords: living heritage, digital communication, cultural identity, intangible cultural heritage, shadow puppetry

Introduction

Existing studies on Luoshan shadow puppetry have mainly focused on its historical inheritance, modeling aesthetics, musical structure, and performance features (Huang, C. Z., 2019; Liu, S., 2006; Liu, Z., 2021; Xu, M., 2015; Zeng, F. G., 2008; Wang, C. L., 2020). These studies clarify the genre's explicit artistic characteristics, but they pay limited attention to how such cultural elements can be translated into contemporary participatory communication systems. International scholarship increasingly understands intangible heritage as a community-based process of transmission, participation, and reinterpretation rather than static documentation alone (UNESCO, 2003). Digital heritage research likewise warns against technology-driven applications that privilege novelty over cultural meaning (Parry, R., 2005). Related studies on digital intangible heritage, museum participation, and human-computer interaction suggest that digital media can broaden access only when they strengthen interpretation, participation, and situated cultural experience (Alivizatou, M., 2019; Arnaboldi, M. & Diaz Lema, M., 2021; Hornecker, E. & Ciolfi, L., 2019). Within the Chinese context, Qian (H., 2018) has also demonstrated the feasibility of transforming Luoshan shadow puppetry through digital animation. Despite these contributions, important gaps remain. Existing research often separates history, aesthetics, music, and craftsmanship from actual transmission practice, while digital revitalization is more often discussed conceptually or through design output than evaluated through integrated empirical evidence on audience cognition, interaction, and continued participation. In addition, limited attention has been

paid to the role of inheritors and to the feedback relationship between digital contact and embodied practice, although living heritage ultimately depends on human continuity rather than media visibility alone (Zhou, Q. M., 2019). These limitations provide the basis for the present study.

Objectives

1. Establish a documented framework of the historical, technical, and symbolic elements of Luoshan shadow puppetry in order to support authentic preservation and digital translation.
2. Identify the major socio-technical and interpretive barriers that affect contemporary understanding, especially among younger audiences, and extract the key cultural elements suitable for communication transfer.
3. Design and evaluate an integrated digital dissemination model across the digital exhibition hall, H5 interactive system, and offline experiential activities in order to test its effects on cognition, participation, and sustainability.

Literature Review

1. Existing studies on Luoshan shadow puppetry have mainly focused on its historical inheritance, modeling aesthetics, musical structure, and performance features (Huang, C. Z., 2019; Liu, S., 2006; Liu, Z., 2021; Xu, M., 2015; Zeng, F. G., 2008; Wang, C. L., 2020). These studies clarify the genre's explicit artistic characteristics, but they pay limited attention to how such cultural elements can be translated into contemporary participatory communication systems.

2. International scholarship increasingly views intangible heritage as a community-based process of transmission, participation, and reinterpretation rather than static documentation alone (UNESCO, 2003). Digital heritage studies likewise caution against technology-driven applications that privilege novelty over cultural meaning (Parry, R., 2005). Research on digital intangible heritage,

museum participation, and human-computer interaction suggests that digital media can broaden access only when they strengthen interpretation, participation, and situated cultural experience (Alivizatou, M., 2019; Arnaboldi, M. & Diaz Lema, M., 2021; Hornecker, E. & Ciolfi, L., 2019). In China, Qian (H., 2018) has also shown the potential of transforming Luoshan shadow puppetry through digital animation.

3. Despite these contributions, three gaps remain. First, existing studies often separate history, aesthetics, music, and craftsmanship from actual transmission practice. Second, digital revitalization is frequently discussed conceptually or through design output, but less often evaluated with integrated empirical evidence on audience cognition, interaction, and continued participation. Third, insufficient attention has been paid to the role of inheritors and to the feedback relationship between digital contact and embodied practice, although living heritage ultimately depends on human continuity rather than media visibility alone (Zhou, Q. M., 2019). These gaps provide the basis for the present study.

Methodology

Research Design

This study adopted a mixed-method design integrating theoretical model construction, spatial design implementation, and empirical validation. It examined whether a digitally reconstructed exhibition environment could enhance cultural cognition, expand communication reach, and strengthen the participatory sustainability of Luoshan shadow puppetry. Within one unified research framework, three sequential components were conducted: a digital exhibition hall for immersive cognition, an H5-based interactive system with AR elements, and an offline experiential workshop for embodied cultural

transmission. Together, these components formed a progressive evaluation sequence linking digital exposure, interaction, and offline participation.

The digital exhibition hall was organized through a functional zoning and experiential progression model (Figure 3). Its design emphasized modular structure, scenario-based immersion, and circulation-oriented movement to simulate the narrative unfolding of shadow puppetry culture. Rather than serving as a static display, the exhibition functioned as a spatial communication system guiding users from observation to interaction and from cognition to participation.



Figure 1 Functional zoning and experiential progression design logic of the digital exhibition space.

Participants

Participants were recruited through a combination of stratified sampling and voluntary participation. Recruitment channels included local community cultural centers, university campuses, and online announcements distributed through social media platforms. A total of 330 individuals initially participated in the study. After excluding incomplete or invalid responses, the final valid sample consisted of 312 participants.

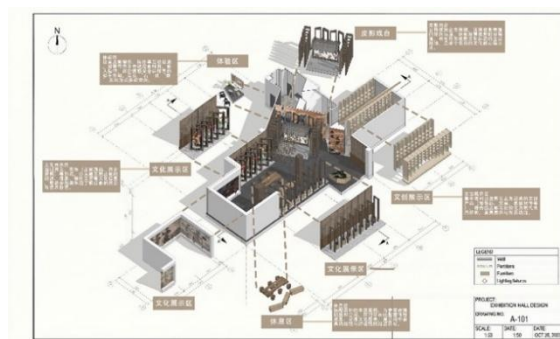


Figure 2 Spatial layout plan of the digital exhibition hall, including cultural display zones, interactive areas, stage space, and circulation paths.

Participants ranged in age from 18 to 65 years ($M = 29.84$, $SD = 10.72$). The sample included 164 females (52.6%) and 148 males (47.4%). Approximately 61% of participants were undergraduate or postgraduate students, 27% were working professionals, and 12% were community residents not currently enrolled in higher education. Prior exposure to shadow puppetry varied: 38% reported previous viewing experience, while 62% indicated limited or no direct engagement before the study.

All participants provided informed consent prior to data collection. The study procedures complied with the ethical principles outlined in the Declaration of Helsinki. Participation was voluntary, anonymous, and participants were informed of their right to withdraw at any time without penalty.

Measures

1. Questionnaire Survey

A structured questionnaire was developed around the three core evaluation dimensions of the study: cultural cognition and empathy, communication effectiveness, and willingness for continued participation. The items covered cultural identity, interest level, understanding degree, satisfaction,

and willingness to participate, and were measured on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

The questionnaire items were reviewed by experts using the Index of Item-Objective Congruence (IOC) method to ensure alignment with the study objectives. Following this screening, wording and content arrangement were further refined through iterative expert consultation so that the final instrument was suitable for use in the integrated intervention context.

2. Behavioral Data

For digital interventions, user behavior metrics were collected, including duration of stay, browsing path, interaction completion rate, repeat visit rate, and sharing frequency. In this study, a successful interaction was operationally defined as the completion of the intended engagement sequence within a designated module, such as finishing an AR exploration task, browsing a complete thematic unit, or completing a core interactive narrative path. Duration of stay was interpreted as an indicator of engagement depth rather than simple exposure time, while interaction completion rate was used to assess whether users moved beyond initial curiosity toward sustained participation.

3. Expert Evaluation

Expert evaluation was conducted through a three-round Delphi process. Consensus was defined a priori as at least 80% agreement among experts. In each round, experts reviewed the content integrity, cultural accuracy, interaction logic, and display effectiveness of the digital systems. Items that did not reach the consensus threshold were revised according to expert feedback and re-evaluated in the subsequent round until response stability was achieved. The expert panel included architectural designers, digital media practitioners, and shadow puppetry cultural scholars to ensure interdisciplinary validity.

Three experiments were conducted:

Experiment 1: Digital Exhibition Hall

A digital exhibition hall was designed based on traditional shadow puppetry stage prototypes. Functional zoning included: Cultural exhibition area; Interactive experience area; Cultural product display area; Rest area.

User experience and cultural cognition were evaluated through questionnaires and behavioral data analysis.

Experiment 2: H5 Interactive System

An H5 mini-program was developed integrating AR interaction, cultural narratives, and gamified elements. The system aimed to enhance communication reach and youth engagement. User interviews and traffic analytics were conducted to evaluate dissemination effectiveness.

Experiment 3: Offline Cultural Experience

Offline experiential activities included performance observation, hands-on carving workshops, and interactive participation. Inheritance effects were evaluated through in-depth interviews and satisfaction surveys.

Statistical Analysis

Quantitative data were analyzed mainly through descriptive statistics (mean $\pm$ standard deviation), while behavioral metrics were used to evaluate the depth and continuity of user engagement. Qualitative data from interviews and expert feedback were thematically analyzed to interpret the mechanisms through which digital contact was transformed into cultural understanding and participatory intention. Accordingly, the study emphasizes triangulated convergence across questionnaire, behavioral, expert, and interview evidence rather than isolated interpretation of a single indicator.

When inferential comparisons were applicable, the significance level was set at $p < 0.05$; however, the present article primarily reports descriptive and thematic patterns derived from the integrated intervention.

Results

The empirical evaluation of the proposed digital living heritage communication model was organized around three dimensions: cognition and cultural empathy, communication and reach, and living heritage sustainability. Rather than treating the three experiments as isolated outcomes, the analysis triangulated questionnaire responses, behavioral records, expert review, and interview evidence. The convergent results indicate that the integration of digital systems and offline experiences contributed to clearer cultural understanding, stronger audience engagement, and greater continuity of participation.

Effects on Cognition and Cultural Empathy

Understanding of Luoshan shadow puppetry and to strengthen cultural empathy through immersive spatial reconstruction and interactive display mechanisms. Post-experience questionnaire responses showed a clear increase in participants' self-reported understanding of the historical origins, artistic characteristics, and performative structures of Luoshan shadow puppetry. Participants also demonstrated stronger recognition of its regional stylistic features, ritual context, and craftsmanship logic. Behavioral records revealed relatively long stay duration and high completion of multimedia interpretive modules, suggesting sustained engagement rather than superficial browsing. Expert evaluation further indicated that the revised exhibition structure improved thematic coherence and cultural narrative clarity. Taken together, these findings suggest that digital spatial reconstruction can transform abstract heritage knowledge into more accessible and emotionally resonant experience.

Effects on Communication and Reach

In Experiment 2, the H5-based interactive communication system was used to evaluate whether mobile and networked media could extend dissemination scope and lower the threshold of access for younger audiences. Questionnaire feedback, user behavior metrics, and short interviews all pointed

to the same trend: the H5 system improved accessibility, stimulated interaction, and encouraged content sharing. Traffic-related indicators showed repeated access and sustained engagement within narrative modules, while users actively interacted with the embedded AR and narrative components. Interview data further suggested that contextualized storytelling and task-based interaction reduced the perceived difficulty of traditional shadow puppetry knowledge and made the content easier to understand and recommend. These results indicate that the H5 intervention functioned not only as a communication channel but also as a mediating structure linking exposure, comprehension, and voluntary sharing.

Effects on Living Heritage Sustainability

Experiment 3 evaluated the sustainability dimension of living heritage by examining whether digital dissemination could be translated into offline embodied practice. Participants engaged in live performance observation, hands-on carving workshops, and interactive puppet manipulation sessions. Post-activity feedback indicated stronger cultural identification, higher satisfaction with experiential authenticity, and greater willingness to participate in future heritage-related activities. Importantly, interviews with inheritors suggested that prior digital exposure reduced the initial communication barrier, increased curiosity among young participants, and improved workshop attendance and interaction quality. The combined evidence supports the view that digital media can reinforce rather than replace traditional transmission when it is strategically connected to face-to-face practice. The results therefore support the feasibility of an organic circulation system in which digital dissemination stimulates offline participation, and offline engagement in turn strengthens long-term cultural continuity.

Table 1 Summary of Experimental Effects on Three Dimensions.

Dimension	Intervention	Key Outcome
Cognition & Empathy	Digital Exhibition Hall	Improved cultural understanding; increased stay duration
Communication & Reach	H5 Interactive System	Expanded dissemination; higher engagement
Living Heritage	Offline Experience	Strengthened cultural identity; enhanced participation

Discussion

The findings of this study indicate that digital media should not be understood merely as a supplementary preservation tool, but as a structural mechanism for reconstructing the living dimension of intangible cultural heritage. By integrating living heritage theory, cultural meme theory, and communication theory into one applied framework, the research shows how cultural elements can be extracted, interpreted, and re-embedded within interactive environments. In this sense, the proposed model moves beyond a simple information-transmission logic. Its purpose is not only to deliver content efficiently, but to activate a chain of cognition, emotion, participation, and re-engagement through which heritage is experienced as a living cultural practice.

From a theoretical perspective, the concept of living-state communication extends conventional digital heritage discourse by emphasizing reciprocity between online mediation and offline enactment. Traditional display-oriented models often present heritage as a stable visual object, thereby reducing complex social practices to aesthetic fragments. By contrast, the present study suggests that digital systems can function as interpretive mediators that reconnect fragmented elements such as story, craft, sound, and ritual context. This also responds to concerns in digital heritage and museum studies that

technological innovation without interpretive depth may intensify decontextualization rather than meaningful participation (Parry, R., 2005; Alivizatou, M., 2019).

The results also provide a more nuanced view of the relationship between digital engagement and commodification. The study does not assume that every interactive or mobile format is automatically beneficial. Instead, it suggests that digital communication contributes positively only when the design remains grounded in structured cultural analysis and when online access is connected to offline participation. Under these conditions, digital platforms can make heritage more approachable without necessarily emptying it of ritual and community meaning. At the same time, sustainability cannot be secured by design alone. Continued operation of the organic circulation system requires institutional coordination, platform maintenance, content updating, and stable collaboration among inheritors, schools, cultural centers, and local governance bodies.

Several limitations should nevertheless be acknowledged. The study was geographically confined to Luoshan County, which limits the direct generalizability of the findings to other heritage contexts. In addition, long-term longitudinal evaluation was not conducted, so durable behavioral transformation and intergenerational inheritance effects remain to be verified. Future research should therefore combine cross-regional comparison with longer observation periods, and should further assess the institutional and economic conditions necessary to sustain digital-offline circulation beyond the duration of a single research project.

Recommendation

First, local heritage governance bodies should integrate digital exhibition modules, lightweight mobile interaction tools, and experiential workshops into

existing museum, school, and community cultural infrastructures, rather than treating them as isolated short-term projects. Second, digital revitalization should be organized through collaborative governance involving inheritors, educators, designers, and local cultural departments so that content accuracy, interpretive depth, and platform maintenance can be sustained over time. Third, the model proposed in this study may be scaled to other forms of intangible heritage, but the mode of adaptation should vary according to heritage type: performative heritage may prioritize audience interaction and staged participation, whereas craft-based heritage may place greater emphasis on process visualization, apprenticeship simulation, and skill-based learning.

References

- Huang, C. Z. (2019). The historical origins and modern inheritance of Luoshan shadow puppetry. *Chinese Theatre*, (11), 87-88.
- Liu, S. (2006). The fusion of man, god and nature: An analysis of the modeling art of Luoshan shadow puppetry. *Beauty and Times*, (9), 74-76.
- Liu, Z. (2021). A brief discussion on the modeling characteristics of Luoshan shadow puppetry. *Beauty and Times*, (2), 26-28.
- Qian, H. (2018). Research on the innovative application of Xinyang Luoshan shadow puppetry in digital animation. *Creative Design Source*, (6), 49-53.
- Wang, C. L. (2020). On the reasons for the formation of the “one song for multiple uses” phenomenon in Luoshan shadow puppetry: Taking the suona in the accompaniment music as an example. *Qilu Art Garden*, (5), 10-15.
- Xu, M. (2015). On the plastic arts of Luoshan shadow puppet from the perspective of modern decoration. *Sichuan Drama*, (7), 104-107.
- Zeng, F. G. (2008). Analysis of the singing music of Luoshan County shadow play. *Sichuan Drama*, (6), 99-100.

- Zhou, Q. M. (2019). The living artist and the artist's life: Taking Luoshan shadow play artist Master L as an example. *Chinese Art Time and Space*, (4), 107-111.
- Alivizatou, M. (2019). Digital intangible heritage: Inventories, virtual learning and participation. *Heritage & Society*, 12(2-3), 116-135.
- Arnaboldi, M. & Diaz Lema, M. (2021). The participatory turn in museums: The online facet. *Poetics*, 89, 101536.
- Hornecker, E. & Ciolfi, L. (2019). *Human-computer interactions in museums*. Cham: Springer.
- Parry, R. (2005). Digital heritage and the rise of theory in museum computing. *Museum Management and Curatorship*, 20(4), 333-348.
- UNESCO. (2003). *Convention for the safeguarding of the intangible cultural heritage*. Retrieved from <https://ich.unesco.org/en/convention>.