Media Studies; Vol.3, No.4; 2026
E-ISSN: 3006-368X P-ISSN: 3006-3671
DOI: https://doi.org/10.70267/ms.v3n4.0918
Published by: Zeus Press

# Digital Presentation and Cultural Interpretation of Traditional Xinjiang Motifs: A Review Centered on Research into Textile Patterns

**Hongcan Xie***

*Xinjiang University, College of Design and Art, Urumqi, Xinjiang Uygur Autonomous Region 830017, China*

**Corresponding author: Hongcan Xie.*

## Abstract

The digitization of traditional motifs from Xinjiang involves documenting patterns, analyzing their forms, and interpreting their cultural contexts. An important question is how visual presentation can be improved without losing the information that gives these motifs meaning. Focusing on Chinese-language scholarship concerning textile patterns, this review compares object-based examination, formal pattern analysis, digital documentation, and intelligent recognition, while drawing on research in digital cultural heritage. Each approach supports a different task, from recording materials and describing visual structure to organizing information. Yet a result produced by image recognition still requires an evidentiary connection to historical interpretation. Digital records of Xinjiang motifs should therefore retain an object's provenance, production techniques, functions, and the grounds for any interpretation. Original documentation needs to be distinguished from analytical diagrams and contemporary redrawing. Assessments of public communication should likewise distinguish visual recognition, cultural understanding, and subsequent learning rather than treating technological sophistication as evidence of cultural interpretation.

## Keywords

traditional Xinjiang motifs, digital presentation, cultural interpretation, cultural heritage

## 1. Introduction

Research on traditional Xinjiang motifs spans different regions, historical periods, and communities of use, while the objects under study differ according to their material carriers. Shi Jianping discusses the artistic meanings and formal features of the almond-shaped badam motif; Madinamu Tursun and Zhan Binghong examine the composition and aesthetic characteristics of embroidery on Hami Uyghur clothing; and Nan Xi and colleagues study the structure, craftsmanship, and material composition of textiles excavated from the Niya cemetery [1–3]. Although all three subjects involve textiles associated with Xinjiang, they pose different questions about decorative form, clothing ornament, and excavated artifacts. They should not be combined uncritically into a single regional style. Digitization creates opportunities to record, compare, and communicate these materials, but it also brings interpretive challenges. A sharp image may reveal a motif's outline and composition without showing how the object was made, where the motif appeared, or what its historical setting was. Recoloring or reconstructing missing areas can make a design easier to view while introducing differences from the surviving artifact. This review therefore asks how existing studies approach textile motifs, what digital



© 2026 The Author(s). Authors retain copyright in their articles.

techniques can accomplish, and what evidence cultural interpretation requires. It is a thematic review rather than a product-design study, and it does not presume that adopting digital technology necessarily amounts to successful cultural transmission.

## 2. Scope and Organization of the Literature

### 2.1 Defining the Objects of Study

Here, "traditional Xinjiang motifs" refers to decorative patterns discussed in the literature in connection with historical objects, traditional clothing, and textile crafts associated with Xinjiang. Excavated textiles and embroidery on traditional garments are the principal materials considered. This review does not attempt to cover every medium, such as architecture, pottery, or cave painting, nor does it treat today's administrative boundaries as equivalent to the cultural boundaries of the past.

An important distinction must be maintained among objects "excavated in Xinjiang," objects "used in Xinjiang," and motifs "originating in Xinjiang." An excavation site establishes where an object was found; its use has to be assessed from other evidence; and any claim about origin or transmission requires a stronger historical basis. Xinjiang is used here as a geographical frame for organizing the studies, not as a presumed place of origin for every motif discussed.

Plant-derived patterns such as the badam motif should not automatically be assigned to the same system as inscriptions, animals, or other decorations on inscribed brocades simply because all appear on textiles. Comparing them is useful for identifying which research methods fit different types of evidence, not for constructing a common lineage that has not been demonstrated.

### 2.2 Literature Selection and Comparative Approach

The review draws on two groups of Chinese-language studies. The first deals directly with Xinjiang patterns and related textiles, including research on design, workmanship, conservation, digital capture, and chronological classification. The second concerns digital cultural heritage, cultural memory, and information presentation, and is used to frame the analysis. Studies in the second group are not treated as historical evidence for the meanings of particular Xinjiang motifs. Comparisons focus on the object of inquiry, source material, method, and intended use of the findings. Full texts, where available, support more detailed discussion of methods; abstracts are used to establish a study's subject, not to infer results that could not be checked. No claims are made about database hit counts, proportions of the field, or overall effectiveness, and the number of references is not treated as a measure of coverage. The discussion proceeds from the material basis of interpretation to the tasks of digitization and the presentation of cultural information. Its main concern is how methods can connect with one another, rather than a study-by-study account organized by author.

## 3. Research Foundations for Xinjiang Textile Motifs

### 3.1 Pattern Form and Artifact Information

Existing research broadly follows two complementary routes: formal analysis of patterns and object-based examination. Formal analysis treats a motif as a relatively independent visual unit, attending to outlines, composition, color, and principles of decoration; it is useful for comparing variations within similar subjects. Studies of badam motifs and embroidery on Hami Uyghur dress belong to this approach [1–2]. As Figure 1 shows, embroidery on a Hami chapan is not an isolated image detached from its carrier. Its subject matter, scale, and arrangement are conditioned by such garment areas as the front opening and cuffs. Digital extraction should therefore retain both individual pattern units and their positions within the garment as a whole.



© 2026 The Author(s). Authors retain copyright in their articles.

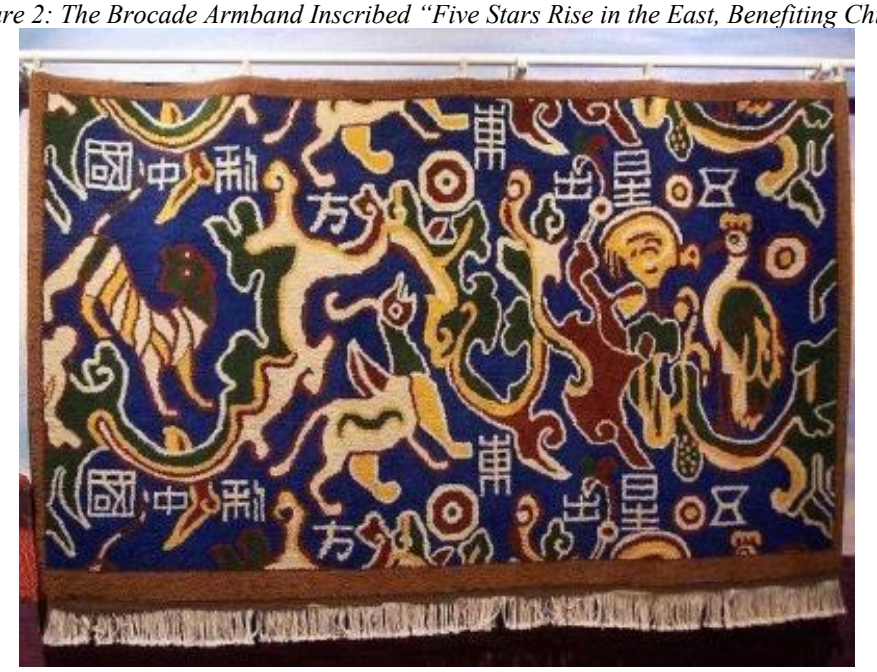
*Figure 1: A Chapan from the Hami Region and Its Embroidered Decoration*



*Source: China Arts and Crafts Society*

Object-based study, by contrast, interprets motifs through the form, materials, techniques, and archaeological contexts of their carriers. Nan Xi and colleagues' work on textiles recovered from the Niya cemetery suggests that a fuller explanation of patterning requires attention to weave structure, production technology, and artifact function [3]. The "Five Stars Rise in the East, Benefiting China" brocade armband in Figure 2 brings together characters, cloud forms, star patterns, and animal figures. Their relationship depends on the woven structure and the form of the armband. Cropping the design into isolated fragments can weaken the connection among the inscription, the position of the imagery, and the object's use.

*Figure 2: The Brocade Armband Inscribed "Five Stars Rise in the East, Benefiting China"*



*Source: Xinjiang Uygur Autonomous Region Museum*



© 2026 The Author(s). Authors retain copyright in their articles.

Zhang Hui and colleagues' analysis of the "May All Generations Enjoy Good Fortune" inscribed brocade excavated at Niya, together with Miao Huicui and Zhao Feng's discussion of the relationship between images and text in Han-period inscribed brocades, further shows why formal analysis and object-based study cannot replace each other [4–5]. Formal analysis converts complex patterns into line drawings, color fields, or repeating units that support comparison. Object-based study establishes what object the visible details belong to, where they occur, and which material and technical conditions shaped them. Digital presentation of traditional Xinjiang motifs should consequently preserve three linked levels: the full artifact and its provenance; the motif's exact position on that artifact; and analytical diagrams identifying any cropping, flattening, reconstruction, or recoloring. Only when an extracted design can be traced back to its source object can digital imagery support both formal comparison and verifiable cultural interpretation.

## 3.2 Craft Techniques and State of Preservation

The appearance of a textile motif is bound up with its manufacture. If weaving and embroidery processes are disregarded, visual features produced by technique may be mistaken for deliberate aesthetic choices. Nan Xi and colleagues use textual investigation, comparison, microscopy, and infrared spectroscopy to examine the forms, technologies, and composition of textiles excavated at Niya [3]. Lou Shuqi's study of the conservation and restoration of a patterned woolen robe from Yingpan instead concentrates on the condition and treatment of a particular artifact [6]. Figures 3 and 4 illustrate how the visibility of a design can change during restoration. Both lines of inquiry show why a copied image alone is insufficient: understanding the motif also requires knowledge of the material that carries it and the condition in which that material survives.

These issues directly affect digital documentation. Folds can distort the proportions of a design, losses can interrupt repeated motifs, and surviving colors cannot be assumed to reproduce the original palette without supporting evidence. Flattening, infilling, and color adjustment should be documented separately from the initial record. Original photographs, structural diagrams, and hypothetical reconstructions serve different purposes: photographs show a surviving condition, diagrams clarify structure, and reconstructions present interpretations grounded in evidence. Treating all three as a single "standard motif" risks misleading later users about the status of the material. Archaeological textile patterns do not exist simply as flat images independent of the artifacts. Fibers, weave structures, the extent of damage, conservation materials, and exhibition conditions can all affect color, structure, and visual completeness. Research on excavated Xinjiang textiles should therefore consult material analysis, conservation records, and restoration files instead of drawing conclusions solely from reproductions or post-restoration displays.

*Figure 3: The Yingpan Woolen Robe with Human, Animal, and Tree Motifs Before Restoration*



*Source: China National Silk Museum*



© 2026 The Author(s). Authors retain copyright in their articles.

*Figure 4: The Red-Ground Woolen Robe with Paired Human, Animal, and Tree Motifs from the Yingpan Cemetery After Restoration*



*Source: China National Silk Museum*

### 3.3 Cultural Interpretation and Contexts of Exchange

The regional characteristics of Xinjiang motifs need to be demonstrated through particular materials. Broad descriptions such as "multicultural integration" cannot substitute for analysis. Claims about cultural connections should specify whether their evidence comes from imagery, inscriptions, techniques, or contexts of use, and should identify the dates and provenances of the objects being compared. Guo Maoquan discusses the circulation of plants along the Silk Road and their artistic representation through the example of the pomegranate [7]. This approach is helpful for distinguishing a natural species from its representation in art, but evidence of plant movement alone cannot establish that a particular motif followed the same route. The bibliographic details of Guo's work can be checked against reports of research outputs supported by the National Social Science Fund. For badam, pomegranate, or grape motifs, the plant name, visual form, and cultural interpretation should be considered separately. Decorative forms can be altered and reorganized, and a shared name does not guarantee a shared meaning across periods or media. Interpretation should begin by stating what is visible in the specific object, then identifying the evidence behind a proposed reading, and only then assessing possible historical links. Such an approach leaves room for research into cultural exchange without drawing conclusions from visual resemblance alone.

## 4. Principal Tasks of Digital Presentation

### 4.1 Digital Capture and the Retention of Information

Shang Yuping and colleagues study digital information capture using the "Five Stars Rise in the East, Benefiting China" woven armband excavated from Niya as their case [8]. This provides direct material for discussing the recording of Xinjiang textiles. The immediate value of such work lies in producing a record that can be examined and researched; digital capture does not, on its own, produce a complete cultural explanation. Capturing an artifact and extracting a motif are different operations. Capture documents the object and the



© 2026 The Author(s). Authors retain copyright in their articles.

information it retains, while extraction selects lines, colors, or structures for a particular purpose. The latter makes patterns easier to reuse but inevitably leaves some information aside. A detail removed from a garment, for instance, may no longer show its relationship to the neckline, cuff, or overall garment form. For Xinjiang textiles, a useful way of organizing records is to keep extracted patterns linked to the full objects, together with notes on provenance and processing. Users should be able to examine a clear pattern and then locate it on the physical artifact, rather than having access only to a cropped or visually enhanced image. This does not mean every collection requires sophisticated equipment. The essential requirement is that different layers of information remain connected, not that the display itself be novel.

## 4.2 Intelligent Recognition and Its Limits

Digital methods are also being used to classify Xinjiang motifs. Zhao Yu and colleagues use a lightweight network with an attention mechanism to identify broad historical periods in traditional Uyghur embroidery patterns from Xinjiang. Their samples are divided into three classes: before the Qing dynasty, from the Qing to the Republican period, and the modern and contemporary period [9]. The study demonstrates that image-computing techniques can be tested on a predefined classification task. Its results, however, are conditioned by the samples, labels, and categories used. Predicting which period a picture resembles is not the same as establishing the precise date of an undated artifact, still less its cultural origin. A bridge of documentary and object-based evidence is required between classification and historical dating. Compared with manual formal analysis, intelligent recognition offers a testable route for classification. Compared with object-based analysis, what it can reveal about materials, production, and archaeological setting depends on the information supplied to the model. The approaches are therefore better treated as complementary than as substitutes.

## 4.3 From Image Collections to Knowledge Organization

Digital cultural heritage research offers a broader perspective on organizing information. Tan Biyong and colleagues review the digitization of intangible cultural heritage from technological, cultural, and institutional perspectives, while Zhou Ya and Xu Xin survey foundational, technical, and applied research in the area [10–11]. Their discussions indicate that building digital resources involves preserving, linking, and using cultural information, not merely collecting files. Xia Cuijuan's work on knowledge integration across cultural-memory resources also examines how heterogeneous materials can be organized together [12]. For Xinjiang motifs, the relevance lies in connecting images with objects, techniques, places, and documentation, rather than simply adding more images to a repository. At a minimum, a pattern record should preserve its name, the source object, information about dating, the location of the motif on that object, technical details, and the source of any interpretation. Where information is contested, the different views should remain visible; where it is unknown, a definite value should not be invented for the sake of convenient classification. This is a requirement concerning the quality of research data, not a proposal for a particular digital product. Better-defined relationships among records make later comparisons, cultural interpretations, and public learning easier to verify.

## 4.4 Display Formats and Learning Tasks

Li Wenqi reviews interactive visualization in digital humanities in terms of users, data, tasks, visual representation, and interaction. Liu Xinda and colleagues survey developments in virtual reality for cultural heritage conservation [13–14]. These works help inform choices about display formats, but they do not themselves establish the effectiveness of communicating Xinjiang motifs. Presentation should be matched to the task. Identifying an ornamental unit calls for a clear close-up; understanding repetition requires comparison of parts and wholes; explaining an artifact's use requires its form and context to be shown. Immersive environments may add spatial information without necessarily clarifying fine textile details. Digital displays of Xinjiang motifs should therefore be evaluated for more than visual richness: can visitors locate the evidence for an interpretation, distinguish an original image from a redrawn version, and explain the relationship between a motif and its carrier?



© 2026 The Author(s). Authors retain copyright in their articles.

## 5. Cultural Interpretation in Digital Presentation

### 5.1 Original Records and Contemporary Redrawing

Tracing lines, simplifying details, and changing colors can make traditional Xinjiang motifs easier to see, but each operation entails choices. Some features remain; others disappear. The resulting design therefore bears the judgment of the person who processed it. There is nothing inherently inappropriate about such work, provided its status is made clear. A simplified diagram intended for structural analysis should not be presented as a historically accurate original, and areas filled in from assumptions of symmetry should not be confused with surviving fabric. For plant-based motifs such as the badam design, particular care is needed to record sources and avoid combining fragments from several objects while calling the result a faithful record of a single traditional motif. Original images, analytical diagrams, and contemporary redrawings can be displayed alongside one another, but each needs a stated purpose. This preserves the convenience of visual processing while allowing readers to distinguish evidence from later interpretation.

### 5.2 Selecting and Expressing Cultural Information

Jia Xiaoshuang and Xu Yongjun survey the development of memory practices, Xia Cuijuan discusses cultural memory in digital settings, and Zhou Wenhong and colleagues examine the construction of digital memory led by public institutions [15–17]. One insight shared by these studies is that preserving cultural materials involves selection, organization, and participation, not straightforward reproduction. Applied to Xinjiang motifs, this raises questions about what digital displays foreground and what they leave out. Names and associated meanings are easy to compress into short labels. Making techniques, differences in use, and competing interpretations intelligible requires more space. If only names and meanings survive, cultural explanation can become a rigid lookup table. A fuller interpretation should answer three questions: which object does a pattern come from, how have researchers interpreted it, and to what extent can that interpretation reasonably be applied? For traditional garments still in use, makers' and wearers' accounts can also be recorded, but those accounts should be attributed to particular people and circumstances rather than generalized to entire communities.

### 5.3 Levels of Evaluation in Cultural Communication

Clarity of digital display and understanding of cultural content need to be assessed separately. The former can be examined in terms of image quality and ease of use; the latter requires evidence that users can explain an object's function, identify the sources of information, and understand relevant contexts. Recognizing a badam motif does not necessarily mean knowing what kind of garment it came from. Remembering the name of an inscribed brocade does not establish understanding of how its text and imagery relate. Views, time spent, and liking can indicate exposure and interest, but cannot answer questions about cultural understanding on their own. Evaluation of Xinjiang motif communication should therefore distinguish, at minimum, visual recognition, cultural comprehension, and later learning. These indicators may be combined in a study but should be reported separately. The directly relevant studies selected for this review do not support a general conclusion about the effectiveness of digital communication of Xinjiang motifs. It is more appropriate at this stage to define evaluation tasks carefully than to begin with a positive conclusion and seek indirect evidence afterward.

## 6. Research Assessment and Conclusions

### 6.1 Principal Observations and Limitations

The literature surveyed encompasses formal pattern analysis, object-based research, digital capture, and intelligent classification. These approaches differ not simply in technical complexity but in the questions they address. Formal analysis describes design features; object-based research provides evidence about materials and techniques; digital capture creates a documentation base; and intelligent classification addresses specified image-recognition tasks.

What is most needed now is stronger integration among these tasks. Digital patterns should remain traceable to artifacts, classification results should disclose how labels were assigned, and cultural interpretation should



© 2026 The Author(s). Authors retain copyright in their articles.

identify the materials on which it rests. Making these relationships explicit would enable digital presentation to support research rather than merely provide reusable graphics. This review has two limitations. Its primary source materials concern textiles and do not represent every type of traditional Xinjiang motif. Moreover, the depth of access to the selected studies varies, making it impossible to judge the quality of methods or overall development trends across the entire field.

### 6.2 Directions for Further Research

Future work could begin with smaller groups of materials from the same locality, craft tradition, or artifact type, tracing how motifs change across time and use. Such focused studies would make it easier to check provenances, names, and differences of interpretation than would an immediate attempt to build a vast "Xinjiang motif database." Interactive communication also deserves consideration. Liu Ke and Liu Rui's discussion of gamified narratives and Tang Jinyu and Zhu Xuefang's work on serious games for digital intangible heritage offer reference points for designing learning tasks [18–19]. In applying these approaches to Xinjiang motifs, researchers should first define what learners need to understand and then evaluate the form of interaction; a game format alone is no proof of effective cultural communication. Intergenerational learning provides another possible direction. Shi Yan's review offers background [20], but the transmission of Xinjiang motifs within families or communities still calls for dedicated interviews, observation, and longitudinal follow-up.

### 6.3 Conclusion

Focusing on studies of traditional Xinjiang textile motifs, this review distinguishes two complementary but noninterchangeable lines of inquiry. Pattern-centered studies address outline, composition, and decorative features, whereas artifact-centered studies situate motifs within an object's form, materials, craft techniques, and preservation history. Digital methods can support information capture, image classification, knowledge organization, and presentation, but the value of their findings for subsequent research depends on the clarity of provenance, processing records, and labeling criteria. Digital presentation should preserve the link between a motif and its source object and distinguish original records, analytical diagrams, and contemporary redrawing. Classification results should not be treated as direct proof of date or cultural origin. Interpretation likewise requires evidence concerning the object's provenance, manufacture, and use, while acknowledging disagreement and information that remains uncertain. Communication outcomes should be assessed at different levels—visual recognition, cultural understanding, and subsequent learning—rather than inferred from viewing figures or preferences alone. Although the selected studies do not justify an overall assessment of this entire field, they indicate that research on traditional Xinjiang motifs needs tighter connections among visual designs, physical artifacts, and the evidence used to interpret them. A clearer visual presentation will be most valuable when accompanied by a source record that can be traced and checked.

## References

[1] Shi, J. (2010). Xinjiang badam motifs: Artistic meaning and styles of representation [in Chinese]. Literary and Artistic Contention, (14), 111–113.

[2] Madinamu Tursun, & Zhan, B. (2021). Composition and aesthetic characteristics of embroidery motifs on Hami Uyghur clothing [in Chinese]. Wool Textile Journal, 49(3), 65–70.

[3] Nan, X., Shang, Y., Ouyang, P., & Zhou, H. (2023). Characteristics of textiles excavated from tombs M3 and M8 at the 95MNI cemetery of the Niya site: Objects held by the Xinjiang Uygur Autonomous Region Institute of Cultural Relics and Archaeology [in Chinese]. Journal of Donghua University (Social Science), 23(1), 17–28. https://doi.org/10.19883/j.1009-9034.2022.0587.

[4] Zhang, H., Liu, T., Li, X., et al. (2021). Pattern analysis and innovative design of the "Wanshi Ruyi" inscribed brocade unearthed at Niya [in Chinese]. Fashion Guide, 10(4), 99–104.

[5] Miao, H., & Zhao, F. (2021). An examination of text and imagery in Han-dynasty inscribed brocades [in Chinese]. Silk, 58(10), 75–80.



© 2026 The Author(s). Authors retain copyright in their articles.

[6] Lou, S. (2009). Conservation and restoration of the Yingpan woolen robe with human, animal, and tree motifs [in Chinese]. Sciences of Conservation and Archaeology, 21(1), 59–62.

[7] Guo, M. (2018). The "travels" of plants along the Silk Road and their artistic representation: The pomegranate as an example [in Chinese]. Journal of Lanzhou University (Social Sciences), 46(2), 17–23.

[8] Shang, Y., Ouyang, P., Diao, C., et al. (2020). Digital information capture of textile artifacts excavated from the Niya cemetery in Xinjiang: The "Five Stars Rise in the East, Benefiting China" woven armband (95MNIM8:15) [in Chinese]. Cultural Relics, (5), 80–88.

[9] Zhao, Y., Zhang, M., Cheng, Y., Li, W., & Wei, X. (2026). Period recognition of traditional ethnic embroidery patterns using a lightweight attention-enhanced network [in Chinese]. Packaging Engineering, 47(S1), 99–107. https://doi.org/10.19554/j.cnki.1001-3563.2026.S1.014.

[10] Tan, B., Xu, Y., & Zhang, Y. (2011). Technology, culture, and institutions: A review of research on digitizing intangible cultural heritage [in Chinese]. Zhejiang Archives, (6), 30–33.

[11]Zhou, Y., & Xu, X. (2017). A review of research on digitization of intangible cultural heritage [in Chinese]. Library and Information Service, 61(2), 6–15. https://doi.org/10.13266/j.issn.0252-3116.2017.02.001

[12] Xia, C. (2021). Knowledge integration of cultural-memory resources: From metadata application profiles for heterogeneous materials to integrated ontology design [in Chinese]. Documentation, Information & Knowledge, 38(1), 53–65. https://doi.org/10.13366/j.dik.2021.01.053

[13] Li, W. (2022). A review of interactive visualization applications in digital humanities [in Chinese]. Documentation, Information & Knowledge, 39(5), 42–55.

[14] Liu, X., Li, K., Geng, G., et al. (2025). Research advances in virtual reality technologies for cultural heritage conservation [in Chinese]. Journal of Computer-Aided Design & Computer Graphics, 37(4), 545–560.

[15] Jia, X., & Xu, Y. (2019). Current developments and trends in memory practices at home and abroad [in Chinese]. Documentation, Information & Knowledge, (1), 60–66.

[16] Xia, C. (2024). Cultural memory: From the postmodern to the post-digital era [in Chinese]. Documentation, Information & Knowledge, 41(6), 75–82.

[17] Zhou, W., Dai, L., Huang, S., et al. (2022). International developments in the social construction of digital memory led by libraries: Positioning, approaches, and strategies [in Chinese]. Documentation, Information & Knowledge, 39(2), 20–29.

[18] Liu, K., & Liu, R. (2023). Narrative expression, media presentation, and practice in digital humanities from the perspective of gamified storytelling [in Chinese]. Documentation, Information & Knowledge, 40(5), 118–126.

[19] Tang, J., & Zhu, X. (2020). Development and application of serious-game projects for transmitting digital intangible cultural heritage [in Chinese]. Library and Information Service, 64(10), 35–45. https://doi.org/10.13266/j.issn.0252-3116.2020.10.005.

[20] Shi, Y. (2022). Review and prospects of intergenerational learning research in China: A CNKI-based literature search [in Chinese]. Beijing Youth Research, 31(2), 103–112.

## Funding

This research received no external funding.

## Conflicts of Interest

The authors declare no conflict of interest.

## Acknowledgment

This paper is an output of the science project.



© 2026 The Author(s). Authors retain copyright in their articles.

## Copyrights

Copyright for this article is retained by the author (s), with first publication rights granted to the journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).



© 2026 The Author(s). Authors retain copyright in their articles.