

Strategies for Integrating Gamification Mechanisms into the Digital Dissemination of Cultural Heritage: A Case Study of Stone Carvings in Southern Dynasties Mausoleums

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ABSTRACT

With the widespread application of digital technologies in the field of cultural heritage, the dissemination of cultural heritage is gradually shifting from static display to interactive experience and online dissemination. However, current digital dissemination practices still focus on visual representation and information display, making it difficult to fully promote public understanding and sustained participation. As important remains of ancient Chinese mausoleum art and ritual culture, the stone carvings in Southern Dynasties mausoleums have high historical, artistic, and cultural value. Nevertheless, due to their complex historical context, strong spatial attributes, and specialized symbolic significance, the public tends to stay at a shallow level of perception during the viewing process. Based on this context, this study adopts a qualitative research method to analyze the problems faced by stone carvings in Southern Dynasties mausoleums in digital dissemination, such as high comprehension threshold, insufficient interpretation level, weakened spatial relationship, and limited user participation, from the perspective of cultural heritage dissemination and interaction design. This study proposes gamified dissemination strategies such as task guidance, narrative experience, spatial exploration, feedback and incentives, lightweight social dissemination, and authenticity prompts. The findings suggest that gamification mechanisms are a dissemination method that assists the public in understanding the context, spatial relationships, and cultural significance of cultural heritage, and can provide actionable design ideas for the digital dissemination of stone carving cultural heritage.

Keywords: Gamification Mechanisms, Cultural Heritage, Digital Dissemination, Stone Carvings in Southern Dynasties Mausoleums

INTRODUCTION

With the widespread application of digital technologies in the field of cultural heritage, the dissemination of cultural heritage is no longer limited to traditional on-site visits, simple textual and visual introductions, or museum exhibitions, but is gradually shifting towards various forms such as virtual displays, digital guides, interactive experiences, and online dissemination (Buragohain et al., 2024; Zhang et al., 2024). The rapid development of digital technologies has not only expanded the channels for the dissemination of cultural heritage, but also changed the way the public interacts with and understands cultural heritage. However, in the practice of digital dissemination of cultural heritage, the use of technologies tends to focus on visual representation and information display. Users often only passively watch digital models, images, and textual interpretations, lacking opportunities for active exploration, sustained participation, and deep understanding (Gong et al., 2024; Liu, 2020; Rahaman, 2018). Therefore, how to enhance the attractiveness, understanding,

and participation of cultural heritage dissemination in the digital environment has become the core issue of this study.

The stone carvings in Southern Dynasties mausoleums are important remains of ancient Chinese mausoleum art and ritual culture, mainly including stone beasts, stone pillars, and stone tablets (Figure 1). This type of heritage not only has artistic value, but also carries the political system, ceremonial order, spatial concept, and aesthetic characteristics of the Southern Dynasties period (Zhu et al., 2025). However, compared to some well-known cultural heritage sites, the stone carvings in Southern Dynasties mausoleums have highly specialized and historical distance. When general audiences observe these relics, they often feel their size, shape, and sense of history, but it is difficult for them to understand the institutional meaning, spatial attributes, and cultural symbols behind them.



Figure 1. The stone carvings in Southern Dynasties mausoleums (Source: Photo by author, 2025)

In the context of digital dissemination, if only stone carvings are converted into digital images or 3D models without further organizing their historical context, spatial attributes, and interpretation pathways, users can only stay at a shallow level of viewing. For cultural heritage sites with complex backgrounds and spatial attributes such as the stone carvings in Southern Dynasties mausoleums, the key to dissemination is how to guide the public to understand them.

The gamification mechanisms provide new ideas for the digital dissemination of cultural heritage. The so-called gamification is not simply about turning cultural heritage into entertainment, but rather introducing mechanisms such as tasks, rules, narrative, feedback, rewards, exploration, and social sharing from games into non-game contexts to enhance user engagement motivation and experience processes (Deterding et al., 2011). In the dissemination of cultural heritage, gamification mechanisms can help users shift from passive information reception to active knowledge exploration, from single viewing to continuous participation, and from isolated understanding to contextualized understanding.

Based on the above background, this study takes the stone carvings in Southern Dynasties mausoleums as an example and adopts a qualitative research method to analyze the understanding threshold, insufficient interpretation, weakened spatial attributes, and limited user participation that cultural heritage faces in digital dissemination from the perspective of cultural heritage dissemination and interaction design. On this basis, this study further explores the possible path of gamification mechanism intervention in the digital dissemination of stone carvings in Southern Dynasties mausoleums, and proposes corresponding strategies from task guidance, narrative experience, spatial exploration, feedback and incentives, social dissemination, and authenticity prompts. The research aims to demonstrate that gamification is not an entertaining treatment of cultural heritage, but rather a dissemination method that assists the public in understanding the context, spatial attributes, and cultural significance of heritage.

LITERATURE REVIEW

Digital dissemination has become an important direction in the research of cultural heritage preservation and dissemination in recent years. With the development of 3D scanning, digital modeling, virtual reality, augmented reality, interactive web pages, and mobile applications, more and more cultural heritage can be recorded, displayed, and disseminated through digital means. On the one hand, digital technologies have broken through the limitations of cultural heritage in time and space, enabling more members of the public to have remote access to heritage resources (Buragohain et al., 2024); on the other hand, they also provide new possibilities for the reorganization, interpretation, and re-dissemination of heritage information (Lian & Xie, 2024). For example, 3D models can present the morphological details of heritage objects, virtual exhibitions can simulate visiting pathways, AR guides can overlay digital information into the on-site space, and interactive interfaces can provide different levels of information based on user behavior.

However, digital dissemination does not equate to effective dissemination. Although some digital cultural heritage projects are technologically rich in presentation, there are still problems such as single content organization, insufficient level of interpretation, and weak user participation (Gong et al., 2024; Xu et al., 2025). Especially for cultural heritage with complex historical backgrounds, strong symbolic meanings, or strong spatial attributes, if digital dissemination is only used for visual, modeling, or informational display, it is difficult to truly enhance public understanding (Liu, 2020). The dissemination of cultural heritage requires not only visibility, but also readability, comprehensibility, and participation. Therefore, the core issue of digital dissemination is gradually shifting from technology display to the design of user experience, interpretation path, and dissemination mechanisms.

Gamification research provides important references for this issue. Gamification refers to the application of game design elements to non game contexts to enhance user engagement motivation, behavioral continuity, and experiential experience (Deterding et al., 2011). Common gamification mechanisms include task setting, level progression, role-playing, point systems, real-time feedback, progress visualization, storytelling, and social interaction (Toda et al., 2019). These mechanisms can enable users to form a stronger sense of participation in the process of achieving goals, receiving feedback, and gradually exploring. Gamification mechanisms have been widely used in fields such as education, health, tourism, and public communication to enhance user interest and engagement.

Gamification mechanisms have certain applicability in the dissemination of cultural heritage. Cultural heritage often contains complex historical information, spatial attributes, and symbolic systems, and the general public needs some guidance in understanding them. Through task-based learning paths, narrative historical contexts, and exploratory interactive mechanisms, gamification can lower the threshold for understanding cultural heritage and enable users to gradually acquire knowledge through participation (Bellotti et al., 2013). Meanwhile, feedback and reward mechanisms can also help enhance users' incentives to continue exploring, while social sharing mechanisms can expand the scope of cultural heritage dissemination.

However, the intervention of gamification mechanisms in the dissemination of cultural heritage also carries risks. Cultural heritage has authenticity and historical complexity, and historical content cannot be arbitrarily rewritten for the sake of interest, nor can controversial or uncertain information be expressed as definitive conclusions. If gamification design overly emphasizes entertainment effects, it may weaken the historical depth and cultural significance of cultural heritage itself (Champion, 2016). Therefore, gamification mechanisms in cultural heritage should be a design method that assists understanding.

In existing research, discussions on gamification and the dissemination of cultural heritage have mainly focused on museums, ancient buildings, archaeological sites, or tourist experience contexts. However, discussions on stone carving heritage, especially the stone carvings in Southern Dynasties mausoleums with symbols of spirit road space, mausoleum system, and ritual system, are still relatively limited (DaCosta & Kinsell, 2022; Marques et al., 2023). The difficulty in disseminating the stone carvings in Southern Dynasties mausoleums lies not only in the visualization of the remains themselves, but also in how to interpret their historical background, spatial order, and cultural significance. Therefore, it is necessary to further explore its digital dissemination strategy from the perspective of gamification mechanisms.

METHODOLOGY

This study adopts a qualitative research method and focuses on the understanding barriers, participation barriers, and issues of dissemination transformation of stone carvings in Southern Dynasties mausoleums in digital dissemination. This study does not primarily aim at technological development or user experimentation, but rather analyzes the possible pathways for gamification mechanisms to integrate gamification mechanisms into the digital dissemination of stone carvings in Southern Dynasties mausoleums from the perspective of cultural heritage dissemination and interaction design, and proposes corresponding strategic frameworks.

In terms of case selection, the stone carvings in Southern Dynasties mausoleums have strong representativeness. Firstly, they are important material remains of mausoleum culture during the Southern Dynasties period in China, including stone beasts, stone pillars, and stone tablets, and is a heritage type with clear institutional and spatial significance. Secondly, this type of heritage has high historical and artistic value, but its public familiarity is relatively limited, and there are obvious knowledge barriers in the dissemination process. In addition, the stone carvings in Southern Dynasties mausoleums are scattered, some of which are located in the natural environment of the suburbs, and some have been placed in museums or protected exhibition spaces. Their dissemination contexts are relatively diverse, suitable for discussing the intervention of digital technology and gamification mechanisms.

The analytical framework of this study includes three levels. Firstly, at the level of heritage characteristics, the main focus is on analyzing the historical, spatial, symbolic, and interpretive complexity of the stone carvings in Southern Dynasties mausoleums. Secondly, at the level of dissemination issues, the main focus is on analyzing the understanding threshold, insufficient interpretation, and lack of interactive participation that digital dissemination faces. Thirdly, at the level of gamification mechanisms, corresponding strategies are mainly proposed from the aspects of task guidance, narrative experience, spatial exploration, feedback rewards, and social dissemination. Through the correspondence between these three levels, this study attempts to construct a gamified strategy framework for the digital dissemination of stone carvings in Southern Dynasties mausoleums.

DIGITAL DISSEMINATION CHALLENGES OF STONE CARVINGS IN SOUTHERN DYNASTIES MAUSOLEUMS

The first challenge faced by the digital dissemination of stone carvings in Southern Dynasties mausoleums is the high threshold for historical understanding. The history of the Southern Dynasties itself is not the most familiar part of people's daily cultural memory, and mausoleum stone carvings are closely related to ancient ritual systems, burial systems, spirit road spaces, and identity levels. When the general public comes into contact with the stone carvings in Southern Dynasties mausoleums, they often first notice the size, shape, or damaged state of the stone beasts, but may not necessarily understand why they are set in the mausoleum spirit road, nor is it easy to understand the relationship between stone pillars, stone tablets, and mausoleum space. Without background interpretation, stone carvings can easily be understood as isolated ancient sculptures.

The second challenge is the insufficient level of interpretation in digital display. Currently, many digital dissemination methods for cultural heritage still rely on textual and visual introductions, image displays, 3D model browsing, or short video dissemination. These methods can enhance the visibility of heritage, but may not necessarily help users establish a complete understanding (Liu, 2020). For the stone carvings in Southern Dynasties mausoleums, it is not enough to only display the appearance of a single stone carving. It is also necessary to explain the location of the mausoleum, the sequence of spirit road, the relationship with the identity of the mausoleum owner, the symbolic meaning of the stylistic features, and the differences between different stone carvings. If digital dissemination does not establish a hierarchical interpretation structure, users will find it difficult to enter cultural understanding from visual observation.

The third challenge is that spatial attributes are not easily perceived. The significance of stone carvings in Southern Dynasties mausoleums lies in the overall space and spirit road sequence of the mausoleum. Stone

beasts, stone pillars, and stone tablets are not randomly placed objects, but are closely related to the direction of the mausoleum, road organization, ritual order, and viewing pathway (Zhu et al., 2025). However, in current online dissemination, users often see photos or models of individual remains, lacking understanding of their spatial location and overall relationship. If the digital display cannot reconstruct or explain these spatial attributes, it is easy to weaken the significance of the stone carvings in Southern Dynasties mausoleums as a component of mausoleum space.

The fourth challenge is the lack of user engagement and sustained dissemination ability. Traditional heritage dissemination mostly remains on one-way interpretation, with users mainly obtaining information through reading, watching, or listening to lectures. This approach is more effective for users who already have an interest or knowledge base, but its appeal and sustainability are relatively limited for the general public, especially young users (Drotner et al., 2017). If there is a lack of tasks, exploration, feedback, and interactive mechanisms, it is difficult for users to form the motivation to further understand the stone carvings in Southern Dynasties mausoleums, and it is also difficult for them to actively share relevant content with others. Therefore, the digital dissemination of stone carvings in Southern Dynasties mausoleums needs to shift from one-way display to more participatory experience design.

GAMIFICATION-BASED DIGITAL DISSEMINATION STRATEGIES

In response to the above issues, gamification mechanisms can integrate gamification mechanisms into the digital dissemination of stone carvings in Southern Dynasties mausoleums from multiple aspects. Firstly, a task-based knowledge guidance strategy can be established. The stone carvings in Southern Dynasties mausoleums contain a lot of historical and professional information. If presented directly in large paragraphs or a complete knowledge system, it can easily cause cognitive burden for users. Task-based design can break down complex knowledge into several small goals, allowing users to gradually understand the heritage content while completing tasks (Bellotti et al., 2013). For example, tasks such as understanding the types of the stone carvings in Southern Dynasties mausoleums, searching for the stylistic features of stone beasts, determining the function of stone pillars, and comparing the differences between stone carvings in different mausoleums can be set. In this way, users can actively observe, judge, and learn under the guidance of specific problems and goals.

Secondly, narrative-based historical experience can be constructed. The dissemination of cultural heritage is not only the transmission of knowledge, but also a contextual construction. For the stone carvings in Southern Dynasties mausoleums, narrative mechanisms can help users enter specific historical spaces. Digital dissemination can take entering a spirit road in Southern Dynasties as the narrative entrance, guiding users to gradually encounter stone beasts, stone pillars, stone tablets, and mausoleum environments in spatial order. In this process, the system can organize scattered heritage information into a continuous experience pathway through short stories, character perspectives, historical clues, and question prompts. For example, users can enter the digital scene as professional researchers or ordinary visitors, and learn about the functions, symbols, and historical background of stone carvings by searching for clues. It is worth noting that narrative design must be based on real data, and speculative content needs to be annotated to avoid misleading imaginative designs into historical facts.

Thirdly, exploratory spatial interaction strategies can be designed. The stone carvings in Southern Dynasties mausoleums have obvious spatial attributes, so digital dissemination should not only display individual remains, but also help users understand the relationship between heritage and spatial environment. Users can be guided to explore the digital space through methods such as 3D digital maps, virtual routes, location markers, and comparative browsing. For example, users can view the distribution of different mausoleum stone carvings on the map, gradually unlock relevant nodes along the virtual spirit road, click on different stone carvings to obtain hierarchical information, and compare the differences in shape, conservation condition, and spatial attributes of stone carvings in different locations. This exploration mechanism helps to transform the stone carvings in Southern Dynasties mausoleums from isolated sculptures into spatialized heritage for understanding.

Fourthly, feedback and achievement mechanisms can be introduced. The real-time feedback in gamification

mechanisms can enhance users' motivation to participate, allowing them to know their exploration progress and learning outcomes (Meng et al., 2024). In the digital dissemination of stone carvings in the Southern Dynasties mausoleums, mechanisms such as progress bars, knowledge cards, digital collection cards, route completion prompts, and quiz feedback can be set up. For example, after the user completes a recognition task for a stone carving type, the system can unlock a "stone carving knowledge card"; After completing a virtual spirit road route, users can receive the badge of "Southern spirit road Explorer"; After the user answers questions about the stone carving function, the system can provide instant explanations. This type of mechanism helps to enhance the engagement and sense of achievement of users' active learning.

Fifthly, lightweight and social dissemination strategies can be developed. For the stone carvings in Southern Dynasties mausoleums, a more suitable pathway may be through lightweight forms such as mini programs, H5 interactive pages, short video interactive questions and answers, AR check-in, and social media sharing cards. Lightweight dissemination reduces the entry barrier for users and is more suitable for spreading on mobile devices and social platforms. For example, content such as "Today's Encounter with a stone carvings in the Southern Dynasties", "One Minute Recognition of Stone Beast Patterns" can be designed to enable users to gain knowledge through short-term interaction and share the results or knowledge cards with others. This approach helps to extend the dissemination of cultural heritage from a single viewing to continuous exposure and secondary dissemination.

Sixthly, a hierarchical interpretation and authenticity prompt mechanisms can be established. Although gamification mechanisms emphasize participation and fun, they must be combined with the principle of authenticity in the dissemination of cultural heritage. the stone carvings in Southern Dynasties mausoleums involve historical systems and cultural interpretations, some of which are subject to academic controversy or uncertainty in interpretation. Therefore, the digital dissemination interface can adopt a hierarchical information structure to distinguish between basic knowledge, in-depth explanations, academic viewpoints, and speculative content. For information with high certainty, it can be presented as a basic explanation; For content with speculation or different interpretations, a "speculation" tip should be marked. This can maintain the fun of dissemination and the rigor of cultural heritage interpretation.

Overall, the gamification mechanisms involved in the digital dissemination of stone carvings in the Southern Dynasties mausoleums did not simply add game elements, but reorganized the dissemination pathway. The task mechanism solves the problem of where to start understanding, the narrative mechanism solves the problem of how to enter historical contexts, the spatial exploration mechanism solves the problem of how to understand heritage relationships, the feedback mechanism solves the problem of how to maintain participation motivation, the social dissemination mechanism solves the problem of how to expand dissemination influence, and the authenticity prompt mechanism solves the problem of how to avoid misinterpretation. Gamified dissemination only has true meaning when these mechanisms collectively serve the understanding of heritage.

CONCLUSION

This study takes the stone carvings in Southern Dynasties mausoleums as an example to explore the strategy of gamification mechanisms in the digital dissemination of cultural heritage. This study suggests that the difficulty in digital dissemination of stone carvings in the Southern Dynasties mausoleums lies in their complex historical context, strong spatial attributes, specialized symbolic meanings, and high threshold for public understanding. Although traditional text and image displays and general digital model browsing can improve the visibility of heritage, they cannot fully address the problems of insufficient public participation and understanding.

The gamification mechanism provides new dissemination ideas for this issue. Through task-based knowledge guidance, narrative historical experience, exploratory spatial interaction, feedback and achievement mechanisms, lightweight social dissemination, and layered interpretation and authenticity prompts, the complex information of the stone carvings in Southern Dynasties mausoleums can be transformed into a digital dissemination pathway that is easier for the public to enter, understand, and participate in. The value of gamification lies in the use of reasonable interactive mechanisms to enable the public to gradually understand

the historical significance and cultural value of heritage through exploration, judgment, feedback, and sharing.

Meanwhile, the gamified dissemination of cultural heritage must adhere to the principle of moderation. The stone carvings in Southern Dynasties mausoleums have serious historical and cultural attributes. The relevant design cannot arbitrarily rewrite history to enhance interest, nor can fictional plots replace academic explanations. Gamification mechanisms should be used as an interpretive tool rather than a substitute for cultural heritage values. Future research can further carry out digital prototype design, user experience testing, and dissemination effect evaluation based on the strategies proposed in this study, to verify the actual effects of different gamification mechanisms in the dissemination of stone carving heritage.

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