

From visual narrative to interactive experience: innovative application of digital media art in the inheritance of traditional culture

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Abstract: With the widespread application of digital technologies such as virtual reality and augmented reality in the cultural domain, the traditional methods of cultural inheritance are facing new opportunities and challenges. This paper explores how digital media art can enhance the dissemination of traditional culture and audience engagement through innovative visual storytelling and interactive experiences. The study combines case analysis with user research, using representative cases like Digital Forbidden City to analyze how digital media reshapes the presentation of cultural symbols and evaluates its impact on public cultural identity. The findings indicate that interactive design-based digital media art can enhance the audiences immersive experience, improve the effectiveness of cultural dissemination, and promote the digital re-creation of cultural content. The paper further proposes a framework for cultural heritage strategies based on visual storytelling and interactive experiences, providing theoretical support and practical guidance for the future digital development of traditional culture.

1. Introduction

In the context of rapid globalization and digital technology, the dissemination and preservation of traditional culture face unprecedented challenges. Research indicates that the interest of the audience in traditional culture is gradually declining, particularly among the younger generation, who have limited knowledge of traditional culture (Zang Zhipeng & Xie Xuefang, 2024:2)^[16]. Additionally, the methods of spreading traditional culture remain largely static, such as through exhibitions and books, lacking interactivity and failing to adapt to modern social media and digital trends (Zhou Yonglong, 2023:31)^[17]. UNESCO (2022) highlights that globally, intangible cultural heritage is losing at an annual rate of 4%. To address these challenges, digital media art, as a new form of cultural dissemination, can leverage the advantages of visual storytelling and interactive experiences to offer new possibilities for the preservation of traditional culture^[18]. This article aims to explore how digital media art can innovate the way traditional culture is preserved through visual storytelling and interactive experiences. By analyzing case studies of digital media art in the preservation of traditional culture, it aims to highlight its significant role in enhancing cultural

identity, fostering cultural innovation, and increasing public engagement. The findings will provide theoretical support and practical guidance for the development of cultural heritage strategies, promoting the innovative development of traditional culture in the digital age. Therefore, this article proposes the following approach. The following research questions are to be addressed: How does visual storytelling influence the dissemination of traditional culture through semiotics and narrative structure? What key elements of interactive experiences, such as immersion and user control, can enhance the effectiveness of cultural inheritance? How does digital media art impact the perception and acceptance of traditional culture among different audience groups, including young people and the elderly?

This study employs a research method that combines literature review and analysis, selecting representative digital media art projects such as "Digital Forbidden City" and "Digital Dunhuang." It collects user experience data to analyze the application effects of digital media art in the preservation and inheritance of traditional culture, summarizing successful experiences and innovative strategies. Additionally, it draws on existing research findings from related literature to provide a theoretical foundation for this study.

2. The role and influence of digital media art in cultural inheritance

Digital media art (Digital Media Art) is a new form of art that uses computer technology as a medium, creating and disseminating through interactive and multimodal expressions (Manovich, 2001:4-5)^[9]. Bolter & Grusin (1999:730-732) proposed that digital media art, through the mechanism of remediation, reconstructs traditional art forms, giving them new forms of expression in new media environments such as virtual reality, augmented reality, and interactive imagery^[2]. Digital media art integrates various media forms, including text, images, audio, and video. Artists can use advanced digital tools and technologies to explore new artistic forms and techniques, creating unprecedented visual and auditory effects that present artistic content in a richer and more three-dimensional manner. Additionally, touch screens, gesture recognition, virtual reality (VR), and augmented reality (AR) technologies can be integrated into the experience, providing viewers with more personalized and immersive artistic experiences. This interactive, multimedia, and innovative form of art offers artists a broader creative space, enabling artworks to transcend the limitations of a single medium. It not only enhances audience participation but also infuses new life into artworks. In recent years, digital media art has not only become a new form of creation. The methods have gradually permeated into areas such as cultural heritage protection, the cultural and creative industry, and museum exhibitions. In recent years, digital media art has been widely applied in these fields. For instance, the Nanjing Museum has utilized naked-eye 3D technology in the Great Gratitude Temple Porcelain Tower exhibition project, allowing visitors to appreciate the towers intricate details and light and shadow changes without any equipment, thus enhancing the appeal of cultural dissemination (Figure 1). Additionally, the Digital Dunhuang project uses virtual reality technology to conduct high-precision scanning and interactive displays of the murals and sculptures at the Mogao Grottoes, enabling visitors to travel through a thousand years of history and immerse themselves in the charm of Dunhuang art.

Digital media art has been integrated into various modern fields and is an essential component in addressing the challenges of traditional cultural inheritance in our country. Traditional culture, as defined by Wang Zengfu (2017:112-121), encompasses a unique cultural system with distinct styles and values that have developed over a long historical period in a particular nation or region^[19]. This system includes language and writing, customs, religious beliefs, artistic forms, philosophical ideas, and scientific knowledge. Since the mid-19th century, Chinese culture has faced both adaptation and challenges during its modernization process. On one hand, it has encountered external cultural

influences; on the other hand, it has explored creative transformation and innovative development within its local context (Li Xinchao, 2021:8)^[20].

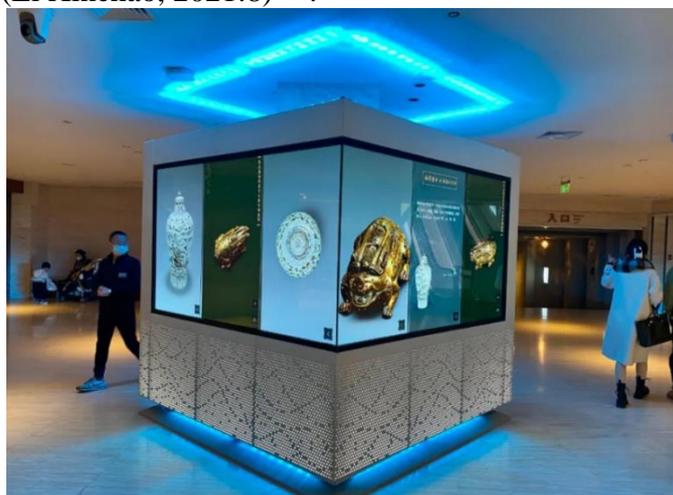


Figure 1 Nanjing Museum naked-eye 3D

Digital media art, through technologies such as virtual reality, augmented reality, animation, and digital imaging, offers a new approach to the visual storytelling of traditional culture. By deconstructing stories, legends, and historical events from traditional culture, it infuses them with modern significance and presents them in a more vivid, lifelike, and engaging manner. This helps audiences better understand and appreciate the charm of traditional culture, thereby enhancing their sense of identity and pride in it. Through the dissemination of digital media art, more people can gain a deeper understanding of the value and significance of traditional culture. Additionally, digital media art facilitates cultural exchange and integration among different regions and ethnic groups, fostering greater understanding and respect for diverse cultures, and further promoting the protection and development of cultural diversity.

Digital media art enables the reenactment of traditional culture through visual narratives, offering a dynamic and immersive way to reconnect with cultural heritage.

Visual narrative (Visual Narrative) is a storytelling method that conveys information and expresses plots through visual elements such as images, animations, and symbols (McCloud, 1993:66-69)^[12]. In traditional culture, techniques like murals, dramas, and comic books use visual narratives to make stories more vivid and engaging. For example, ancient Chinese murals use color, composition, and character design to tell historical and religious stories, conveying rich cultural information even without text. In the digital media environment, visual narratives are no longer limited to linear storytelling; instead, they offer multiple exploration paths through database narratives (Database Narrative) (Manovich, 2001:225)^[10]. Semiotics further suggests that visual symbols, such as colors, images, and symbolic signs, can convey specific cultural meanings and enhance user emotional resonance during interactions (Barthes, 1980:51)^[4]. Additionally, the selection of traditional cultural symbols should consider their cultural value and adaptability to modern contexts. For example, in the design of cultural and creative products, representative intangible cultural heritage symbols, such as the Foshan Lion Head (Color Binding), can be reinterpreted by incorporating modern design elements. This allows designers to breathe new life into these symbols while preserving their cultural essence. In the field of digital media art, visual storytelling is no longer limited to static images, but enhances user immersion through interactive technologies, dynamic visual languages, and gamified experiences (Ryan, 2005:723)^[14]. In contemporary interactive exhibitions or games, users can explore different historical contexts based on their choices, thus shaping personalized cultural experiences.

The structure of visual storytelling can be categorized into linear and non-linear narratives. Mickael, through his analysis of Rembrandts paintings, suggests that linear narratives unfold stories in chronological order, featuring a clear beginning, development, climax, and conclusion. In contrast, non-linear narratives use techniques such as multi-threading, flashbacks, and interludes to disrupt the linear flow of time, offering viewers a more complex narrative experience (Bal, 1991:91-97)^[3]. In digital media art, non-linear narratives can be realized through interactive technologies, allowing viewers to explore different story paths based on their choices. Visual storytelling constructs story contexts through visual elements, enabling viewers to intuitively experience the atmosphere and emotions of the story. Storytelling is the core of visual narrative, attracting viewers attention and evoking emotional resonance through the progression of plots and character development. Emotional resonance can be enhanced through techniques such as color, lighting, and music, creating a visual and auditory connection for the audience. Color plays a crucial role in visual storytelling, often conveying strong emotions and guiding cognition. Warm tones are typically associated with warmth and vitality, while cool tones are linked to calmness and sadness. The use of lighting can create specific atmospheres; for example, bright light symbolizes hope and brightness, while dark lighting evokes fear and despair. The contrast of light and shadow, along with color coordination can enhance the narrative effect. Goethe, in his Theory of Colors (Farbenlehre), proposed that colors can evoke emotional responses through visual perception, and he believed that the warmth, contrast, and harmony of colors can enhance the appeal of design (840:803-815)^[7]. In digital museum exhibitions, different color schemes are used to create specific historical atmospheres. For example, the Palace Museums digital exhibition often uses warm golden tones to emphasize the imperial atmosphere, while the Dunhuang murals use natural tones to recreate the artistic style from a thousand years ago.

Images and symbols are also crucial components of visual storytelling. Images convey the storys content through characters, objects, and scenes, while symbols convey deeper meanings through symbolism and metaphor. Animation and special effects are essential tools in visual storytelling, enhancing the storys visual impact and appeal. In the dissemination of traditional culture, semiotic analysis can reveal how visual elements carry cultural connotations. For instance, in Peking Opera masks, red symbolizes loyalty, and black symbolizes uprightness (Bing Fuquan, 2002:10-15)^[6]. Animation technology can transform traditional cultural symbols into vivid visual representations. For example, in the Digital Dunhuang project, researchers used digital restoration techniques to bring mural symbols to life in virtual reality, allowing viewers to step into cultural scenes from a thousand years ago and enhance their sense of cultural identity through interactive experiences (Figure 2).



Figure 2 Digital Dunhuang

The expression of interactive experience design in digital media art serves as a contemporary approach to interpreting and revitalizing traditional culture.

Interactive experience is a user-centered design approach that leverages digital technology and interactive strategies to enhance users' immersion, personalized experiences, and emotional connections with cultural and artistic works. In the context of digital media art, interactive experience not only boosts audience engagement but also facilitates the dynamic re-creation of traditional cultural content. It emphasizes that users are not just passive recipients but active participants and creators. For instance, in the Digital Forbidden City project, users can explore artifacts through touch screens and use AR technology to recreate historical scenes, thereby gaining a deeper cultural understanding and emotional connection.

The core features of interactive experience design include engagement (Engagement), feedback (Feedback), and personalization (Personalization). Among these, engagement and feedback are the core elements of interactive experiences. Interactive experience design encourages users to actively participate in the creation and experience of the work, interacting with it through touch, gestures, voice, and other methods. This enhances user engagement and investment, and the system can respond to user actions in real-time, providing immediate feedback and allowing users to feel the impact of their actions on the work. Finally, by analyzing collected user data and using intelligent recommendation systems, personalized experiences are provided based on user preferences and behaviors, meeting the diverse needs of different users.

When designing interactive experiences, a user-centered design approach should be adopted. This involves starting from the users' needs and using tools like user research, user profiling, and user journey maps to gain a deep understanding of their behaviors, preferences, and expectations. By collecting user feedback through interviews and surveys, the interactive design can be optimized to better meet user needs. Shneiderman (1987:51) noted in his "Eight Golden Rules of Interface Design" that users need immediate feedback and clear control to maintain immersion^[15]. Additionally, Csikszentmihalyi (1991:126) proposed the theory of "flow experience," which suggests that when users interact in an environment where the challenge level matches their personal abilities, they are more likely to enter an immersive experience, thereby enhancing the effectiveness of the interaction^[11]. Scenario simulation and role-playing are crucial methods in interactive experience design. By creating virtual scenarios and characters, these methods allow users to immerse themselves in specific situations, enhancing the realism and immersion of the experience. For example, in some interactive art installations, users can play specific roles and experience different storylines. Multisensory Interaction is also a key strategy for enhancing cultural experiences. By combining visual, auditory and tactile stimuli, it can significantly enhance users' engagement and immersion. For example, the "Digital Dunhuang" project in 2022 introduced haptic feedback technology to allow users to feel the material and carving texture of the murals during the interaction, thus enhancing the authenticity of the cultural experience.

Successful cases of interactive experience design highlight its significant appeal and impact. For instance, Thomas Heatherwicks' interactive installation "Tree of Life" (Figure 3) allows users to control the growth of branches and the blooming of flowers through gestures, enabling them to experience the process of creating life. This nature-based interaction design lowers the barrier to participation and ignites users' creative passion. Wang Xinyu's online interactive work "Global Positioning" invites global audiences to participate in creation via the internet. Audiences mark their locations on the webpage and share information, forming a constantly evolving world map. This web-based interaction expands the boundaries of participation, fostering global collaboration and co-creation. The effectiveness of interactive experience design can be evaluated through various methods, such as user research and usability testing. User interviews and surveys help understand user satisfaction with interactive experiences; usability testing helps observe user behavior and

feedback during actual use, identifying and improving issues. Through case studies of contemporary interactive experience design, we can summarize successful practices: when designing, data analysis and intelligent recommendation systems are used to provide personalized interactive experiences that meet the needs of different users; when users engage in interactive experiences, multiple sensory stimuli—visual, auditory, and tactile—are employed to deepen their sense of immersion; meanwhile, creating virtual scenes and characters, can immerse users in specific scenarios to enhance the realism and emotional resonance of the experience; finally, by analyzing users' behavior data during the experience, the interactive experience can be continuously optimized to boost user satisfaction.



Figure 3 Homas Heatherwick, Tree of Life (2024)

The innovative application of digital media art provides new modes for the inheritance and continued development of traditional culture.

With the rapid growth of the global digital cultural industry, digital media art has become a vital medium for cultural dissemination and preservation. In recent years, innovations in technologies such as virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) have opened up new possibilities for the digital representation of traditional culture (Arielli, 2021:11-12)^[1]. UNESCO (2022) notes that digital technology is transforming the way cultural heritage is protected, shifting from static displays to interactive experiences. This article explores innovative applications of digital media art in the preservation of traditional culture from three perspectives: education, entertainment, and social interaction.

The educational model is a key application of digital media art in the preservation of traditional culture. Its core lies in enhancing the audiences cultural understanding and learning experience through digital technology. Based on Piagets constructivist learning theory (1950:7-8), digital interaction technology can enhance the knowledge construction process, making learning more personalized and situational^[13]. For example, "National Treasure" (Figure 4) uses celebrity narrators to tell the stories of cultural relics, combined with animation effects and augmented reality (AR) scenes, allowing viewers to gain cultural knowledge through an immersive experience. Additionally, the "Digital Forbidden City" project (Figure 5) uses VR tours, 3D artifact modeling, and intelligent

voice commentary to provide multi-layered interactive learning experiences, making traditional cultural knowledge more accessible and engaging.



Figure 4 CCTV, National Treasure



Figure 5 Digital Palace Museum

The entertainment model is a key approach to attracting young audiences to traditional culture. The term gamification was first coined by programmer Nick Pelling in 2002, but it was not until later that it was officially recognized in academic literature (Deterding et al., 2011)^[5]. Then, until around 2010, the concept began to gradually gain popularity. Since then, gamification has become a hot topic in education, business, and design, and has also been widely applied in cultural heritage. For example, Honor of Kings collaborated with the Dunhuang Academy to introduce the Dunhuang Flying Apsara skin, which integrates mural elements and historical context, subtly introducing young players to traditional culture through the gaming experience. According to online data, the market size of cultural games has grown by over 25%, with 80% of users reporting that digital games have increased their interest in traditional culture. This data suggests that games can

stimulate users interest in learning and enhance cultural identity through task-driven activities, role-playing, and immediate feedback.

In the social media environment, users have become the core driving force behind cultural dissemination. Jenkins (2006:23) proposed the concept of participatory culture, which highlights how the UGC model can enhance the interactivity and community identity of cultural content^[8]. In recent years, short video platforms have become a key platform for the spread of intangible cultural heritage skills. For instance, Li Ziqi's lacquerware themed video, released in 2024 (Figures 6 & 7), garnered over 100 million views within 5 hours of its release and sparked discussions in the comment section with over 100,000 comments. Additionally, Chinese cultural short videos on TikTok and YouTube are also contributing to the international spread of traditional culture.



Figures 6 Li Ziqi, Carved lacquer hidden flowers, carved out purple Qi from the east!1 (2024)



Figures 7 Li Ziqi, Carved lacquer hidden flowers, carved out purple Qi from the east!2 (2024)

The application of digital media art in the preservation and promotion of traditional culture will continue to deepen and expand. As technology advances, there will be a greater emphasis on leveraging artificial intelligence and big data, along with internet platforms, to facilitate intelligent, personalized, and global dissemination. Additionally, technologies such as virtual reality (VR) and augmented reality (AR) will be used to deeply integrate traditional culture with modern technology,

art, education, and entertainment, further enhancing users immersive experience of traditional culture.

3. Conclusion

This study delves into the application of digital media art in the preservation and promotion of traditional culture, highlighting the crucial role of visual storytelling and interactive experiences in cultural dissemination. The research reveals that visual storytelling, through innovative narrative structures (such as non-linear storytelling) and rich visual elements (such as color, light and shadow, and animation), transforms traditional cultural content into more engaging and impactful forms, enhancing audience emotional resonance and the effectiveness of cultural dissemination. Interactive experience design, with its participatory, feedback-driven, and personalized features, significantly enhances users immersion and emotional connection to traditional culture. Features like cloud boxes and cloud rewards encourage users to actively engage in cultural experiences. These innovative application models not only enhance the dissemination of traditional culture but also offer new approaches for the protection and inheritance of cultural heritage. For instance, the Digital Dunhuang and Digital Forbidden City projects have achieved permanent protection and global dissemination of cultural heritage through digital means. Theoretically, this study enriches the theoretical framework for integrating digital media art with traditional culture, providing new perspectives and methods for related academic research. Practically, the study provides specific strategies and case studies for the modern dissemination of traditional culture, promoting the deep integration of traditional culture with modern technology, and contributing to the protection of cultural heritage Communication has important inspirational significance.

However, this study still has certain limitations. Firstly, the research primarily relies on case studies and lacks large-scale quantitative experiments. Future research could further validate the impact of digital media art on cultural identity and dissemination through methods such as user experience evaluations and behavioral data mining. Secondly, some of the research data comes from official reports or news articles. Future studies should integrate more user surveys and data experiments to reduce the likelihood of data bias. Additionally, with the development of new technologies like the Metaverse and AI, the role of digital media art in cultural heritage preservation remains a topic for ongoing exploration. In summary, this study deepens the theoretical framework for integrating digital media art with traditional culture and proposes practical strategies for optimizing cultural dissemination. Future research can further incorporate quantitative analysis and the application of emerging technologies to promote the innovative development of traditional culture in the digital age and enhance global cultural exchange and mutual learning.

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