

The Integration Status Of Digital Technology And Visual Art In Museum Exhibitions

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ABSTRACT

In contemporary society, digital technology has increasingly permeated daily life and education, profoundly influencing the expression of visual arts. Research on digital display technology in museums not only diversifies exhibition formats but also significantly enhances audience engagement and learning outcomes. This approach embodies the innovative strategies of modern museums in preserving and presenting historical and cultural heritage. This study investigates the integration of digital exhibitions and visual arts at the Hunan Museum, focusing on The Art of Life: Multimedia Exhibition of Mawangdui Han Culture (June 2024–February 2025). By analyzing audience experiences and the application of advanced digital technologies, the research explores the current state and future potential of digitalization in museum exhibitions. Using a combination of images and textual analysis, the article provides insights into how digital technology enhances the museum's ability to showcase visual art and heritage.

Keywords: Digital Exhibition, Mawangdui Han Tomb, Visual Art

INTRODUCTION

In the digital age, museums are undergoing significant transformations as they increasingly integrate digital technology into exhibition design (Kamariotou et al., 2021). This raises an important question: can audiences embrace these changes and strengthen the connection between museums and their visitors? Traditionally, museums have served as custodians of cultural relics and artworks, with core functions including collection, preservation, and research. Their social role, however, extends further—providing public education through cultural and aesthetic learning opportunities (Smith, 2014). Museums are not only symbols of a city, region, or nation's identity but also key venues for shaping cultural ideologies and fostering artistic development within society (Barrett, 2011). Consequently, when adopting digital technologies, museums must balance technological advancements with their cultural and artistic missions.

Equally vital to museum research is the study of audience behavior and preferences. Visitors often fall into two categories: those seeking entertainment and those with a focus on learning. Some attend museums as a leisure activity, viewing exhibitions as enjoyable weekend or holiday pursuits, while others visit with the intent of gaining knowledge. Regardless of their initial motivations, all visitors benefit from the museum's public education offerings. For some, the impact is subtle and indirect, while for others, the experience enriches their knowledge, aesthetic appreciation, and cultural understanding through thoughtfully designed exhibits. Research has even suggested that museum visits can alleviate psychological anxiety and enhance emotional well-being (Huang, 2024). In summary, as institutions dedicated to serving society and audiences, museums must explore how digital technologies can enhance the display of visual art and foster more meaningful, engaging exhibitions in the digital era.

LITERATURE REVIEW

With the rapid development of technology, museum exhibitions are gradually shifting from traditional static displays to digital and interactive directions. The integration of digital technology and visual arts not only provides visitors with a richer visiting experience but also enhances the educational and communication effects of exhibitions. This article will explore the integration status of digital technology and visual art in museum exhibitions from three aspects: digital technology theory, audience related research theory, and visual art related research theory.

Audience Experience and Digital Technology

a. Digital Technology Theory

In modern society, we are all digital students (Kolikant, 2010). The development of digital technologies such as artificial intelligence, augmented reality, virtual reality, and machine vision is becoming increasingly popular, accelerating the pace of digitization (Jonathan et al., 2024). Now is the time to ensure that we have the necessary tools to understand the future. In a world where digital culture redefines human information behavior as code and digital life, it increasingly dominates human activities and communication (Blank, 2012a). These developments fundamentally change the expectations of museum visitors, whether real or virtual, the work of museum professionals, most notably the nature of museum exhibitions, and the digital art and life in a digitally saturated world are changing our ways of observation, behavior, senses, and aesthetics (Bautista, 2013). Overall, as museums become shared spaces for local, national, and global communities, and transition from collection centered institutions to user/visitor centered organizations, they are taking on new roles and responsibilities related to attracting audiences, conveying meaning through collections, creating learning experiences, and most importantly, the indispensable daily digital life and cultural connections to the museum ecosystem (Walhimer, 2021). The research on recent exhibitions in museums leading change has been used as an example to illustrate new directions, while also pointing to a reimagining of future museums, with the core being the integration of digital culture and visitor experience, as well as participation in real and virtual spaces (Pioli, 2024). The issue of museum visitors and visitors in digital and virtual environments (Chung et al., 2024). The interaction and participation between reality and numbers are important aspects that museums need to consider (de Oliveira et al., 2024). Museums need to convey meaning, attract visitors, and reflect social awareness and consciousness (Li, 2024). Museums of any size must have plans for outreach, diversity, inclusivity, and community interaction (Cole et al., 2019). The digital presence and identity status are changing the behavior of visitors, reshaping the identity of museums to help them think about the world in new ways, as well as their evolving social and cultural consciousness (Giannini et al., 2022). As museums establish relationships through social media, they may find themselves more susceptible to the influence of audience opinions and their relationship with exhibited art (Kidd, 2011). Digital aesthetics and sensory, installation, mixed media, interactive and participatory art, virtual reality, augmented reality, robots and robots, as well as digital artists appearing online with their own voices, have all had an impact on museums (Çeltek, 2021). People are increasingly seeing numbers because the world they live in is filled with digital media. This immersion in digital media is affecting human perception of color, light, space, and time (Lyu, 2024).

Understanding digital culture is crucial for the success of museum professionals in the 21st century (Kameas & Polymeropoulou, 2020). The digitization of the world has brought a paradigm shift to museums: it is challenging our thinking and work patterns (Giannini & Bowen, 2022). If museums want to maintain their relevance, we will need to adjust museum strategies, planning processes, workflows,

practices, and plans to meet the expectations and behaviors of our digital audience (Taormina & Baraldi, 2023). Museum professionals have a responsibility to study, analyze, and test these differences, and determine how to best utilize the opportunities they provide to more effectively achieve our institution's goals. There is no one size fits all approach to expanding the scale of museums globally, designing more multi-sensory exhibition experiences, or developing networked collection management practices (Ambalavan & Chauhan, 2024). Guiding museums to respond to the transformative and complex impact of digitization requires us to continue cultivating the uniqueness of our museum institutions: their collections, audiences, income, and identity (Pioli, 2024).

b. Theories related to the audience

In the context of the digital age, museums, as important places for cultural heritage and education, are facing unprecedented opportunities and challenges (Bautista, 2013). As the core resource of museums, the importance of audiences is increasingly prominent (Kotler et al., 2008). This section explores how digital technology affects the interaction between museums and audiences, and how museums can better meet audience needs, improve public participation, and enhance cultural dissemination efficiency through digital means. Museum audience research is an important way to understand audience behavior, needs, and satisfaction (Li, 2024). By recording the behavior and time of the audience's walking and stopping, visiting routes, demographic data, etc., museums can have a more comprehensive understanding of the audience's needs and experiences (Anderson, 2019). The application of methods such as interviews and questionnaire surveys provide strong support for the improvement and development of museums (Piacente, 2022). In the digital age, the relationship between museums and audiences has undergone profound changes (Bautista, 2013). Museums are no longer just providers of cultural products but have become guides and service providers for visitors' cultural experiences (Chan, 2013). The application of digital technology not only improves the operational efficiency and management level of museums but also enhances audience participation and satisfaction (Li et al., 2024). The position of the audience in museums is becoming increasingly important. Museums must fully understand the needs and preferences of their visitors and provide more personalized services through digital means (Anderson, 2019). At the same time, museums should actively innovate exhibition forms to enhance audience participation and experience (Piacente, 2022). In the future, museums should continue to explore the deep integration of digital technology with museum exhibitions and services, continuously improving audience participation and satisfaction (Kamariotou et al., 2021). At the same time, museums should also strengthen audience research, understand the new needs and characteristics of audiences, and provide strong support for the future development of museums (Ayala et al., 2024). In summary, in the digital age the relationship between museums and audiences has become even closer (Anderson, 2019). As the core resource of museums, the importance of the audience cannot be ignored (Black, 2012). Museums should fully utilize digital technology to enhance collection management and exhibition experience, provide precise services through big data analysis, strengthen audience research, innovate exhibition forms, and meet the new needs and characteristics of audiences. In the future, museums will continue to achieve higher quality development driven by digital technology (Li et al., 2024).

c. Theoretical on visual arts

Hegel said that the universal need for art is the rational need to elevate the inner and outer worlds to... This feeling of viewing art as a relationship between external and internal can be viewed in the context of the lost 'combination with the internal origins of external forms, forming a perception of its meaning' (Kaminsky, 1962). Therefore, digital art works may bring about new combinations or interrelationships in these aspects, or a feeling of reconnecting human poetry creation with understanding and meaning of the

world, which may be considered as the expression form determined by the technical attributes of digital art works that can be reflected in their production process and possibilities. Since the end of the 20th century, 'visuality' has been a fundamental factor influencing cultural formation (Hentschel, 2014). Although it was originally used in Thomas Carlyle's 1841 book "On Heroes," the concept of visual perception, as a theoretical term in the postmodern era, As a theoretical term in the postmodern era, It can be defined as all factors that affect the perception of things that the human eye can physically perceive (Boyer, 1996). Hal Foster compared the concepts of "vision" and "visuality" as follows: the concept of visuality includes sustained methods from the last century, such as television programs, photographs, advertisements, videos, as well as current technological methods (Azcárate, 2023). Since the emergence of concepts such as new media art or "digital art", computer art, multimedia art, and interactive art, it has become inevitable to shape the adaptation of our museum experience system by changing spatial and temporal perception (Bautista, 2013). The development of computer technology and the emergence of the Internet have affected art production, leading to fundamental changes in art acquisition and expression (Hope & Ryan, 2014). The new media art movement has transformed museum visitors from passive spectators to active participants (Anderson, 2019).

Methodology

This study is qualitative research, using field investigation research methods. Firstly, the researchers conducted field research on the digital exhibition of Hunan Museum, taking visual art photos at the exhibition site and recording the interaction between the audience and the exhibition space. The second step is to conduct descriptive analysis of the feedback and intuitive feelings of the audience after the visit based on relevant theories such as art reception theory, visual art, and art psychology, and draw relevant conclusions.

RESULTS AND FINDINGS

Site Observation

In 2024, Hunan Museum planned the The Art of Life: Multimedia Exhibition of Mawangdui Han Culture exhibition, which invited the Chinese Art Laboratory of Harvard University as academic guidance. The Hunan Museum collaborated with Eugene Y. Wang, a tenured professor of Rockefeller Asian Art History at Harvard University, to curate the exhibition and produced it in partnership with China Central Television Integrated Media Development Co., Ltd. and Shanghai Kaimu Cultural Technology Co., Ltd. The exhibition utilized digital technology to provide an immersive digital display of the Han Dynasty culture in Mawangdui. The visual impact of this exhibition has created an unprecedented effect, and almost all visitors are shocked by the artistic quality created by the digital exhibition hall. The theme of the exhibition is life art, expressing the concept of life and life after death in the Han Dynasty culture of Mawangdui. Exhibitions are not just the application of digital technology, but more importantly, curators use digital technology to recreate the world of ancient people while fully understanding Han culture and the ideology of the people. This is a digital presentation of the results of years of research by Mawangdui Han tomb scholars. It is amazing that the curatorial team has indeed used digital technology to recreate these imaginations. Below, we can immerse ourselves in watching the wonderful moments in the exhibition based on the pictures collected by the researcher.



Figure 1: Opening of the Digital Exhibition Hall (Image: Author)

As shown in Figure 1, the exhibition begins with a striking four-sided, all-encompassing digital display wall. At the center of this electronic structure are four specially designed display screens. This immersive visual arrangement detaches entirely from the real world, inviting visitors to step into an exhibition space that feels disconnected from conventional reality. The design embodies the curator's vision for life art exhibitions, offering a glimpse into the ancient worldview and creating an immediate sense of separation from the modern environment.



Figure 2: Immersive Appreciation of Exhibition Viewers (Image: Author)

As depicted in Figure 2, the audience is deeply engaged with the cultural relics on display, fully immersed in the exhibition experience. This level of engagement highlights the transformative power of modern digital technology, which acts as a captivating tool to draw visitors into the exhibition hall, offering both physical and emotional gratification. This phenomenon aligns with the concept of "flow," introduced by

Mihaly Csikszentmihalyi, a pioneer of positive psychology. According to Csikszentmihalyi's flow theory, flow is a state of complete absorption in an activity, where individuals become so focused that they lose awareness of their surroundings. This deeply enjoyable experience is intrinsically rewarding and often compelling enough for people to seek it at great personal expense.



Figure3: Exhibition of the “Ten Questions” on Ancient Cosmology (Image: Author)

Figure 3 illustrates ancient cosmology, inspired by the written cultural relic Ten Questions discovered in the Mawangdui Han Tomb. The visuals reconstruct the ancient people's interpretation of the starry sky and the universe. Keen observers may notice that this depiction aligns closely with our modern conceptualization of the cosmos.



Figure 4: Ancient cosmology (Image: Author)

The Mawangdui Han Tomb belongs to the burial tomb of King Changsha of the Western Han Dynasty in China, so the items inside are all reflections of the ancient people's way of life at that time and their imagination of the afterlife. Therefore, in the exhibition of life art, many scenes were chosen where auspicious clouds lifted objects and flew them into the sky. This is a matter of consideration. The ancients believed that auspicious clouds could carry a person's soul to heaven. Therefore, many lacquerwares during this period would depict symbols of auspicious clouds. In the Figure4, we can see that the daily necessities in the tomb, such as lacquerware, gloves, and ancient books (bamboo slips), were lifted by auspicious clouds and flown to the sky. The audience immersed themselves in the spiritual world of ancient people in such a scene.

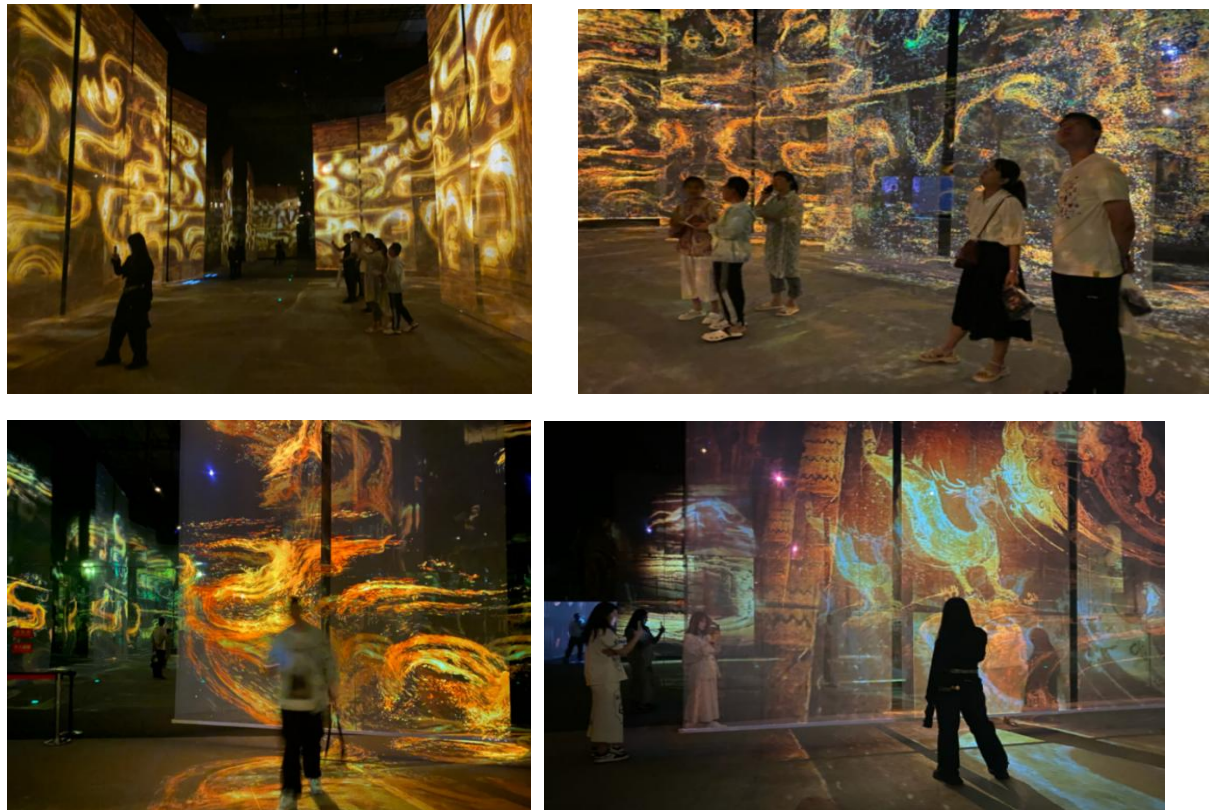


Figure 5: Interaction between audience and exhibits (Image: Author)

Figure 5 illustrates the layout of the third tomb and its four coffins from the Mawangdui Han Tomb. The tomb's owner, associated with princely status in ancient times, was interred with a primary coffin surrounded by four additional coffins. This arrangement symbolized their elevated rank. The main coffin served as the tomb owner's "room," housing all the burial objects, while the four outer coffins added layers of protection and significance:

- Black lacquer coffin:** This is the outermost coffin, intended to separate the tomb owner from the living. Its material is wood, coated with black paint on the outside, without excessive decoration, appearing plain.
- Black painted coffin:** The second layer coffin is painted with red lacquer inside. On the upper part of the inner wall of the right-side panel, there are black lacquer drawn galloping horses and portraits, although the strokes are hasty, they are barely formed. The exterior of the coffin is painted with black lacquer as the base, featuring complex and varied cloud patterns, as well as over 110 divine and monster patterns such as "Immortal Descending Leopard", "Monster God Manipulating Snake", "Giant Bird Carrying Fish", and "Immortal Playing". These patterns are vividly and smoothly crafted, full of romantic colors, depicting the deceased's soul entering the underworld protected by the gods.
- Red painted coffin:** The third layer coffin is coated with red lacquer both inside and outside. On the vermilion lacquer surface of the coffin, bright colors such as blue green, pink, brown, lotus root brown, reddish brown, and yellow white were used to paint auspicious patterns of dragons, tigers, Vermilion sparrows, deer, and immortals. These patterns symbolize that the deceased has escaped the invasion of evil spirits and reached the realm of immortality.
- Jinxiu Inner Coffin:** This is the coffin that directly holds the body of Lady Dai Hou, and it is also the innermost layer of the four layered coffin. The coffin is painted with red lacquer inside and black lacquer outside. The outer wall of this coffin is covered with feather decal brocade, which is the first discovery of silk fabrics as decoration on the outer wall of coffins in Warring States tombs in Changsha area and has very precious value.

These four layered coffins not only reflect the superb woodworking skills and lacquerware craftsmanship of the Western Han Dynasty but also contain rich cultural connotations and beliefs. They are important physical materials for studying the funeral customs and religious beliefs of the Western Han Dynasty.



Figure 6: The audience in the digital exhibition hall is attracted by the display effect and enjoys the exhibition (Image: Author)

The use of digital displays has transformed the presentation of original cultural relics, offering audiences a completely new visual experience. Figure 6 captures the interaction between visitors and the exhibition space during this display, with the researcher conducting on-site observations and documenting the experience. These images provide valuable insight into the current application of digital technology in the Hunan Museum's temporary exhibitions.

Combination of technology and art

The Art of Life: Multimedia Exhibition of Mawangdui Han Culture seamlessly blends traditional culture with modern technology, representing a remarkable achievement in cultural innovation and dissemination. Guided by academic expertise from Harvard University's Chinese Art Laboratory and in close collaboration with Professor Eugene Y. Wang, a leading scholar, the Hunan Museum has created an exhibition that not only highlights the rich cultural heritage of the Han Dynasty in Mawangdui but also brings this historical era to life through a fresh perspective and innovative approach.

a. Deep interpretation of the concept of lifeThe exhibition, themed "Art of Life," deeply explores and showcases the unique concepts of life, death, and the afterlife in the Han Dynasty culture of Mawangdui. Through carefully planned exhibition content, such as digital restoration of unearthed cultural relics, simulated reproduction of historical scenes, and multimedia narratives combined with Han Dynasty philosophy and religious thought, audiences can gain a deeper understanding of people's exploration and pursuit of the meaning of life in that era.

b. The perfect combination of academia and technology

The success of this exhibition is attributed to the perfect combination of academic research and digital technology. The research achievements of Ma Wangdui Han tomb scholars over the years have provided a solid academic foundation for the exhibition; The academic guidance from Harvard University and the participation of experts such as Professor Eugene Y. Wang ensured the accuracy and authority of the exhibition content. At the same time, the cooperation with CCTV Integrated Media Development Co., Ltd. and Shanghai Kaimu Cultural Technology Co., Ltd. has enabled these academic achievements to be

vividly presented through cutting-edge digital technology, achieving a win-win situation between academic research and cultural dissemination.

c. The rebirth of cultural heritage

The Art of Life exhibition is not only a comprehensive display of the Han Dynasty culture in Mawangdui, but also an active exploration of cultural heritage protection and innovative utilization. It proves that through modern technological means, ancient cultural heritage can be revitalized and revitalized, attracting more attention and participation from young people, thereby promoting the inheritance and development of excellent traditional Chinese culture. In summary, this exhibition is not only a visual feast, but also a profound cultural exchange and soul stirring. It not only amazed us with the charm of digital technology, but also deeply felt the profoundness and unique charm of Chinese culture.

CONCLUSIONS AND RECOMMENDATION

The integration of digital technology into museum exhibitions represents a transformative approach to showcasing cultural heritage.

i. Deep Integration of Technology and Culture

The exhibition of the Mawangdui Han Tomb exemplifies the seamless fusion of digital technology with cultural and artistic aesthetics. By combining thorough literature analysis, cultural relic verification, and innovative design, it achieves a level of immersion unattainable through traditional methods, significantly enhancing the appeal and emotional impact of the display.

ii. Precise Alignment with Display Objectives

Digital technology not only introduces technical innovation but also addresses the challenge of vividly and intuitively presenting ancient societies. With its high precision, interactivity, and visual impact, digital technology offers museums an effective solution for creating compelling historical and cultural exhibitions.

iii. Enhanced Audience Experience

For visitors, digital exhibitions provide not only stunning visuals but also an emotional connection. Immersive experiences create a sense of witnessing history firsthand, fostering a dialogue with the past that transcends time. This heightened engagement significantly boosts visitor satisfaction and loyalty, laying the groundwork for the long-term sustainability of museums.

iv. Innovative Models for Cultural Dissemination

Digital exhibitions revolutionize cultural dissemination by enabling visitors to actively explore content through interactive technologies such as virtual reality. This hands-on learning approach enhances interest and comprehension. Moreover, the ability to share exhibitions online broadens access, allowing more people to engage with and appreciate the historical culture of the Hunan region, thereby advancing cultural preservation and promotion.

v. Enhanced Visual and Sensory Appeal

The use of digital technology elevates the visual impact of exhibitions, with high-quality imagery and animations bringing artifacts and historical settings to life. This creates a more captivating and memorable experience for audiences.

vi. Adaptability to Exhibition Needs

Digital technology offers the flexibility to customize display content and formats for diverse themes and requirements. This adaptability ensures that museums can effectively convey

historical, cultural, and scientific knowledge while meeting the specific needs of different exhibitions.

In summary, the integration of digital technology into exhibitions not only enriches the display of historical and cultural heritage but also transforms the visitor experience, fosters cultural dissemination, and ensures museums remain dynamic and relevant in the digital era.

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