

Research on Innovative Pathways for Museum Cultural Communication

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ABSTRACT

With the development of media technology and the improvement of audience aesthetic standards, people's spiritual and cultural needs have become higher. The 'museum craze' continues to grow, with museums attracting more and more people to visit in their spare time, becoming a new trend in cultural tourism. Museums leverage modern technology, strengthen content storytelling, and enhance cross-border cooperation to expand the influence of cultural dissemination. Through the transmission of values, culture, and art, they establish emotional connections and a sense of identity with their audiences.

KEYWORDS

Museum; Communication strategy; Audience experience; Integration of culture and tourism

1 Introduction

In the digital age, the development of media technology has injected new vitality into the dissemination of museum culture. As digital technology is integrated into the museum sector, the traditional one-way educational model centred on physical exhibits is gradually evolving into participatory communication that involves immersive experiences and two-way dialogue. This transformation is not only reflected in the application of media technologies such as AR and VR in specific scenarios, but more fundamentally in the reconstruction of cultural communication methods. Shifting from authoritative narratives to emotional resonance, and from dry knowledge systems to accessible expressions, we can build a bridge between culture and audiences, thereby maximising the cultural dissemination effectiveness of museums.

2 Technology empowerment: building a new paradigm for immersive experiences through the coexistence of virtual and real worlds

2.1 Interactive exhibitions, technological interaction revitalises cultural treasures

Immersive experiences with a strong sense of participation and high interactivity break the traditional single viewing model of museums, enhancing the fun and memorable aspects of the viewing process for audiences. Interactive exhibitions utilise advanced technology to make museum cultural dissemination more authentic and vivid. Mobile smart devices, network and wireless technologies, Twitter and instant messaging, WeChat, Facebook social networks, and wireless sensors are transforming the role of visitors from passive observers to active participants, enabling them to quickly integrate into the museum environment and revitalising the dissemination of museum culture ^[1]. In the wave of the 5G era, XR technology is demonstrating its unique appeal. The application of technologies such as virtual reality (VR), augmented reality (AR), mixed reality (MR), and 3D has brought about a 'radical' change in museums. The shift from merely 'seeing' to 'experiencing' has brought audiences and exhibits into closer interaction, truly achieving a fusion across time and space.

The Poly MGM Museum breaks through the traditional spatial and temporal limitations of museums by using digital equipment such as LED displays, OLED display cabinets, VR, and AR in its exhibitions to enhance audience interaction with the exhibits. On-site visitors can click on the icons on the display cabinets to enjoy a 360-degree stereoscopic view of the exhibits. By leveraging technology to blend traditional culture with modern technology, an immersive, fun, and interactive exhibition experience is created. The 'Mawangdui Immersive Digital Exhibition' was jointly created by the Hunan Museum, Professor Wang Yuejin's team at Harvard University's CAMLab, and the China Digital Library. The exhibition combines cutting-edge technology with Han Dynasty culture to create a visual and auditory feast that transcends time and space for visitors. Ultra-high-definition technology is used to digitise exhibits, which are then combined with naked-eye 3D technology and LED dome projection to create an immersive exhibition space. Using AI technology to recreate the digital image of Lady Xin Zui, visitors can interact with the digital figure to learn about life in the Han Dynasty. This immersive experience not only enhances audience engagement, but also brings ancient artefacts to life.

2.2 Multi-sensory coordination, organic integration of 'digital intelligent humans' and exhibition space

Traditional museum exhibits are usually static, and visitors can only learn about the stories behind history through text and pictures. With XR tech, you can check out exhibits and get into the historical scenes, so you can learn about history in a more fun and real way. For example, we can stand in the Roman Colosseum in the XR world, listen to the roar of the beasts, and feel the atmosphere of that time. We can also stroll along the Great Wall, witness its magnificent scenery with our own eyes, and feel the spiritual power of national heroism. This immersive experience makes it easier for audiences to relate to the content, deepening their understanding and memory of history and culture.

A smart museum is a new type of museum based on a digital museum, which makes full use of new technologies such as the Internet of Things and cloud computing to build a new type of museum characterised by comprehensive and thorough perception, broadband ubiquitous interconnection, and intelligent integration of applications ^[2]. In November 2023, the National Museum of China launched a new initiative to revitalise and utilise cultural relics: the pilot version of the Chinese Civilisation Cloud Exhibition went live. This is the first time in China's museum sector that a digital avatar, Ai Wenwen, has guided visitors through an immersive exhibition experience. The dynamic activation of digital avatars is seamlessly integrated with the exhibition environment of cultural relics. Utilising 3D and real-scene video synthesis rendering technology, the museum's digital avatars are endowed with vivid expressions and agile movements, bringing Ai Wenwen into the real-world setting. In the 'Ancient China' exhibition hall of the National Museum of China, she interacted with the museum's artefacts as a virtual digital intelligence, gaining the unique ability to bring the artefacts to life and stunning the entire audience ^[3].

2.3 Breaking the constraints of time and space, combining online viewing with offline tours

Traditional museum exhibition spaces are limited and cannot display all of the collections and historical scenes. However, the application of XR technology can break through the constraints of time and space, enabling the expansion of museum exhibition spaces. Visitors can use XR technology to view more exhibits and historical scenes within the limited exhibition space. This combination of virtual and real elements provides visitors with a richer exhibition experience.

An online museum is a new type of exhibition platform that introduces museum collections and exhibitions to audiences through the Internet, based on the museum's rich collection database. 'Exploring Dunhuang' is a virtual tour project launched by the Dunhuang Research Academy in collaboration with Tencent. The project utilises advanced technologies such as VR virtual reality, 3D modelling, and game engines to recreate the actual scenes of the caves with 1:1 millimetre-level precision and simulate the lighting conditions inside the caves at different times of the day. Adopting a model that combines online exploration with offline experiences, visitors can access the virtual caves with a single click via the official website of Digital Dunhuang or the WeChat mini programme Digital Dunhuang Immersive Exhibition, where they can browse the stories depicted in the Dunhuang cave murals and experience the charm of Dunhuang culture. The Palace Museum's official 'Panoramic Forbidden City' online tour platform tells the story of a thousand years in a whole new way. The website uses high-definition 360° panoramic technology to fully restore the core areas of the Forbidden City, including the Outer Court, Inner Court, Imperial Garden, and corner towers. Visitors can freely zoom in, rotate, and switch perspectives, accompanied by voice commentary and text annotations, allowing them to 'virtually explore the Forbidden City' without leaving home. This has not only promoted new forms of digital preservation and utilisation of cultural relics, but also opened up new avenues for the protection and inheritance of cultural heritage.

3 Narrative innovation: Youthful expression activates a new mode of emotional communication

3.1 Professional commentary: Deepening authoritative interpretation and emotional guidance

Museum storytelling is the use of storytelling to describe exhibits, which includes four elements: the story itself, the narrator, the narrative setting, and the audience. These four elements determine the overall direction of museum narrative design. In a specific museum setting, in addition to using story themes to connect the overall exhibition space, it is also necessary to expand the narrative content to enrich the storyline and increase the value of the content ^[4].

Paleozoological Museum of China (Baoding Natural History Museum) is the largest natural history museum in Asia. It features five themed exhibition halls: Earth's Pulse, Ancient Oceans, Dinosaur Empire, Mammalian Dawn, and Extinction's Tragedy. The exhibition space structure runs from Exhibition Hall 1 to Exhibition Hall 5 along a single directional route. The content is organised around the theme of 'Exploring the Evolutionary Journey of Life,' using natural resources as a medium to systematically popularise Earth science, the origin of life, and the evolutionary journey, balancing scientific accuracy with educational appeal. The guide adapts their language and style to suit different audiences, bridging the gap with visitors from diverse backgrounds, fostering resonance and a sense of identity. They weave in the stories behind the

exhibits and incorporate modern, popular examples to make history and culture more vibrant, three-dimensional, and inclusive. Make the 'cold' exhibits in the display cases more human and modern, and use plain language to explain obscure and professional scientific knowledge so that the audience can easily understand and accept it. In addition, the museum regularly holds 'public welfare lectures' and science education activities, inviting experts in natural sciences to give in-depth explanations on specific professional fields. Incorporate everyday phenomena that are easy to understand into scientific knowledge, combine them with your own experiences, and introduce diverse voices and perspectives. For example, during the 2025 Spring Festival, a special public lecture series titled 'Celebrating the New Year at the Museum' will be held, featuring the 33rd session on 'The Science and Culture Behind the Lunar Calendar' and the 35th session on 'Snake Year Talk: 100,000 Questions About Snake Evolution.' These sessions will explore the mysteries of science together with the audience against the backdrop of the Snake Year Spring Festival.

3.2 Audience participation: Building co-creation value and community connections

Paleozoological Museum of China (Baoding Natural History Museum) is a large-scale natural history museum jointly established by the Baoding Municipal People's Government and the Institute of Vertebrate Paleontology and Paleoanthropology. It features hyperlinking, hyper-sharing, and fully open functionality. Its prime location and the natural knowledge contained within the museum make it a new hub for science education and research in the Beijing-Tianjin-Hebei region. In addition to its permanent exhibitions, the museum also offers a series of educational activities, such as 'Dinosaur Night Watchman,' 'I Repair Fossils in Baoding,' and 'Reading Salon.' Through hands-on experiences and interactions with scientific experts, participants can gain a deeper understanding of science and technology knowledge. By combining theory with practice, especially for the youth demographic, learning becomes an engaging and enjoyable process. This approach helps participants transition from textbook knowledge to real-life applications, making the learning experience more vivid and memorable, thereby enhancing their comprehension of science and technology concepts.

In January 2025, on the first anniversary of the opening of Paleozoological Museum of China (Baoding Natural History Museum), the 'I Paint Dinosaurs with Famous Artists' public welfare art collaboration activity was launched, co-organised by the Baoding Municipal People's Government, the Institute of Vertebrate Paleontology and Paleoanthropology, and the China Youth Daily, and co-hosted by the Baoding Municipal Bureau of Culture, Radio, Television, and Tourism, the Baoding Municipal Federation of Literary and Art Circles, Paleozoological Museum of China (Baoding Natural History Museum), China Youth Online. The event invited renowned artists to create half-size paintings on the theme of dinosaurs, and solicited artwork submissions from children aged 18 and under worldwide to complete the works. Children combine their personal stories, memories, and creative inspiration and incorporate them into their paintings to depict the dinosaur world in their hearts. Through the medium of painting, the audience is invited to participate in the narrative, creating a dreamlike collaboration with the museum's elements.

3.3 Scene extension: creating an audio-visual experience and time-space travel

As a cultural narrative entity, museums combine cultural cognition and immersive experiences through narrative media, narrative spaces, narrative stories, and narrative identities to better develop, preserve, and disseminate culture. The digitisation of cultural resource exhibitions and displays is the main path for museum digitisation, aiming to update museum exhibition facilities, narrative logic, and media innovation. The technical characteristics of digital technology have influenced the form, experience, and narrative of exhibitions^[5]. New media imaging technology is influencing museum narrative spaces, attributes, and dimensions through immersive experiences. By integrating narrative media, narrative spaces, narrative stories, and narrative audiences, it combines cultural understanding with immersive experiences to inspire the inheritance and innovation of cultural beauty, cultural refinement, cultural depth, and cultural accessibility.^[1]

Paleozoological Museum of China (Baoding Natural History Museum) has launched an AR audio guide feature. Visitors can turn on Bluetooth and WeChat location services, and the WeChat mini programme will automatically pop up and play audio guides based on the exhibition points in the hall. When paired with VR glasses, the Tyrannosaurus rex skeleton next to the dinosaur skeleton leaps out, and by clicking on the exhibits, more hidden content is triggered, allowing viewers to appreciate the awe-inspiring ancient creatures more intuitively. 'Flying Over Yan and Zhao for a Billion Years' uses a simulated flight mode to take viewers on a six-minute journey into the ocean, over mountains, and into forests, allowing them to experience the magnificent geological changes that have taken place in North China over hundreds of millions of years and witness the spectacular evolution of life, providing a transcendent experience that spans time and space. The 5D cinema includes several films, such as 'The Great Adventure of Life on Earth,' 'Black Feather Elf,' and 'The Adventure of Little Woolly Rhinoceros.' Through elements such as VR glasses, shaking seats, and lighting design, the film content is combined into a seamless whole, allowing the audience to feel as if they are there, embarking on an adventure with

ancient creatures.

4 Cross-border integration: Diverse presentation expands the new matrix of the communication ecosystem

4.1 'Museum plus' commercial culture

The rise of the 'museum craze' has prompted museums to delve deeper into traditional cultural elements that are easily understood and accepted by audiences, effectively combining them with modern fashion trends. This has transformed once "aloof" museums into popular 'must-visit destinations,' with some visitors even going so far as to 'travel to a city just for a museum.' As museums become more youthful, traditional culture is no longer boring. Cultural spaces are opening up in new ways, and cultural relics are becoming more vibrant and integrated into people's lives.

With the development of society and the improvement of people's aesthetic needs, the concept of cultural and tourism consumption has shifted from the original focus on sightseeing to the pursuit of deeper spiritual culture. The 'Museum+' model integrates museum culture with commercial consumption such as leisure, entertainment, and tourism into a comprehensive business model. It collaborates with surrounding bookstores, restaurants, shopping malls, and leisure and entertainment areas to create a museum tourism complex, introducing modern social needs into cultural spaces to create "trendy" landmarks. This model combines commerce and culture under the 'Museum+' banner, achieving the aggregation of multiple business models^[6]. Paleozoological Museum of China (Baoding Natural History Museum) covers an area of approximately 120 acres and has a total floor area of 73,100 square metres. It is integrated with the Xinhua Bookstore, Bellin Natural World, a simple restaurant, an Italian restaurant and other venues, achieving a fusion of museum and scenic area. The Shanghai Museum has collaborated with a coffee brand to launch a 'Da Ke Ding' latte art coffee, with the cup sleeve printed with bronze ware patterns and explanations of the artefacts. The Chengdu Museum held a 'Ancient Shu Baby' emoji design competition, transforming elements such as the Sun Bird and the Long-Eyed Mask into cute cartoon characters. The Dunhuang Research Academy has partnered with Tencent to develop the 'Digital Patron' project, allowing visitors to 'adopt' murals by answering questions online and donating steps, thereby obtaining exclusive digital collectibles. The 'museum plus' commercial consumption model has upgraded museums from their traditional educational function to 'cultural living spaces.' Museum culture is becoming increasingly popular among young people, and the combination of traditional culture and modern commerce has made 'visiting museums' a trend, giving traditional culture a new lease on life.

4.2 'Museum+' cultural and creative products

As visiting museums becomes the 'new trend,' an increasing number of cultural and creative products centred around museum exhibits and their surroundings are also attracting the attention of audiences. Museum cultural and creative products serve as a calling card for a city, an exhibit, or a piece of culture. By continuously exploring and leveraging high-quality intellectual property (IP), improving the relevant industrial chain, and launching museum cultural and creative products, we can add a touch of beauty to the lives of visitors and inject new vitality into the dissemination of ancient culture.

Cultural and creative products draw inspiration from the museum's precious collections and use modern design techniques to transform them into practical items that are both culturally meaningful and appealing to modern tastes. Compared with traditional souvenirs, museum cultural and creative products place greater emphasis on design and fun. They use humour, exaggeration, abstraction and other techniques to creatively transform cultural relic elements, forming a series of products that are both culturally distinctive and entertaining. Paleozoological Museum of China (Baoding Natural History Museum) has launched a series of cultural and creative products called 'The Eye-Catching Packages of the Museum of Ancient Animals.' The design style of these products 'cutesifies' some of the museum's distinctive exhibits. Using exaggerated techniques, the museum's prized possession, *Sinraptor dongi*, as well as other special exhibits such as *Psittacosaurus* and *Atopodentatus unicus*, have been sculpted into cute and lovable figures. While retaining the morphological characteristics of ancient animals, these sculptures add a touch of cuteness and friendliness. In addition, Paleozoological Museum of China (Baoding Natural History Museum) is constantly innovating its cultural and creative products. The recently launched 'Dinosaur Key Chain' series cleverly combines elements of ancient animals from the museum with the modern functionality of a key chain, retaining the fun of the ancient animal exhibits while also giving them practical value in everyday life. This cross-border integration has brought traditional culture into the lives of young people in a more vivid and interesting way.

4.3 'Museum plus' media communication

On 15 January 2025, TikTok released its 2024 City Cultural Tourism Big Data (Full Version), in which Baoding was ranked as the second most popular treasure city among TikTok users. Paleozoological Museum of China (Baoding Natural History Museum) was selected as a popular city IP, and Baoding Cultural Tourism was selected as a popular city cultural tourism official account. As one of the main forms of cultural tourism, museums can drive the economic and cultural development of a city. The integration of museums and cultural tourism is an important means of promoting the coordinated development of the cultural and tourism industries. While maintaining its core cultural and educational functions, it is also necessary to strengthen cooperation with social forces, leverage the power of media to promote IP brand building, and enhance its own appeal and competitiveness.

The immediacy and interactivity of new media on the Internet have not only provided museums with a rapid means of promotion, but have also enabled them to optimise their operational and service models. In particular, the advent of the short video era has greatly lowered the threshold for information dissemination. Museums should make full use of the unique advantages of new media platforms such as TikTok, MicroBlog, WeChat, and websites to enrich their communication methods, actively engage with audiences, and expand the channels for promoting museum culture. This summer, rednote launched a special project called 'Departure After Sunset' in collaboration with the Yangzhou Museum, Shanghai Museum, and Luoyang Ancient Tomb Museum, launching the 'Museum Wonder Night' event and inviting audiences from all over the country to explore the adventures and wonders of museums. In addition, museums can also collaborate with the entertainment, film, television, and gaming industries to attract more attention from the public through new communication symbols and creative activities. For example, the popularity of cultural and museum variety shows such as 'I Repair Cultural Relics at the Forbidden City' and 'National Treasures' has sparked a craze among the general public, especially the younger generation, for traditional culture and museum tourism. Museum variety shows have brought the 'museum craze' from online to offline, with countless viewers embarking on a 'treasure hunt' at museums^[6].

5 Conclusion

In recent years, museums have become cultural landmarks and tourist attractions in cities, attracting visitors to explore historical traces through exhibitions and displays that are distinct in style and varied in theme. The continuing rise in popularity of museums has satisfied the spiritual and cultural needs of a wide audience, while also promoting the development and innovation of museums themselves. In the era of all-media, where media convergence continues to deepen, digital technology has brought new ideas to the dissemination of museum culture. Museums should make full use of their technological advantages, adopt narrative forms that appeal to audiences, keep pace with modern trends, and use innovative and youthful perspectives to continuously expand the effectiveness and influence of their cultural dissemination.

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