

# *Explorations on the Application of Digital Museums to Aesthetic Education Classrooms in the Web3.0 Era*

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**Abstract:** From the perspective of the application of aesthetic education courses in digital museums, this paper answers the question of aesthetic education in the Web3.0 era, following the new wave of The Times brought by the technological revolution, and introduces a new teaching method through the application of digital museums from multiple dimensions such as structure, form, and content. With digital museum resources as classroom content, we introduce digital museum resources in a holistic way through 3D projection immersive tours, VR glasses viewing, digital real-time tours, and classroom projection device displays. Let students fully embrace positive aesthetic instruction before, during, and after class, and recognize that the aesthetic education experience has rich connotations and remarkable practical effects.

## 1. Introduction

The Internet world is currently in the Web 3.0 phase as blockchain technology matures and becomes widely applied. In this period, a standardized and constrained distributed Internet information network was established under the philosophy of decentralization. Compared to the information monopolies and personal privacy data breaches of the Web 2.0 era, information is more secure and trustworthy. The open-source approach and the concept of value connectivity enable Web 3.0 to achieve the purpose of equal exchange of information. In terms of information transmission, encryption, which ensures the openness and transparency of the entire communication chain, has played a revolutionary role in the protection of intellectual property rights of digital achievements, and digital museums have emerged in this technological context. The preservation of digital achievements in museums is now a well-established solution, but the application of digital achievements is still an area that needs to be explored urgently. How to use new technologies to maximize the public resources of museums to serve the people, and how to more effectively disseminate the humanistic and aesthetic value of museums. From the perspective of the application of aesthetic education courses in digital museums, this paper answers the question of aesthetic education in the Web3.0 era, following the new wave of The Times brought by the technological revolution, and introduces a new teaching method through the application of digital museums from multiple dimensions such as structure, form, and content. With digital museum resources as classroom content, we introduce digital museum resources in a holistic way through 3D projection immersive tours, VR glasses viewing, digital real-time tours, and classroom projection device

displays. Let students fully embrace positive aesthetic instruction before, during, and after class, and recognize that the aesthetic education experience has rich connotations and remarkable practical effects.<sup>[1]</sup>

## 2. The status quo of aesthetic education and the problem of inadaptation

The Opinions on Comprehensively Strengthening and Improving Aesthetic Education in Schools in the New Era released in 2020 put forward that comprehensively strengthening and improving aesthetic education in schools in the new era should adhere to the correct direction of political consultation. School aesthetic education, as an important carrier of moral education, adheres to the promotion of socialist core values. We will strengthen education in fine traditional Chinese culture, revolutionary culture, and advanced socialist culture, and guide students to foster a correct view of history, the people, the nation, and culture. Cultivate noble sentiments, shape a beautiful mind, and enhance cultural self-confidence."<sup>[2]</sup> Since the 18th National Congress of the Communist Party of China, aesthetic education has achieved excellent results in terms of active development in various sectors and made progress in cultivating humanistic qualities in students. However, as Internet technology continues to upgrade, people's aesthetic and appraisal standards are constantly changing under the influence of confusing and complex information and the emergence of many different ideas, according to data surveys and practice. "Money worship", "Internet celebrity economy", "idol worship", "entertainment to death" and other values continue to erode young people's thoughts, resulting in "beauty is the upper-class lifestyle", "rich and leisure life is beautiful", "appearance level first" and other vulgar aesthetic tendencies. Meanwhile, in the world of art and design, the Western discourse system is still in its strong phase, and the rules of fashion are still defined by the Western world. Fashion colors of the year, for example, are monopolized by Pantone and other U.S. color companies, as well as some luxury brands. Asian faces on the fashion runways must have high cheekbones and red eyes. China still does not have a significant voice in these areas. At present, there is still insufficient investment in the moral and ideal education of young people, who still lack the ability to discover and create beauty. In 2019, the document "Opinions on Effectively Strengthening the Aesthetic Education Work in Colleges and Universities in the New Era" issued by the Ministry of Education pointed out that "the aesthetic education work in colleges and universities is not adapted to the requirements of current education reform and development, is not adapted to the construction of a comprehensive education system of moral, intellectual, physical, American and labor training, and is not adapted to meet the expectations of young students for high-quality and rich aesthetic education resources."<sup>[3]</sup> In today's rapidly changing information technology, much of the teaching material is not up to date, the content is relatively conservative and backward, and the instruction form is old-fashioned and inflexible. Instead, today's mature technology, with increasingly lightweight algorithms, has enabled the transfer of more 3D and realistic image data, bringing more possibilities to the teaching materials of aesthetic education.

## 3. The status quo of aesthetic education and the problem of inadaptation

The question of appropriateness in aesthetic education needs to focus on the current level of technology and the overall awareness of young people. Today's Internet technology is in the Web3.0 era. In the past, the Web1.0 era has shown an explosion of data, but due to technical limitations in efficiently processing individual information, user data is difficult to use commercially. In the Web2.0 era, however, papers related to GFS, MapReduce, and Big Table technologies were published in rapid succession after 2003 due to the internal research of US Internet giant Google, and the Internet giants that mastered the relevant core technologies formed a monopoly for centralized data commercial applications. Merchants are beginning to use data

analysis to form targeted product pushes, using user data for user psychology analysis so that different users browsing the same product present different prices, and commercial killings are not uncommon. There have been protests over serious issues of user data privacy breaches and unequal information exchanges, which have sparked a philosophical debate about the exchange of value on the Internet.

Web 3.0 refers to the third-generation Internet data model, which constitutes a new Internet information model with equal interconnection of data through a distributed network like blockchain. Following the promulgation of the General Data Protection Regulation (GDPR), which ushered the Internet into the Web 3.0 era, China enacted the Data Security Law.<sup>[4]</sup> The GDPR defines seven data rights that data subjects have: the right to access, the right to correct, the right to delete (the right to be forgotten), the right to limit processing, the right to portability, the right to object, and the right not to be subject to automated decisions. In contrast to the centralized data monopoly of the Web 2.0 era, Web 3.0 presents a distributed data model with value exchange. The open-source application subjects break the barrier between applications and other applications, and one can realize an open and transparent communication chain under the protection of data encryption technology, effectively avoiding data privacy violations. At the same time, the concept of blockchain has evolved in a short period of time from emerging to mature, followed by a wide range of applications, and information interconnection has been achieved at the technical level. The transparency of the communication chain allows the digital achievements to be greatly protected, while at the same time, one can use the information record of the data chain to implement an effective reward and punishment system. For example, in the case of digital achievements of cultural relics, one can use digital time stamps to effectively record the transmission path of digital achievements of cultural relics and thus obtain the spread and cultural impact of digital achievements of cultural relics. At the same time, digital watermarking can be used to document in detail the ownership of cultural relics and copyright information of secondary cultural creations and standardize the protection of intellectual property rights of digital achievements. From the open-source authorization of cultural relics digital achievements to the effective dissemination of cultural relics digital achievements, and then to the secondary creation and sales of cultural creators, the standardization and openness of the entire Internet cultural communication and application path can greatly stimulate the vitality of creation and application and promote the development of cultural industries.

#### **4. The Web 3.0 field of aesthetic education optimization methods and metrics.**

The empowering effect of technology for education in the Web 3.0 era has been tremendous, with lightweight algorithms coupled with 5G communications technologies enabling real-time interoperability of 3D digital platforms. Based on this, the form of instructions is no longer limited by time, geography, and language, and instructions can be implemented online with the help of remote communication. More importantly, students' learning material is no longer a single graphic model of books and textbooks, and 3D immersive reality textbooks provide practical and powerful help for deeper teaching inputs. This point is even more urgent in aesthetic education, where traditional graphic teaching, often due to lack of actual experience, fails to more clearly understand the multilayered sense of beauty. As the twin digital results of the real world, 3D reality data has completely reproduced the physical appearance of the physical object with the support of high-precision 3D scanning technology, allowing students to carefully examine the details of the physical object anytime and anywhere, and at the same time, combined with voice explanation, video introduction, graphic explanation, and other ways, to feel the rich connotation of beauty at multiple levels and cultivate students' aesthetic taste, exercise students' humanistic quality, enrich students'

knowledge and judgment. In addition to fully restored digital twin-realistic teaching materials, the decentralized nature of the Web3.0 era gives more open-source opportunities. People can make more flexible use of historical relics and technical resources to design and create new three-dimensional scenes, create a teaching game platform, so that students can enter the teaching game world through the image of digital characters, teach through fun, improve teaching quality and students' interest, and guide students to learn independently. More importantly, images of students in Web3.0 Internet classrooms are digitally personified, which greatly reduces low student self-esteem based on appearance, family, and other factors, and enables de-labeling, demonstrating the fairness of the Internet era.

## **5. The digital museum becomes an aesthetic education classroom.**

Nowadays, museum resources are also innovating and changing with The Times in the context of Web 3.0 technology, and the digital achievements of museums are already remarkable. With the support of many foundations and other social organizations, artifacts have been digitized through high-precision stereoscopic scanning, and museum scenes can be fully recreated as twin digital museums through image technology. Digital museum provides a panoramic construction, and users can through mobile phones, computers, 3D glasses, and other terminal equipment barrier-free visit the museum, not subject to the site, time, or space restrictions, highly restore the feeling of visiting the museum in real life, and even through the image amplification and Angle of the free switch to understand the cultural relic information more detailed. Many exhibitions that have been withdrawn from physical museums due to time constraints can be permanently preserved through digitization and become part of the digital output of a digital museum. In addition, the 3D library materials are complete high-precision cultural relic models generated by high-definition 3D scanning technology, so that users can actually experience the feeling of carefully playing with cultural relics and can carefully view the texture inside the ceramic bottle, the bottom rubbing, and other details that cannot be seen and felt when visiting the physical museum in the past.

The digital museum's resources are now huge in the world. According to statistics from the Baidu Encyclopedia Digital Museum platform, as of May 2016, the Baidu Encyclopedia Digital Museum includes a total of 1,609 museums and 217 digital museums have been launched, including 56 3D panoramic digital museums. The data only counts the number of online museums on Baidu's digital museum platform, and there are many independent digital museums that are not included in the calculation. Abroad, the Google Arts & Culture program runs the Google Art Initiative, through which it partners with museums around the world. More than 3,000 digital museums are already online on the project's official website, including world-renowned museum resources such as the Louvre and the Royal Museum of Belgium. Digital museum resources are very characteristic, and the representative ones in China include "digital Dunhuang" Dunhuang Digital Museum, "Cloud Forbidden City" Forbidden City Digital Museum, and the National Digital Museum. Among them, the digital Dunhuang Panorama restores the complete appearance of 30 classic caves and provides viewers with detailed explanations of the frescoes and caves. The Dunhuang frescoes face damage from air, water vapor, temperature, and other irresistible factors, irreversible damage that is incalculable with the passage of time, which explains the impossibility of visiting all of the more than 500 caves when visiting the Dunhuang frescoes in reality. "Digital Dunhuang" provides a more scientific and safe way for visitors to learn about Dunhuang murals and their cultural and historical materials. The digital achievements of the Dunhuang murals are of great significance, leaving valuable material for future generations to experience, observe, and learn. The "Cloud Palace Museum" pays more attention to the interactive experience in the viewing process, and the interesting handheld map is more suitable for the habits and preferences of young people, and the

visiting process is designed to be like the experience of playing a map in a game. The National Digital Museum also introduced a virtual digital person "Ai Wenwen" as a simulated tour guide, which vividly restored the tour guide functions such as tour and explanation, increasing the interaction and fun of visiting. The digital museum contains the cultural relics and historical data of the physical museum, deeply restoring the physical museum and opening it up to the outside world, which is undoubtedly a great addition to the teaching materials of the humanities and social sciences. No matter students or social audiences, they can directly visit the museum on the mobile phone or other devices anytime and anywhere, and the precious historical relics data in the browser, carefully play with high-precision 3D cultural relics models, listen to scientific explanations, and harvest more intuitive historical and human materials in addition to books and textbooks.

Currently, China has not standardized the introduction of digital museums into aesthetic education classrooms, but there have been some initial explorations. The Hangzhou Young Teachers' Research and Training Community has introduced digital museums into the curriculum of "History and Society".<sup>[5]</sup> Zhu Qiurong, a member of the community, gives a history lesson using digital museum resources to students at Hangzhou Baochu Experimental School. The teacher requires students to observe the components and human behaviors of agricultural settlements in Ancient West Asia by comparing with the "Imaginary map of agricultural settlements in Ancient West Asia" on the electronic whiteboard in front of the classroom. Students can then use the tablet computer in their hands to query digital museum resources, make bold assumptions about the Hemudu and Banpo sites in combination with learned methods, and carefully verify the conditions required for an agricultural settlement. The Guiding Opinions of the Ministry of Education and other six departments on Promoting the construction of new education infrastructure and Building a high-quality education Support System pointed out: "Relying on the big platform of" Internet + education ", innovation in teaching, evaluation, research and management and other applications, and promote the deep integration of information technology and education and teaching." The introduction of digital museums into domestic aesthetic education classrooms can be based on typical historical events in the context of historical time, and the introduction of digital museums can be linked to the classroom so that teachers and students can browse the corresponding artifacts or other historical material together. In terms of exhibitions, it is no longer limited by time and spatial distance and can design an exhibition classroom on the cloud where teachers and students can visit online exhibitions of digital museums together. In terms of artifact materials, colleges and universities can work with museums to tailor aesthetic education courses using digital museum resources. Aesthetic education knowledge can be conveyed in a multi-layered and vivid way through teacher lectures and explanations, as well as displays of digital artifacts. In the classroom, VR glasses or holographic projection can be equipped according to the actual resources, so that students can immerse themselves in the splendid culture of 5,000 years China and its rich aesthetic concepts, more easily understand the aesthetics of different times and origins of today's aesthetics and cultivate students' humanistic quality and independent aesthetic judgment.

## **6. The expected impact and outlook.**

In addition to providing digital information of existing cultural relics, digital museums can also provide a good creative platform to cooperate with external forces for secondary creation, including but not limited to cultural and creative design, scene design, game design, etc., and the derivative products of these digital cultural relics can greatly revitalize cultural relics. In addition to learning about the digital museum's original digital heritage material, students can get involved in the spin-off industry. For example, in the three-dimensional holographic scenes created according to the context of ancient poetry, students can enter such three-dimensional holographic scenes while

watching historical relics related to ancient poetry and prose, immerse themselves in the artistic conception of poetry and prose, realize the process from text to history and then to real aesthetic experience, and cultivate aesthetic quality and humanistic quality in multiple layers and structures. Three-dimensional game scenes based on historical artifacts allow students to browse digital artifacts while participating in digital game interactions. Through the inquisitive and playful nature of the students, they can unconsciously gain historical knowledge of the relics during the play and feel the beauty of history in the aesthetic embodiment of the different dynasties set in the game.

Through the decentralized philosophy of Web 3.0, using the concept of open-source technology and value exchange, we can greatly mobilize resources from all sides while protecting intellectual property rights and jointly build a healthy and sustainable ecology of aesthetic education in digital museums. In this way, we can harvest a steady stream of innovative educational resources that mobilize student learning enthusiasm and interest in historical aesthetics, help students maintain independent aesthetic judgment in a complex information age, and thus largely address the imbalance and instability in aesthetic education.

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