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Research on the Innovative Mode and Development Path of Digital Technology Empowering Cultural Tourism Education

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ABSTRACT

Under the background of the rapid development of digital technology, the challenges of traditional cultural tourism education such as the single expression of content are urgently needed to release its potential. This study focuses on the internal mechanism of digital technology empowering cultural tourism education, systematically explains its core connotation, focuses on exploring innovative models and proposes key development paths. The research shows that digital technology has significantly improved the immersion, interactivity and learning efficiency of cultural tourism education by breaking through the limitations of time and space. It innovatively proposes to build two core empowerment models: the "digital cultural tourism education" curriculum system and the "smart cultural tourism education park" that integrate virtual and real reality; He also pointed out that consolidating digital infrastructure, innovating the institutional system, enriching content forms, and strengthening the talent team are the key paths to drive high-quality development. This study provides theoretical support and practical guidance for the construction of a cultural and tourism education system in the new era with deep integration of culture, science and technology, and education, and is of great significance for promoting the diversified, personalized and global development of cultural and tourism education.

Introduction: The rapid development of digital technology is profoundly reshaping all walks of life, and the field of cultural tourism and education is also ushering in unprecedented opportunities for change. However, the traditional cultural tourism education model is trapped by the fact that content expression is limited to static display and one-way indoctrination, resulting in low audience participation. High-quality resources are limited by physical space and carrying capacity, and the spread range is narrow. The form of education is seriously homogeneous, and it is difficult to meet the needs of diverse learning. These challenges not only restrict the release of the educational value of cultural and tourism resources, but also exacerbate the gap between cultural inheritance and public awareness. In view of the digital transformation of cultural tourism education, the existing research mostly focuses on specific technology application cases or preliminary experience impacts, but the theoretical refinement of the deep connotation and internal mechanism, the systematic innovation model, and the operational discussion of the generalizable development path are still insufficient, and a more comprehensive and in-depth analysis system is urgently needed to guide the practice. To this end, this study aims to systematically sort out the core connotation of digital technology-enabled cultural tourism education, deeply explore its typical innovation model, and propose a

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feasible key development path based on the current bottleneck, in order to provide a solid theoretical reference and practical guidance for solving the traditional dilemma and promoting the high-quality development of cultural tourism education towards immersion, personalization, and inclusiveness.

1. The background of digital technology empowering cultural tourism education

1.1 Opportunities brought by digital technology to cultural tourism education

In the wave of digital technology, VR/AR technology has injected transformative vitality into cultural tourism education, breaking the shackles of time, space and physics of traditional education models. With the help of VR headsets, learners can immerse themselves in historical and cultural scenes and cultural tourism landscapes at home, such as the "Digital Dunhuang" VR project of the Dunhuang Academy and the AR tour program of the Palace Museum.

Build an open and shared digital platform based on digital technology to bridge the gap in cultural tourism and educational resources. [1] The first is to break through the limitations of physical space, so that high-quality cultural and tourism educational resources are no longer limited to specific regions, and learners can access the global resource library through the Internet [2]; The second is to reduce the cost of obtaining high-quality resources, and online platforms provide a large number of free or low-cost digital resources, so that people with limited economic conditions or inconvenient geographical locations can equally access content; The third is to realize the large-scale reuse of resources, and digital courses or virtual experiences can be repeatedly used by a large number of users, so as to improve the educational coverage and utilization efficiency of scarce cultural and tourism resources.

1.2 The development trend of cultural tourism education in the digital era

In the digital era, cultural tourism education has shown new trends in personalized customization, collaborative decision-making and quantitative evaluation, and is developing in the direction of precision, efficiency and quality. Digital technology helps cultural tourism education transform from standardized to precise services, and through the analysis of behavioral data, social media preferences and active feedback, operators can accurately identify user needs. Based on this, cultural and tourism institutions have designed layered educational products, such as the AR archaeological game for children at the Loulan Museum, the "Urban Culture Blind Box" task for young people at the Confucius Temple in Nanjing, and the cultural health course for the silver-haired group in Suzhou Garden. The collaborative data decision-making mechanism has been continuously improved, with the cultural and tourism department coordinating resource scheduling, the education department leading quality control, and the two sides sharing core data such as tourist flow heat maps to collaboratively formulate cultural and tourism education policies. Construct an evaluation model covering the whole link of "design-implementation-feedback", consider the dimensions of teachers, services, products, etc., and adopt innovative evaluation methods such as dynamic data kanban.

2. The connotation of digital technology empowering cultural tourism education

The report of the 20th National Congress of the Communist Party of China proposed to "implement the national cultural digitalization strategy", which called for promoting the digital layout of the cultural industry, and pointed out the direction for the digital transformation of the cultural and tourism industry. [3] The core connotation of digital technology-enabled cultural tourism education is reflected in the two interrelated and deeply integrated levels of "digitalization of cultural tourism" and "digital cultural tourism". The digitization of cultural tourism uses 3D scanning and other technologies to transform the physical world cultural tourism assets into digital assets, providing a material library and a basis for reproduction for education, such as the Dunhuang Academy building a grotto database. [4] Based on VR/AR, AI and other technologies, digital cultural tourism creates new forms of cultural tourism, experience methods and educational scenarios in digital space or virtual and real integration environments. Provide immersive, interactive, and intelligent cultural tourism education products and services that transcend physical limitations, such as building a virtual cultural tourism education community on the metaverse platform. The "digitalization of cultural tourism" provides a content foundation and resource guarantee for "digital cultural tourism", while "digital cultural tourism" activates the value of digital resources, creates a new educational experience and model, and may feed back to physical cultural tourism, forming a closed loop of mutual empowerment.

The key to the innovation of digital technology-enabled cultural tourism education lies in transforming static digital resources into dynamic, interactive, and in-depth educational experiences, as well as the intelligent upgrading of the concept of virtual and real integration through-

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out the physical education space. This kind of integration breaks the barriers of time and space, expands the breadth and depth of education, and provides learners with a highly immersive and personalized learning experience, which is the key path to build a modern public cultural service system and implement cultural projects to benefit the people.

3. Digital technology empowers an innovative model of cultural tourism education

3.1 Digital cultural tourism education model

Under the deep empowerment of digital technology, the core of the "digital cultural tourism education" model is to transform the digital assets precipitated by the "digitalization of cultural tourism" into new courses and experience projects with a high degree of immersion, strong interactivity and educational depth through the innovative means of "digital cultural tourism". The construction of this model mainly focuses on the development of characteristic curriculum system and the creation of virtual cultural education experience projects.

The development of the characteristic curriculum system is mainly carried out from three dimensions: the digital transformation of local resources, the empowerment of diversified teaching by digital technology, and the collaboration between industry, university and research to ensure quality. The digital transformation of local resources is based on the unique digital achievements of local cultural tourism, deeply combing the local historical and cultural context, and extracting representative cultural heritage as the core teaching materials. For example, the VR/AR course developed based on the "Digital Dunhuang" database of the Dunhuang Academy. Digital technology empowers diversified teaching to use advanced technologies such as VR/AR to transform static educational content into interactive virtual historical and cultural scenes, and at the same time combine online and offline integrated teaching methods to enhance the sense of presence in teaching and students' desire to explore. Industry-university-research collaboration to ensure quality emphasizes the establishment of a collaborative cooperation mechanism between universities, cultural and tourism institutions and science and technology enterprises, and invites intangible cultural heritage inheritors, cultural preservation experts, and education scholars to participate in the planning, review and implementation of the curriculum, so as to ensure that the course content is professional, cutting-edge and attractive.

The creation of virtual cultural and educational experience projects focuses on the upgrading of virtual experiences and offline interactive experiences that transcend time and space. Through the use of digital technologies such as AR/VR, the establishment of cloud-based digital museums, etc., to reproduce cultural monuments, and provide virtual displays, expert explanations, immersive learning and inclusive education resources, to create a visit experience that is not limited by time and place. At the same time, digital cultural tourism technology is used in physical places to create a multi-sensory narrative environment, simulate practice workshops, create virtual games and other projects, so as to enhance tourists' sense of participation and experience.

The "Digital Cultural Tourism Education" model relies on the "digitalization of cultural tourism" to build a solid resource base, and uses the innovative means of "digital cultural tourism" to transform characteristic cultural resources into educational content and experience that can be widely disseminated, deeply participatory, and entertaining, so as to effectively achieve the goal of cultural inheritance and education.

3.2 Smart cultural tourism education park model

The smart cultural tourism education park model is a paradigm of spatial integration and educational innovation empowered by digital technology for cultural and tourism education. The core lies in the deep integration of physical space and digital space, the construction of an immersive learning field with virtual and real linkage, and the use of intelligent technology to achieve the accurate matching of educational resources and learning needs. The model integrates the natural landscape, historical relics, intangible cultural heritage resources and scientific and technological facilities in the region, activates the educational value of resources through innovative teaching methods, aims to systematically improve the cultural literacy of the public, and cultivate compound talents required by the cultural and tourism industry.

This model relies on digital technology to build an immersive scenario-based learning environment, allowing learners to form an augmented reality classroom of "what you see is what you learn" in the field of virtual and real integration. Trigger knowledge exploration in thematic contextual fields. Digital technology is used to design scenario-based inquiry-based learning and project-based practical teaching methods to improve learners' learning interest and learning efficiency. Based on the analysis of students' interests based on digital technology, it dynamically recommends research routes and courses, and connects the digital resource libraries of museums, universities and enterprises to realize teacher reservations, equipment sharing, and mutual recognition of credits, so as to improve the closed loop of intelligent education ser-

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vices.

4. The development path of digital technology empowers cultural tourism education

4.1 Consolidate the construction of digital cultural tourism education infrastructure

A complete and adaptable infrastructure is the physical cornerstone of the digital transformation of cultural tourism education. In view of the wide distribution of cultural tourism education scenarios and high requirements for real-time interactivity, it is necessary to systematically build a "network-terminal-platform" trinity support system. First of all, we will build a ubiquitous high-speed network infrastructure, realize 5G deep coverage in the core area of culture, tourism and education, create a low-latency, high-bandwidth, and high-reliability network environment, support the transmission of educational resources such as high-definition images, and ensure an immersive learning experience. Secondly, scenario-based intelligent terminals should be scientifically deployed, including VR headsets, portable learning devices and other deeply immersive terminals, outdoor interactive terminals, lightweight learning terminals and information interaction nodes. Finally, a unified resource management and service platform should be built as the core hub, integrating the scattered digital achievements of cultural tourism, formulating unified metadata standards, and realizing the standardized storage and description of resources.

The high-speed network is the channel connecting the "virtual and real", the smart terminal is the interface to reach the user, and the unified resource platform is the hub to activate the value of digital assets. The synergy of the three lays a solid foundation for the convergence, standardization, sharing and innovative application of massive cultural and tourism education resources, and its efficiency directly determines the upper limit of content quality and user experience, which is a prerequisite for the high-quality development of digital technology to empower cultural and tourism education.

4.2 Innovate and improve the digital cultural tourism education system

Constructing and improving the three-dimensional collaborative institutional system of "incentive-norm-leading" can effectively ensure the high-quality development of digital cultural tourism education, and provide an institutional environment and value anchor for the release of infrastructure efficiency, content form innovation and talent capacity improvement. [5] In terms of innovative policy incentives and resource mobilization mechanisms, a special guidance fund has been set up to support the exploration of cutting-edge technologies and attract private capital investment; Optimize the circulation policy of data elements, open up non-sensitive data and establish a point mechanism; Improve the system for the protection and sharing of intellectual property rights. In terms of building a solid barrier for data security and compliance governance, it is necessary to comply with national laws and regulations, build a whole-process data protection system, implement a hierarchical and categorical protection mechanism, and strengthen the empowerment of security capabilities. In terms of deepening the path of value leadership and ideological and political integration, the "moral cultivation" is integrated into digital education, and VR/AR technology is used to inherit red genes and express traditional cultural values.

4.3 Enrich the content and form of digital cultural tourism education

The deep integration of digital technology provides a broad space for content innovation and form upgrading of cultural and tourism education. Although cultural tourism education is still based on offline experience, online education platforms are booming with the help of digital technology, showing great potential to break the limitations of time and space and bridge the resource gap. In order to fully unleash this potential, it is necessary to continue to work on both content and form. First of all, a full-featured online cultural tourism education platform was developed, integrating multiple digital cultural tourism resources, optimizing software adaptation and interactive design, and enabling learners to customize learning paths according to their personal conditions. At the same time, it uses big data and AI algorithms to provide value-added services such as intelligent resource recommendation. In addition, combined with local characteristic historical and cultural resources, the development of cultural and tourism education micro-courses focusing on specific knowledge points. Finally, establish an industry-university-research cooperation mechanism to jointly develop high-value digital education products and applications, and enrich the education supply of "digital cultural tourism".

4.4 Strengthen the construction of a digital cultural tourism education talent team

Digital technology deeply empowers cultural and tourism education, and puts forward compound and high-literacy requirements for practitioners. Building a talent team with both the depth of cultural tourism, the ability to apply digital technology, innovative teaching

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design thinking and cross-field collaboration literacy is the key guarantee for the implementation of the model and the implementation of the path. Talents in digital cultural tourism education need to have five-dimensional core competencies such as digital technology application, cultural tourism professional knowledge, digital teaching design, user experience and data literacy, and cross-cultural communication and collaboration. In order to cultivate such talents, a hierarchical and classified training system should be constructed. Colleges and universities need to strengthen the reform of relevant majors, set up a cross-course module of "digital cultural tourism education", rely on real project practical training, and cultivate source talents with the integration of industry, education and research. [6] In-service cultural and tourism educators should carry out systematic and periodic capacity improvement programs, train digital technology empowerment skills, and help in-service personnel transform. At the same time, a dynamic talent resource pool is established to achieve accurate talent matching for projects through dynamic updates and multi-dimensional evaluations, and to achieve efficient docking and knowledge sharing.

Conclusion

Digital technology is deeply reshaping the form and value of cultural tourism education. This study focuses on its internal mechanism and explores its core connotations, innovation models and paths. The research shows that the two-way integration of "digitalization of cultural tourism" and "digital cultural tourism" is the essence of empowerment, the former transforms physical resources into digital assets, and the latter creates immersive and interactive scenes, forming a closed loop and driving the deep coupling of cultural and tourism resources, digital technology and educational goals. The study proposes two innovative models, "digital cultural tourism education" and "smart cultural tourism education park", the former integrating culture, technology and education, and the latter building a virtual and real linkage learning field to improve the public's cultural literacy and professional talent ability. This study deepens the theoretical understanding of digital technology empowering cultural and tourism education, constructs a "model-path" analytical framework, and provides ideas and guidelines for the transformation of cultural and tourism institutions, education departments and enterprises, which is of great significance for the construction of a modern cultural and tourism education system. We also need to deeply analyze the connotation of digital technology to empower cultural tourism education, fully release the huge potential of digital technology, continuously reflect and optimize in practice, have the courage to innovate, and build a future-oriented and vibrant new ecology of cultural and tourism education.

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