

Transformation of University and College Education on Tourism Digitalization - Based on the Case of Shenzhen City

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Abstract. The rapid development of Internet technology, the multi-field integration of application scenarios and new technologies, such as AI, big data and cloud computing, have boosted the rapid development of the tourism industry's digitalization. The change and development of the tourism industry have led to an increased demand for tourism digitalization digital technology professionals. This study focuses on the university and college level education to meet the development of new tourism scenarios in the big data era. The research explores "Three-in-One" educational framework and "Three-dimensional Scenarios" educational model. This study also examines the present development trend of the tourism market and the skill characteristics of demand. Additionally, the study explores the training framework of tourism digitalization education. The research analyzes the development of the local tourism industry in Shenzhen City. It suggests that localized training programs can benefit the development of tourism digitalization education at universities and colleges.

Keywords. Tourism Digitalization, Tourism Education, Education Innovation, AI and Big data

1. Introduction

The digital economy and the integration of Internet technology are driving new formats in the cultural tourism industry, leading to a growing demand for high-end tourism professionals. Therefore, training tourism digitalization talents in higher education institutions must be improved to ensure the validity of the teaching system in this field. On the one hand, the recognition of talents in tourism digitalization is rising annually. Enterprises and the market are particularly concerned and recognize high-level talents who possess a mastery of digital technology and Internet business models[1]. On the other hand, the complex and innovative high-end talents in the field of tourism digitalization meet the market demand of the new development of the tourism industry. The digital development of high-end tourism service industry with distinctive characteristics urgently needs to integrate the new digitalization positioning of tourism majors in colleges and universities. Therefore, market demand for tourism digitalization talents has shifted in the educational approach, with traditional tourism as the foundation.

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The rapid development of Shenzhen's digital cultural tourism market requires a platform that can produce high-quality professionals specializing in tourism digitalization. It is imperative to carry out customized and differentiated exploration of tourism digital talent training in colleges and universities.

2. Literature Review

With the rapid development of AI and big data technology, various industries are experiencing significant transformation. The digital transformation journey necessitates appropriate talent - termed "digital talent" - to guide this process. Such individuals possess expertise across multiple domains rather than confined to traditional singular fields[2]. Research by Mohammed Al Haziazi (2023) substantiates those factors including digital skills, employee benefits, and a people-centric culture positively correlate with effective talent management, enhancing the mechanisms for managing human resources in Oman's Sultanate companies[3]. Tourism has also experienced significant changes in digital transformation and is one of the leading sectors in digital transformation[4]. Zhao Lei (2022) pointed out that the continuous penetration and integration of the digital economy into the tourism industry requires the support of substantial human capital accumulation, which forces the continuous improvement of the quality of human capital in the tourism industry[5].

The training of digital talents is strong support for the successful digital transformation of the cultural tourism industry, whose professional quality and professional ability directly affect the service quality and economic benefits of cultural tourism enterprises and directly relate to the completion of the transformation and upgrading of the cultural tourism industry[6]. Dai (2019) points out that in line with the trend of digital transformation of the tourism industry, the training of tourism talents should focus on the cultivation of digital talents with digital office skills, digital tourism operation, tourism product research and development, digital marketing and other capabilities[7]. This requires universities to fully connect with the development of new technologies and new models of the tourism industry and serve new driving forces.

In terms of the cultivation of digital talents, Daniel (2017) combined the characteristics of the tourism industry and formed a tourism industry-oriented talent training model of "two combinations, three progressive and four spiral" with professional quality and ability as the core[8]. Li Junyi and He Zhe (2022) said that the tourism industry needs high-end technical talents with Internet thinking, mastering new technologies and meeting the needs of tourists in the new era, and proposed to build a "three-combination" multi-disciplinary personnel training mechanism[9]. Huang Ke (2021) focuses on analyzing the problems existing in the innovation and entrepreneurship training of tourism talents in the era of the digital economy and proposes to build a training model of "three layers", "six steps" and "four integration" to deepen the reform of "second classroom"[10].

3. Education Environment on Tourism Digitalization and the Case of Shenzhen City

3.1. Development of Global Digital Tourism Market

The tourism industry is experiencing a new surge in development due to the ongoing innovation and application of science and technology. Specifically, emerging Internet technology is serving as a new driving force[11]. Digital technology also brings additional opportunities for the digital culture and tourism market in the deep integration of the cultural and tourism fields. In response to the demand for economic transformation, major tourism cities worldwide are employing digital technologies to promote the digital, networked and intelligent transformation of the conventional tourism sector; and to support the sustainable development of tourism through technological innovation, service upgrading, marketing and promotion. For instance, Izmir, the initial city in Turkey to finalize the development of its digital tourist infrastructure, has created a mobile tourism application called Visit Izmir. This program provides travelers with convenient access to information about more than 2,300 locations in 30 districts of Izmir, at any time and from any location.

3.2. Development of China's Digital Tourism Market and Changes in Talent Demand

3.2.1. Development of Tourism Digitalization in China

In the context of the vigorous development of the global digital tourism market, China, as a major tourism country in the world, its digital tourism market is also showing a strong growth momentum. Sixteen industry subcategories with additional evident features of digital cultural tourism attained an operating income of 3,962.3 billion yuan in 2021, according to the annual inventory report of China's cultural and tourism industries. This represents an 18.9% increase from the previous year. Compared to the average level of cultural enterprises, the two-year average growth rate was 11.6 percentage points higher at 20.5%. The vigorous development of China's digital cultural tourism industry has been directly influenced by the profound integration of new technologies and tourism as a result of the digital economy's horizontal expansion to multiple fields and levels.

Online travel industry is also experiencing growth due to the emergence of a few new travel websites, such as Ctrip, Qunar and Fliggy which are representative OTA APPs or platforms in China. Additionally, the growing number of tourism consumers is increasingly favoring online travel due to the emergence of new tourism services, including integrated OTA, mobile APP-customized travel, and destination services[12]. According to the 52nd Statistical Report on the Development of China's Internet, the number of online travels booking users in China has reached 454 million as of June 2023, an increase of 30.91 million compared with December 2022, accounting for 42.1% of the total Internet users (Figure 1). Digital cultural tourism products expand the time and space dimensions of the original tourism model. New logic and experiences for cultural tourism consumer products are built through mobile terminals, virtual platforms, and smart media. For example, Online tourism platforms have accelerated the expansion of new marketing channels by incorporating innovative models, such as live streaming, "ticket blind box" and "train blind box" into the layout content ecosystem.

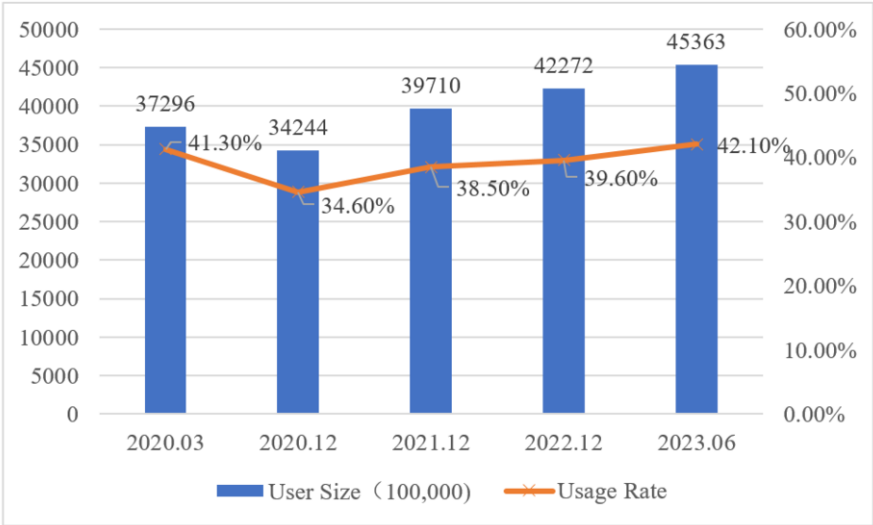


Figure 1. Scale and utilization rate of online travel booking users in China (2020–2023)

Source: 52nd Statistical Report on the Development of Internet in China, sampled valid point data.

3.2.2. Analysis of Demands for Tourism Digitalization Talents in China

The cross-border integration trend of science and technology and the tourism industry has resulted in numerous new scenarios, models, and talent needs, and has also presented new requirements for talent. Tourism companies focus considerably on personal comprehensive abilities. The tourism industry needs to have an entrepreneurial spirit, professionalism, and good skills. Society and industry also need high-end managerial talents with visionary management perspectives and cutting-edge top-tier management capabilities who can gather strength, possess strategic thinking and industry-leading leadership talents. We require skilled talents with a strong understanding of the Internet, proficiency in emerging technologies, and the capacity to explore untapped areas and cater to the changing demands of tourists in the modern Internet era[9].

The significant changes in the tourism industry have raised high demands for high-quality tourism education and talent education. These changes are necessary to strengthen theoretical and practical education and also to emphasize cultural education and interdisciplinary diversified knowledge dissemination[13]. Big data, cloud computing technology, and digital applications are significantly favored in tourism digitalization.

3.3. Tourism Digitalization Development and Tourism Talents Cultivation in Shenzhen

Shenzhen City possesses a wide range of tourism resources. As of 2023, there are 20 scenic spots categorized as A-class, with two designated as 5A-class and eight as 4A-class (Table 1). Additionally, the city is home to National Nature Reserves, National Geopark, and National Wetland Parks, which further enhance its tourism attractions. Shenzhen City also offers numerous recreational and leisure facilities in various types. Additionally, there is a growing number of popular Internet celebrity spots, which are increasingly attracting an increasing number of tourists.

Table 1. Shenzhen City 4A and Above Scenic Spots (as of September 2023)

Number	Scenic Spots	Quality Ratings	Assessment Time (Year)
1	OCT Travel and Resort Area	5A	2007
2	Mission Hills Tourism and Leisure Resort	5A	2011
3	OCT East	4A	2014
4	Evergreen Resort	4A	2011
5	Safari Park Shenzhen	4A	2011
6	Fairy Lake Botanical Garden	4A	2007
7	Waterland Resort	4A	2009
8	Guangming Tour Farm	4A	2017
9	Mission Pastoral Tourism and Culture Park	4A	2009
10	Spring-Mountain Hot Spring Manor	4A	2018

Source: Official website of Shenzhen Municipal Culture, Radio, Television, Tourism and Sports Bureau.

Regarding tourism infrastructure and employees, data extracted from the Shenzhen Statistical Yearbook 2022 indicate that the hotel and catering business in Shenzhen City exhibited 2,066 corporate legal entities by the end of 2021. Specifically, 619 are in the accommodation industry, and 1,447 are in the catering industry, constituting 29.96% and 70.04%, respectively. Currently, the total number of star-rated hotels in Shenzhen City has reached 62, of which 21 five-star, 16 four-star and 22 three-star hotels have been opened. Meanwhile, there are 114,373 employees in the accommodation and catering industries and 30,655 employees in the tourism industry, including 10,363 in the hotel industry, 1,066 in travel agencies and 9,627 in scenic spots.

The statistics mentioned above indicate that cultural tourism consumption in Shenzhen City is demonstrating a sustained surge in popularity, accompanied by ongoing enhancements in infrastructure. Therefore, Shenzhen City’s local higher education institutions need to adjust their educational policies based on the strong market demand and popularity of the tourism digital technology profession, closely follow the demand of the supply side of the real economy and consider the unique characteristics of Shenzhen’s local development.

4. Education Innovation on Tourism Digitalization and Education Practices

4.1. New Orientation and Challenge of Talent Training in Tourism industry

The cohesive advancement of the tourism industry has resulted in a notable increase in the demand for proficient professionals. Colleges and institutions offering programs should prioritize developing digital tourism skills among their students. These skills include a profound appreciation for one’s country and culture, a strong sense of cultural self-assurance, and the ability to adapt to new business models and utilize emerging

technologies effectively; it is essential to develop interdisciplinary knowledge and practical skills in order to excel in the field of digital talent training[14]. Additionally, cross-functional talents with global vision, innovative thinking, and entrepreneurial awareness should be cultivated[15], providing talent guarantee for the tourism industry’s digitalization and further fostering integration and innovation.

4.2. Diversified Practices on Tourism Digitalization Talents Training

4.2.1. Explorations of the New Education Mode of “Teaching and Learning”

A new “Teaching and Learning” model has been devised to transform traditional teaching patterns and learning environments, which incorporates a “Three-in-One” approach and “Three-dimensional Scenarios”, aimed at integrating cultural tourism and digital development (Figure 2). From the “Teaching” perspective, this model is distinguished by interactive coordination and collaborative roles among students, corporations, and instructors. From the “Learning” perspective, “Three-dimensional Scenario” teaching mode is introduced, which combines advanced technologies, innovative scenarios, and cultural immersion.

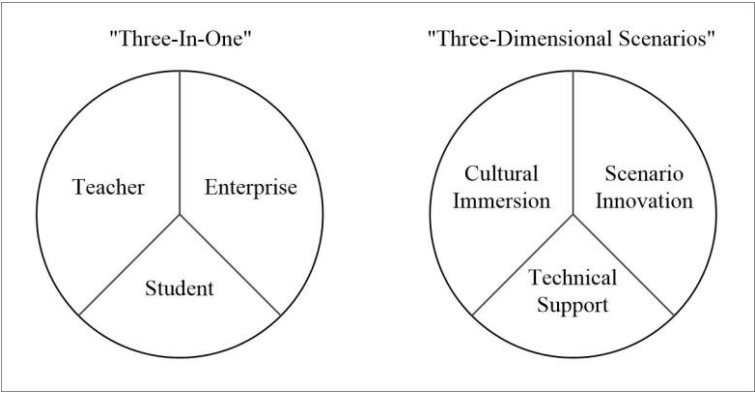


Figure 2. New Model of “Teaching and Learning”

The “Three-in-One” framework focuses on the core of educational ecology, reshaping the relationships among educators, businesses, and students. Focusing on the demand for tourism digitalization, the curriculum teaching resource base is developed, and technology-intensive curriculum groups are designed to cultivate students’ adeptness in perceiving and applying technology. Collaborations with partners in Shenzhen and the Guangdong-Hong Kong-Macao Greater Bay Area are encouraged to establish several off-campus innovative practice bases, encompassing Internet ecological platforms such as OTA platforms, cross-border tourism e-commerce, and new media. Students and teachers will participate in practical, cultural tourism projects, allowing students to be both passive recipients and active contributors in course design and project execution. This engagement will deepen their understanding and application of technology in solving real-world problems and create a virtuous teaching and learning cycle.

The “Three-dimensional Scenarios” component focuses on the learning experience by integrating culture, scenarios, and cutting-edge technology. Cultural embedding ensures that technological innovation always serves cultural inheritance and enhances tourism experiences. It expands students' learning and practice by introducing new

knowledge, concepts, methods, and scenarios driven by innovation, changing demands, and business transformations in various industries. Students can immerse themselves in authentic cultural contexts through practical teaching methods that combine new technology and resources, gaining a deeper cultural understanding. This experience enhances their learning autonomy, the practicality of knowledge, and innovative thinking while developing their ability to renew and regenerate their technical knowledge continually.

4.2.2. Constructions of a New Experiential Teaching System

The construction of comprehensive on-campus laboratories and smart tourism experience centers should be emphasized. To strengthen university-industry cooperation and establish off-campus industry-university-research bases should be emphasized. This will enable teachers and students to engage in practical cultural and tourism projects, thereby enhancing students' capacity to integrate theory with practice[16]. To build multiple Teaching system and Environmental Creation. The teaching format can be enriched with digital technologies to fully expand the boundaries of the classroom, incorporating different dimensions, such as online teaching, blended learning combining online and offline methods, and virtual simulation experiments. Specifically, course resource packages are produced in the form of online MOOC, and AI service terminals are introduced to provide course learning tools, forming a digital-intelligent teaching model.

4.2.3. Constructions of Dual-Teacher Model of Teaching Staff

Integration of digital technology in the tourism discipline involves the convergence of diverse knowledge domains. The teaching staff in higher education institutions specializing in tourism should consist of professionals with different disciplinary backgrounds, particularly those who possess multidisciplinary knowledge and skills. An essential requirement for nurturing versatile talents in tourism digitalization is establishing a "dual-teacher model" teaching staff with solid professional foundations, high teaching capabilities, strong research skills, proficiency in modern teaching methods, and outstanding practical experience. This teaching staff is crucial for cultivating multifaceted tourism digitalization professionals[17]. Additionally, incorporating professionals and highly skilled sales personnel as adjunct instructors in the institution can enhance the diversity of the part-time teaching team.

5. Summaries and Future Research

In the digitalization era, tourism digital technology talent education must be in accordance with industry requirements and developments. This undertaking requires a focus on integrating new knowledge and skills, as well as the coexistence of professionalism and innovative capacity. Reforms and innovations in talent education models suitable for tourism digital technology application scenarios are imperative. This study analyzes tourism digitalization environments in the digital era. Based on development assessment of China's digital tourism technology and changes in talent demand, we explored a new talent education model from the perspectives of target orientation, optimization of knowledge system and capability development. Furthermore, by taking into account the specific talent demand patterns in Shenzhen City and the

unique characteristics of the tourism digital technology market in the city, this study enhances the practical teaching system and methods for cultivating tourism digital technology talents. The present research comprehensively proposes a diversified talent education pathway for higher education institutions, encompassing innovative teaching models, the construction of practical systems, instructional design, environment creation, and faculty team development.

From an interdisciplinary perspective, a new teaching model with “Three-in-One” and “Three-dimensional Scenarios” as the core is constructed, and the practical teaching system for the training of digital cultural tourism talents is improved to meet the requirements for composite digital cultural tourism talents in the development of new tourism. The new model of “teaching and learning” in this study emphasizes the students' rapid cognitive ability to use new technologies, scenarios, and formats, as well as the new tourism talents who can apply new technologies and the development of tourism digitalization in real time. The teaching innovation model aims to establish a joint practice-based partnership with benchmark companies in the tourism and cultural industry and high-tech enterprises in Shenzhen City, such as OCT Group and Invengo Company. Joint practice bases are established to integrate teaching and research, combining full-time and part-time teachers. Innovative practical teaching methods are devised by incorporating new technologies and resources, forming an integrated tourism digital technology practical teaching system that includes “points, lines and areas”. The aim is to establish a specialized education system focused on digital tourism technology, specifically designed to support the growth of the local industry in cities. In conclusion, this research intends to inject new sources of energy and explore new development paths for cultivating tourism digital technology talents, and ultimately support the training needs of Shenzhen and even the Guangdong-Hong Kong-Macao Greater Bay Area composite digital cultural tourism talents.

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