Research on the Artificial Intelligence Enabling the Development of Tourism Education

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Abstract. Artificial intelligence technology is reshaping all walks of life spurred on by the wave of digitalization. In terms of the integration of artificial intelligence and tourism education, artificial intelligence technology is not only an auxiliary means of teaching or learning, but also a way to create a new teaching environment, in which students' enthusiasm can be fully mobilized. In the context of the strategic promotion of smart society and digital China, artificial intelligence has a good prospect in the field of tourism education. The purpose of this thesis is to explore how artificial intelligence technology enables the development of tourism education, and analyze its development opportunities, difficulties and development paths.

Keywords: Artificial intelligence (AI); tourism education; Personalization

1 Introduction

Tourism education is a form of off-campus educational activity that combines inquiry-based learning with travel experience, with cultivating students' comprehensive literacy, broadening their horizons and enhancing their practical ability as the core objectives, covering rich and diverse themes such as cultural exploration, natural exploration, and scientific and technological innovation experience. The tourism education industry is significantly characterized by strong comprehensiveness, multiple subjects involved and dynamic changes of scenes. Artificial intelligence (AI) aims to enable machines intelligence characteristics so that they can operate efficiently and accurately in complex environments. AI is currently integrated into all aspects of tourism education, prompting it to achieve intelligent innovation in terms of resource integration, itinerary planning, education guidance, effect evaluation and other aspects, and to build a more adaptable, interesting and efficient tourism education ecosystem, thus injecting strong impetus into the development of the industry and create many new opportunities.

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2 New Opportunities of Artificial Intelligence Enabling to the Development of Tourism Education

2.1 Exact Resource Matching

The tourism education is usually carried out based on the allocation of abundant and high-quality resources. By virtue of strong data mining and analysis capabilities, AI deeply analyzes multidimensional information such as students' interests and preferences, age levels, knowledge reserves and school syllabus needs to lay a solid foundation for exact matching of research resources. Firstly, AI greatly improves the efficiency of resource screening. Research institutions, schools and other entities can quickly identify resource options suitable for specific research groups from a massive library of destinations, venues and course items through the intelligent platforms. For instance, aiming at junior high school students who are interested in history and culture, the AI system can quickly lock in sites of ancient capital relics, and associate corresponding in-depth explanation courses, hand-restored cultural relics experience activities, etc., to generate a list of exclusive resources with one click. Secondly, AI achieves personalized resource customization. In view of the differences in the growth environment and trigger points of different students' interests, the intelligent algorithm "tailors" each student based on data insights into past study participation records, daily browsing preferences, etc., such as accurately recommending research packages including field trips to wildlife reserves and ecological specimen making workshops for students who love animals and plants and have strong hands-on skills, allowing tourism education resources to seamlessly connect with students' needs. Thirdly, AI ensures dynamic resource optimization. AI tracks resource popularity and feedback evaluation in real time, and continuously adjusts and optimizes matching strategies based on new industry trends, venue facility updates and other conditions to ensure that tourism education resources are constantly replaced and accurately adapted.

2.2 Intelligent Itinerary Planning

The scheduling of tourism education needs to take into account the achievement of learning objectives, the convenience of transportation and accommodation, and the rationality of tight time, which is quite complicated. AI can provide more personalized, efficient and reasonable itinerary planning services for students. The first is to optimize route design. AI develops efficient and smooth travel routes to avoid wasting time on the way through comprehensively considering the geographical distribution of tourism education locations, real-time information on traffic conditions, and the estimation of the duration of each link. For instance, when planning science and technology theme tourism education routes, it cleverly connects science and technology museums, university research laboratories, and science and technology enterprise parks, and flexibly adjusts departure and stay times according to real-time road conditions to ensure compact and orderly tourism education. The second is to intelligently arrange the tourism education. AI reasonably intersperses explanations, interactions, practical exercises, and rest periods based on students' attention curve and knowledge absorption rules. For instance, theoretical courses and on-site observations with high concentration requirements are arranged in the morning, and interesting group discussions and easy expansion games are interspersed in the afternoon to scientifically allocate energy and enhance the tourism education experience. The third is to flexibly respond to emergencies.

AI uses the Internet of Things and big data monitoring to provide instant warning of sudden weather changes, temporary closures of venues and other accidents, intelligently generate alternative solutions, and quickly adjust the schedule, such as changing outdoor nature exploration to indoor popular science viewing and online answering of experts in rainy days to ensure that the tourism education are not disturbed and smoothly advanced.

2.3 The Reproduction of Real and Virtual Scenes

The rapid development of virtual reality (VR) technology has prompted VR-based panoramic technique to be widely used in interactive teaching, immersive teaching and tourism education activities. tourism education is not only an important part of the comprehensive practical activity curriculum, but also a useful supplement to classroom teaching. The tourism education based on VR panoramic technology is a new way of tourism education developed on the basis of on-site tourism education, and is an important attempt to innovate digital teaching. Taking the red tourism education activity of the "Hero Little Eighth Route Army" in the VR Panoramic Memorial Hall as an example, Yuanqing Wu (2022) discussed the application of VR panoramic techniques in tourism education. VR and AR techniques enable students to break through time and space by creating an immersive environment. Limitations, experience the study environment immersively. For instance, through the use of intelligent simulation technology and VR glasses, students can be placed in a specific battlefield environment, and even dialogue with historical figures, so that they can understand the cruelty of war, strengthen the belief in national defense, and establish a correct military outlook in the process of participating in the virtual simulation practice.

2.4 Implementation of Practical Evaluation

The key to improving services and demonstrating value is to accurately evaluate the effectiveness of tourism education on students' knowledge growth, ability training, and emotional attitude shaping. In the era of artificial intelligence, it is necessary to construct multiple intelligence evaluation system to innovate the traditional single report mode. Firstly, it is necessary to break the results-only theory and build a comprehensive evaluation dimension. Smart wearable devices and learning interactive platforms can be used to collect students' participation, interaction frequency, problem raising and problem-solving performance in the whole research process, and measure students' growth from multiple perspectives combined with final results display (such as tourism education reports and creative works), focusing on process accumulation and ability transformation. Secondly, it is necessary to realize real-time dynamic evaluation. Through online learning community discussions and instant feedback on the completion of on-site scenarios and tasks, we can timely learn about the changes in students' learning status, and adjust guidance strategies in a timely manner during the tourism education process. when students are found to have incorrect understanding of historical allusions, supplementary information will be immediately pushed and a small range of questions and answers will be arranged to ensure that the learning effect is consolidated in time. Thirdly, it is necessary to deeply analyze feedback and make optimization. Big data association analysis technology can be used to explore the internal links between different tourism education topics, teaching methods and students' harvest, providing precise directions for tourism education course iteration, instructor

training and activity form innovation. For instance, through analysis, it is concluded that outdoor inquiry learning has a significant effect on the internalization of geographical knowledge, and then the corresponding link design will be increased to continuously improve the quality of research travel education and release the efficiency of education.

3 Difficulties in the Development of Tourism Education in The Intelligent Era

3.1 Positioning Confusion

The use of AI technology will trigger huge changes in the education system and mechanism in the mode of tourism education, which will inevitably impact the inertia of thinking and face more doubts. The primary issue is the balance between education and tourism. Tourism education aims to combine education and tourism experience, but the introduction of AI makes this balance more difficult to control. On the one hand, over-focusing on novel tourism scenarios created by intelligent technology can easily reduce tourism education to pure sightseeing and entertainment activities, deviating from the original intention of education; on the other hand, simply strengthening the intelligent means of knowledge infusion will weaken the fun of tourism education and lead to lower participation enthusiasm of students. Therefore, how to cleverly apply AI to achieve the deep integration and collaborative efforts of the two has become an urgent problem to be solved. The issue followed is the coordination dilemma of personalization and standardization. Although AI is conducive to designing personalized tourism education paths according to students' age, interests, knowledge reserves, etc., tourism education involve multi-regional and multi-topic resource integration, so standardized schedule arrangements, security and other frameworks are indispensable. It is a complicated task to coordinate intelligent customization and unified specification to avoid the conflict between personalized scheme and basic standard in actual operation; a small mistake can lead to an oversight, affecting the overall quality of the tourism education.

The last issue is the contradiction between short-term experience and long-term value. tourism education expects to create an immersive experience for students by virtue of AI, leaving a deep short-term memory for them, but there are about the long-term educational value such as knowledge internalization and improvement of literacy. Taking the experience of virtual historical scenes as an example, whether students can truly understand the historical context, absorb spiritual nutrients and transform them into driving forces for sustained growth after a moment of shock, intelligent means still need to be explored and optimized in deepening subsequent influence and lengthening the timeliness of the tourism education.

3.2 Complicated Implementation

With complex and diverse business, tourism education itself is a huge and arduous system project, involving various aspects and including multiple elements such as food, accommodation, transportation, recreation and education; moreover, it involves multiple links such as tourism education purposes, trip arrangements, tourism education projects, characteristic accommodation, research evaluation, etc., and each level has

different needs and characteristics. Intelligent tourism education have new features such as diversified education subjects, personalized teaching process, anthropomorphic human-computer interaction and intelligent assessment, which make the middle links of tourism education more complicated and further increase the difficulty of organization and implementation.

In the first place, AI is conductive to integrating resources in multiple fields such as education, cultural tourism, and transportation for study travel, but in reality, the data standards of all parties are different and the flow of information is not smooth. For instance, it is difficult for the scenic spot intelligent ticketing system to seamlessly connect with the tourism education and education platform, it is difficult for the hotel reservation intelligent module to match the special needs of the tourism education team, and the digital resource formats of cultural venues in different regions have different formats. Integrating these fragmented and heterogeneous resources to efficiently serve the entire process of tourism education tests the organizers' ability to coordinate and adapt technology. In the second place, there are major obstacles to the adaptation of technical practice to educators. As the key implementers of tourism education, some teachers and tourism education instructors are unfamiliar with the application of AI technology, such as the operation of intelligent navigation equipment and the use of data analysis to optimize teaching strategies. Meanwhile, the design of intelligent assisted teaching tools is often divorced from front-line educational practice, making it difficult for educators to smoothly integrate technology into tourism education guidance, resulting in "two representations" that hinder the effective implementation of intelligent tourism education.

In addition, the challenges of safety supervision have escalated, that is, the deep embedding of smart devices and online platforms in tourism education has brought new security risks. On the one hand, the positioning and tracking of smart wearable devices may be subject to signal interference and hacker attacks, resulting in the loss or disclosure of students' location information; on the one hand, bad information may be mixed in the virtual tourism education space. For instance, the online historical and cultural exploration plate is implanted with distorted historical facts, so it is necessary to build a comprehensive and dynamic safety supervision system in a complex and intelligent environment to ensure the orderly and safe development of tourism education.

3.3 Great Negative Effects

Algorithms, as the core element of AI, draw scientific conclusions through big data analysis and calculation, and effectively issue instructions. The continuous updating and iteration of algorithms will inevitably lead to the reshaping of the relationship between educational subject and object and the transformation of students' learning methods, which may lead to a series of negative effects. Firstly, students' self-exploration ability is limited. Although intelligent itinerary planning and intelligent explanation can improve the efficiency of tourism education, it is easy for students to develop a dependency psychology and weaken the ability of independent planning, independent observation and independent thinking. For instance, in the tourism education of museums, the intelligent voice introduces the exhibits in a set order, and students are accustomed to following the explanation, and they are lazy to explore deeply into the diversified information behind cultural relics according to their own interests; in a long run, students' innovative thinking and problem-solving ability are hindered.

Secondly, the interpersonal interaction is weakened. tourism education focus on emotional exchanges and collaboration between teachers and students, students and students, the intervention of AI increases "human-computer interaction" but reduces in-depth face-to-face communication. Moreover, the replacement of some group discussions by smart partners and the quick answer of students' questions by virtual tutors have made the tourism education atmosphere increasingly indifferent and weakened emotional bonds, which is not conducive to the development of students' social skills and team spirit, and also violates the original intention of tourism education to promote comprehensive quality development.

Thirdly, there are data and privacy security risks and concerns. Massive student information is circulated in intelligent registration, intelligent evaluation and other links, making the privacy data such as name, age, interest preference and even home address exposed to the risk of leakage. Once there are loopholes in data security protection, lawbreakers may steal and utilize the data, which not only endangers the personal rights of but also damages the reputation of tourism education organizations and shakes the foundation of industry development.

4 Practical Strategies for Ai to Drive the Development of Tourism Education

4.1 To Clarify the Value Orientation and Calibrate the Intelligent Tourism Education Positioning

AI is not created and operated out of nothing, but is deeply rooted in the development of tourism education education and talent training needs.

Above all, we should adhere to the fundamental attributes of education. Given that education is the core of tourism education, AI applications must focus on strengthening moral education and cultivating people. It is necessary to integrate educational elements such as moral character shaping, cultural inheritance, and innovative practice into intelligent design in accordance with national education policies and curriculum standards to ensure that every intelligent function and every study scene contains educational value and is not overly entangled by commercial and entertainment elements, thus laying a solid foundation for student growth. Then, we should take into account the needs of multiple subjects: to balance students' pursuit of innovation and knowledge, parents' safety concerns, school teaching supplements, and cultural tourism industry development demands. It is necessary to build an intelligent communication platform, collect feedback from all parties, and help the rational use of cultural tourism resources and create multi-win-win and distinctive intelligent research and travel products by taking students' interest as a starting point, taking into account parents' remote supervision expectations, and fitting in with the school's quality education plan. At last, we should focus on long-term literacy cultivation: to design the "review" and "advanced" links of intelligent research, and applying AI to to analyze student experience data, and explore weak points in knowledge understanding and key points in literacy improvement, such as pushing extended reading and online discussions after historical tourism education to help precipitate short-term perceptions into long-term cultural literacy, guide students to shift from passive acceptance to active exploration, and realize continuous empowering growth of tourism education.

4.2 To Strengthen Synergy and Overcome Implementation Problems

AI-driven tourism education innovation must follow the law of student growth and industrial development, and promote reform and innovation in disciplinary integration, school-enterprise integration, and multi-party collaboration. The first is to build a diversified integration mechanism. Government departments should take the lead in jointly establishing an intelligent tourism education collaborative group in education, culture and tourism, science and technology to unify data specifications and resource docking standards and break down industry barriers. It is necessary to encourage scenic spots, tourism education bases, and technology companies to jointly build and share intelligent platforms and integrate high-quality content. For instance, technology companies can help scenic spots build intelligent science popularization exhibition halls to output resources in an one-stop manner for tourism education and improve implementation fluency. The second is to enable educators to improve their professional: to carry out multi-form intelligent research training, covering technical practical operation, teaching design integration and other dimensions. Colleges and universities can set up relevant courses, and research institutions can organize workshops regularly to invite experts to share cases, so as to help teachers and tutors master intelligent tools, such as using intelligent teaching APP to design interactive research tasks, giving play to the "double engine" advantages of teacher-led and intelligent auxiliary learning to ensure the quality of tourism education. The third is to build a strong safety net to build a strong intelligent research security line from multiply levels of hardware, software, and management. It is necessary to adopt encryption technology to ensure the security of data transmission of intelligent devices, develop intelligent monitoring system to screen bad information in virtual space in real time, and establish a security emergency linkage mechanism, so that once an early warning is issued, the tourism education team, technical support department, and management department can respond in coordination and deal with it quickly, thus escorting the whole tourism education process without worry.

4.3 To Optimize Intelligent Applications and Avoid Negative Effects

The development of the intelligent tourism education model is not achieved overnight or once and for all. Instead, it must always keep up with the cutting-edge trends of scientific and technological development, continue to expand formal content, continuously enrich forms and means, optimize intelligent applications, and avoid negative effects. First of all, it is necessary to flexibly design and pay attention to students' independent learning: to set up a "blank" space in the intelligent system to give students the right to choose and explore independently, such as recommending multiply plans for tourism education, setting up exploration mode in the intelligent tour of scenic spots and only providing clues to encourage students to set their own routes and explore characteristics, and awarding points and honors using incentive mechanisms to stimulate endogenous motivation for independent exploration results. Secondly, it is necessary to pay attention to interpersonal interaction regression: to reasonably define the division of labor between humans and computers, and reserve sufficient interpersonal interaction time based on intelligent assistance. The design of tourism education activities emphasizes group cooperation tasks, and can use intelligent platforms to optimize grouping, provide collaboration tools, guide teacher-student and student - student in-depth dialogue and brainstorming around tourism education topics, and enhance the

effect of tourism education and education through interaction and sublimation of emotions and cohesion of teams. Thirdly, it is necessary to carry out encryption protection and strictly observe data security: to use cutting-edge encryption algorithms to protect the entire life cycle of data, and follow the principle of minimum necessity to authorize access from encrypted storage at the smart registration portal to full monitoring of transmission and use. Furthermore, protection measures such as regularly carrying out data security audits, updating protection strategies, strengthening security awareness of personnel, and signing confidentiality agreements can be taken to safeguard data security and escort the steady progress of intelligent tourism education.

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References

1. X Samuel Roy, Titus Issac. (2024). J Sebastian Terrance Optimizing Travel Itineraries: A Multi-Objective Machine Learning Model Approach [J]. 2024 3rd International Conference on Applied Artificial Intelligence and Computing (ICAAIC).
2. Chen, Y., & Liu, P. (2019). "Virtual Reality Applications in Educational Tourism." Computers in Education.
3. Li, H., & Zhang, X. (2021). "AI and Smart Tourism: Exploring Future Trends." Tourism Management Perspectives, 39, 100837.
4. Duan, L., & Zhang, H. (2018). "Personalized Learning with AI Systems: Challenges and Opportunities." International Journal of Artificial Intelligence in Education.
5. Zhao, Y., & Shi, Z. (2022). "The Impact of Virtual Reality on Tourism Education." Journal of Tourism Research.
6. Wang, C., & Li, D. (2020). "AI-Based Itinerary Planning in Tourism: A Multi-objective Approach." Tourism Economics.
7. Liu, W., & Wu, Y. (2023). "AI and its Integration into Educational Tourism Practices: A Case Study." Smart Learning Environments, 10(1), 5-1