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Reflection on the Application of Virtual Reality in Tourism Education

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Abstract: With the widespread application of virtual reality (VR) technology in tourism education, educators must critically reflect on the ethical issues it raises. This paper analyzes the implementation of VR in tourism education and explores its impact on students' authentic learning experiences. The study examines the practical effects of virtual learning in teaching, offering advanced case studies of VR education and addressing the challenges encountered during its use. Findings suggest that the application of VR in education must prioritize the process-based experience of learners, emphasizing the importance of preserving students' opportunities to engage with educational reality. The study advocates for maintaining the humanistic care found in traditional teaching while reconfiguring new pedagogical practices in integrating technology and education.

Keywords: Tourism Education; VR Classroom; VR Technology Applications.

1. Introduction

In recent years, with the widespread application of intelligent technology in tourism education, virtual reality (VR) has gradually become a key tool for enhancing teaching effectiveness. VR simulates real tourism scenarios (Adams, 2015[1]), allowing students to immerse themselves in virtual environments and experience courses such as hotel management, guided tours, and tea ceremonies. However, as VR technology becomes more prevalent, educators must critically reflect on the ethical issues it presents (Lege & Bonner, 2020[2]), especially regarding the boundaries between virtual and real experiences, the impact of technology on educational agency, and the potential alienation of students' perception of real-world scenarios. Balancing the convenience of technology with ethical guidelines has become an urgent challenge (Slater et al., 2020[3]).

In tourism education, some researchers have referred to this application as "the art of guest-making," aiming to provide students with authentic perceptions through virtual environments, even without real-world settings. This technology enables students to learn experiential in virtual hotels or tourist sites. On the other hand, artificial intelligence has been described as "the art of shaping agency," simulating computer behaviours that appear to have agency in students' eyes, thus enhancing interactivity and teaching effectiveness (Asad et al., 2021[4]).

Virtual reality technology must be applied dialectically between virtual and real spaces. In the face of emerging educational devices and technologies, educators need to critically assess the dual nature of new technologies and balance their positive and negative impacts (Selwyn, 2021[5]). This paper philosophically reflects on the application of VR in tourism education, using Foucault's "power-knowledge" framework to analyse how VR technology shapes power relations and control mechanisms in education through disseminating knowledge. Through this perspective, the paper aims to reveal how VR technology influences students' understanding of tourism and culture, and in the process of integrating technology with education, constructs ethical educational norms that ensure technological empowerment without undermining students' autonomy and engagement with reality, ultimately achieving sustainable educational development.

2. The Practical Effects of VR Education in the Classroom

This case study focuses on the Hotel Management class at Guangdong Institute of Arts and Sciences, where virtual technology is primarily applied to practical courses such as hotel operations management and tea culture with tea ceremony. With the rapid development of information technology, current teaching activities have integrated virtual courses, allowing students to experience course content in an immersive way. This paper summarizes and analyzes some issues discussed in integrating virtual technology into education, including VR education and online education in a VR context, which involves cross-temporal and spatial teaching formats.

2.1. VR Education as an "Experience Enhancer"

The primary advantages of virtual reality (VR) technology lie in its immersive nature and interactive experience (Mütterlein, 2018[6]). In education, the true value of VR does not merely rest in "beautifying" learning materials but in fundamentally transforming traditional learning methods, allowing learners to immerse themselves fully in knowledge transmission. The immense potential of VR education lies in revolutionizing learning models, challenging the traditional "lecture + compliance" approach prevalent in schools, and gradually shifting toward an "experience + reflection" based model. While VR's immersive aspect in education has become prominent, its interactivity still requires further enhancement.

"Experience" refers to fully integrating learners into the virtual environment and enabling them to interact. First, a character projection of the learner must be created in the virtual space. Second, the virtual environment must provide real-time feedback mechanisms based on the learner's actions.

One effective way to enhance the sense of "experience" is by creating a character projection in the virtual space. To achieve this "experiential" interaction level, the virtual avatar should be a vessel for the learner's behaviors, reflecting their movements and gestures in real-time and interacting with the virtual environment and characters.

If virtual avatars can be applied to VR tea culture education, where the learner's actions are mirrored in the VR environment in real time, the sense of immersion will be greatly enhanced. For instance, in the tea-picking process, the learner's virtual avatar can be placed in a mountain tea garden, simulating the precise hand movements needed to pick fresh tea leaves. The environment would respond to the learner's actions, offering feedback such as the speed and pressure of picking and how factors like season and climate affect the quality of the leaves. Paired with the tea-brewing process, the virtual avatar can guide learners through the process, from picking and selecting tea leaves to warming the teacup, washing the tea, and brewing, providing a comprehensive, immersive experience. This allows learners to personally experience the journey from field to teacup, deepening their understanding and appreciation of tea culture.

Additionally, the teacher's actions can be mirrored in the virtual environment. For example, a virtual representation of a renowned tea culture master can be created. As the teacher explains tea-picking techniques or tea-brewing skills, their movements would be reflected in the master's avatar, leading students to experience the essence of tea-picking and brewing. By incorporating virtual avatars into VR tea culture education, learners can interact with virtual tea gardens and tea rooms while engaging in tea-picking, tea-making, and tea-brewing. This approach significantly enhances immersion and engagement, addressing the current gaps in tea culture education's experiential aspect while better conveying the cultural essence of tea ceremonies.

2.2. Bottlenecks Encountered in the Process of VR Teaching

Despite the fact that "VR+Education" organically integrates high technology with teaching, promoting disruptive innovation in teaching models, after real classroom implementation, the author has identified the following issues.

2.2.1. The Negative Effects of Immersive Learning

Currently, some limitations with VR equipment affect its effectiveness in education (Hanson & Shelton, 2008[7]). First, the VR devices available today are generally bulky, and prolonged use can lead to dizziness, fatigue, and other discomforts, negatively impacting student learning experience and outcomes. Second, the content of VR teaching modules is often pre-set, making it difficult for instructors to interact and communicate with students in real time once they enter an immersive learning state. This limits the ability to provide timely guidance and adjustments based on specific issues encountered during experiments or operations, reducing the flexibility and responsiveness of the teaching process.

Furthermore, to enhance the immersive experience, VR modules typically integrate various elements such as text, video, sound effects, and images to create complex virtual scenarios. While these methods help improve the environment's realism, the overabundance of sensory stimuli can distract students (Kaplan-Rakowski et al., 2024[8]), making it harder for them to focus on key learning points and reducing overall teaching efficiency. In the future development of VR education, balancing the immersive experience with students' ability to concentrate will be one of the key challenges in improving VR teaching effectiveness.

2.2.2. High Development Costs and Long Cycles for VR Teaching Module Development

VR + Education," the current challenges primarily lie in the development and widespread application of VR teaching modules. On one hand, VR teaching content needs to be custom-developed based on specific teaching requirements, making it difficult to standardize the content. This limits the scalability of VR applications in Education, significantly increasing development costs. Furthermore, once VR teaching modules are completed, they are challenging to modify. If the teaching content changes, the existing VR modules may lose their educational value, leading to wasted resources and delays in course updates.

On the other hand, developing VR teaching modules heavily relies on complex 3D modeling technology, which often requires considerable time and effort. Additionally, the 3D models used in different VR educational applications are often not shared or reusable, resulting in low utilization of models. This duplication of effort not only extends development timelines but also greatly increases overall costs, reducing the efficiency of resource development. Therefore, improving the flexibility and reusability of VR modules is a pressing issue that must be addressed in the field of "VR + Education.

2.3. VR Hardware is Expensive and Difficult to Operate

Compared to other countries, VR technology in China has developed relatively late and remains somewhat behind in overall advancement. Particularly in the education sector, the high cost of VR hardware has become a significant barrier to its widespread adoption. Many educational institutions find it challenging to afford large-scale implementation of VR equipment due to its high costs. Additionally, VR software systems are still maturing. These systems often lack full functionality and present complex user interfaces, meaning that students typically require the assistance of technical professionals to operate the systems, making it difficult for them to use them independently. This reliance on external technical support further complicates the teaching process and increases the associated costs, greatly hindering the large-scale application of VR technology in education.

For VR to become more widely accessible in the education sector, it is essential to address the issue of hardware costs, streamline the operation processes, and improve the usability of software systems. These improvements would allow students to operate the systems more autonomously, reducing the need for technical support and enhancing VR-based education's overall efficiency and experience.

3. Development Strategies for "VR+ Education"

To address the challenges that have emerged during the development of "VR+Education," a collaborative effort is needed from the government, enterprises, and educational institutions.

3.1. Government Support: Guiding the Development Direction of "VR+ Education"

To promote the sustainable development of "VR+Education," the government should formulate policies from a macro perspective, actively guiding and fostering steady progress in this field. In addressing the current challenges of "VR+Education," the government should establish standardized guidelines, enhance China's influence and leadership in VR technology, and provide clear directions for industry development.

Furthermore, increased investment in the research and development of VR hardware and software is crucial. This includes efforts to reduce production costs while improving the comfort of VR devices and simplifying software operations, ultimately enhancing the overall user experience.

In addition, the government should encourage strong collaborations between VR companies to promote technology sharing and innovation, fostering coordinated development across the industry. To address the current issues of limited resources and redundant construction, the creation of resource-sharing platforms, including vast 3D model libraries, should be a priority. This would help drive economies of scale and facilitate more efficient development. Since constructing resource-sharing platforms is time-consuming and requires substantial investment, it is difficult for a few companies or universities to achieve this alone.

Therefore, the government must organize powerful universities, research institutions, and enterprises to collaborate, driving the integration of data resources, overseeing platform management, and providing subsequent information services. This will provide solid technological and resource support for the long-term development of "VR+Education." This strategic collaboration can ensure that the field develops in a way that maximizes innovation and accessibility while maintaining high educational standards.

3.2. Collaboration between Enterprises and Schools: Building a "VR+Education" Ecosystem

The collaboration between VR enterprises and schools can significantly drive the design and development of VR course resources, transforming high-quality curriculum content into fully virtual experiences and enhancing teaching outcomes. To achieve this, it is essential to encourage educators to participate in developing and producing VR teaching resources actively. Educators should meticulously plan each phase as course designers, from introducing topics and course structure to content delivery, in alignment with the curriculum. As developers of VR courses, enterprises must maintain close communication with educators throughout the development process, addressing technical challenges promptly to ensure that design and development are seamlessly integrated, resulting in high-quality VR course resources.

This partnership between enterprises and schools can establish an integrated model of "industry, academia, research, and application." In this model, schools and enterprises collaborate to develop 3D resource libraries, design VR teaching tools, and explore the diverse applications of VR in education. A healthy interaction between producers and users is created Through mutual reinforcement of production practices and educational practices. This enhances the practical application of VR technology and supports the sustainable and healthy development of "VR+Education" in China. By fostering such collaborations, the VR ecosystem can grow stronger, bridging the gap between technological innovation and educational needs and effectively addressing both.

Conflict of Interest

No conflict of interest between authors.

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