Application and Research of AI-Based Virtual Reality in University English Teaching

Juan Dai
Anhui Institute of Information Technology, Wuhu 241100, China.

Abstract: In the era of rapid information technology development, artificial intelligence (AI) and virtual reality (VR) technologies have gradually infiltrated the field of university English teaching, brought significant applications and impacted to English language learning in listening, speaking, writing, translation, and personalized learning. AI plays a vital role as an auxiliary teaching method in university English instruction, and the integration of VR technology further enhances teaching efficiency. This research will propose relevant recommendations to provide theoretical references for university English education in the age of AI, while also offering insights and guidance to educators in the education industry during the informatization reform of education.

Keywords: Artificial Intelligence; VR Teaching; University English Teaching

1. Introduction

In this era of rapid information technology development, artificial intelligence (AI) is widely applied across various sectors, including its gradual integration into university English teaching, where it plays a significant role in supporting the learning process. This stands in contrast to traditional grammar-translation teaching methods. In conventional English instruction, students passively acquire knowledge from teachers and textbooks, often struggling to see the relevance of what they learn to practical usage. In response to this situation, an increasing number of individuals advocate for English teachers to understand students' needs and create authentic English learning environments.

It is precisely within this context that virtual reality (VR) technology is assuming an increasingly vital role in educational assistance. By employing AI-powered VR teaching, educators can create immersive learning environments for students. Exploiting the advantages of VR's spatial freedom, personalized English teaching can be conducted, and an English teaching system with features characteristic of the information age can be established. This allows students to engage in independent learning, develop their information-processing and logical thinking abilities, and effectively enhance the overall teaching outcomes.

Table 1. The Modernization of Education in the Age of Artificial Intelligence.

Next Generation Artificial Intelligence Development Plan	Higher Education Artificial Intelligence Innovation Action Plan	China Education Modernization 2035	AI and Education Big Data Summit - 2019
In July 2017, the State Council of China issued the "Next Generation Artificial Intelligence Development Plan."	In April 2018, the Ministry of Education released the "Higher Education Artificial Intelligence Innovation Action Plan" and the "20 Action Plan for Educational Informatization."	In February 2019, the Central Committee of the Communist Party of China and the State Council issued the "China Education Modernization 2035."	In August 2019, the "AI and Education Big Data Summit - 2019" was held in Beijing to explore the educational transformation in the era of intelligence.

Note – Source: own development.

2. AI-based VR Technology: Innovative Teaching and Learning

Artificial intelligence (AI) is a technology application system aimed at simulating, studying, and expanding human thinking logic, behaviour patterns, and rules.[1] Over the years, AI has continuously led the development of emerging scientific and technological fields, achieving significant breakthroughs and accomplishments, such as the AlphaGo program and autonomous driving technology.[2]

Virtual reality (VR) technology is a technology that generates realistic 3D images through high-performance computers, encompassing perception in visual, motion, tactile, and auditory aspects. It also involves interactive systems, enabling users to interact with objects in the virtual environment and exercise effective control based on complex individual social attitudes. In such virtual and real environment systems, users can acquire knowledge on a more sensory level and achieve deeper cognitive understanding or comprehension, resulting in unprecedented experiences that stimulate subjective consciousness, encouraging continuous exploration and innovation in practice, eventually leading to a new cognitive leap.

AI-based VR technology combines the strengths of virtual reality and artificial intelligence. It allows individuals to gain a profound sense of self-security when exploring new knowledge in their daily lives. The interactive advantage of this technology lies in providing dynamic, transformative, and interactive effects, allowing users to enjoy visual experiences like 3D movies. Additionally, it can create moments of instant creativity and imagine real-world scenes that do not exist in physical or virtual reality, or scenes that are difficult for individuals to perceive and experience. Particularly in the field of education, the integration of AI-based VR technology with teaching provides learners with a more forward-looking and innovative learning experience. Learners can delve into various new knowledge within the virtual reality environment and gain deeper understanding and cognition. This unprecedented learning experience can spark learners' interests and proactiveness, helping them better comprehend and master the learning content.

Therefore, AI-based VR technology represents an innovative area that combines virtual reality and artificial intelligence, holding significant implications for higher education and teaching.

2.1 Challenges in Higher Education English Teaching

In higher education English teaching, several challenges revolve around course materials, teaching methods, and students' self-directed learning abilities. Firstly, university English course materials are often considered dry and difficult, leading to suboptimal learning outcomes in the classroom. Traditional teaching methods may restrict students' learning experiences and engagement. One way to address this issue is by introducing AI-based educational products that offer diverse learning content and utilize human-computer speech and interaction systems to create virtual reality scenarios, enhancing the appeal and interest of the learning process.[3]

Secondly, although teachers attempt to improve students' English expression and communication skills using multimedia and other supportive tools, students' self-directed learning abilities are lacking. Some students lack effective self-management skills, impacting the effectiveness of classroom teaching. Some may not adequately prepare before class or review after, leading to insufficient understanding of the material being taught, hindering active participation in classroom discussions and interactions. This poses a challenge for teachers as they need to spend more time explaining basic concepts, disrupting the planned course progression. Simultaneously, it also hampers students' ability to complete learning tasks on time and with depth, ultimately affecting academic performance and learning outcomes. Moreover, the lack of self-directed learning abilities may trigger learning anxiety and negative emotions in some students. They may feel confused and helpless, developing aversion towards English learning, consequently affecting overall motivation and interest in learning.

These challenges underscore the need to foster students' initiative and self-directed learning abilities to meet the requirements of modern education. As such, it is essential to explore effective teaching methods and learning guidance within the education system, guiding students to develop a positive learning attitude and enhance their abilities for self-directed learning and self-management.

2.2 Integration and Development of AI+VR Technology in English Teaching

Artificial Intelligence (AI) holds vast potential for applications in the field of education, particularly in English teaching. AI technologies such as language recognition, speech synthesis analysis systems, image and video recognition, automatic translation systems, and language comprehension have been successfully applied to English instruction. Leveraging AI in English teaching effectively transforms the traditional input and output methods of language learning, encouraging students to engage in self-directed

English language learning. It provides students with diverse learning resources and experiences, igniting their interest and fostering proactive learning attitudes. Moreover, it facilitates communication and interaction between students and teachers, breaking away from conventional teaching methods.[4]

1. Personalized Learning Experience: AI technology can offer personalized learning content and pathways based on students' learning progress, interests, and styles. Combined with VR technology, students can immerse themselves in virtual learning environments, engaging in real interactions with English contexts, which enhances their motivation and proactiveness in learning.

2. Integration of Practice and Experience: AI+VR technology enables English learning to transcend traditional paper materials and listening exercises, allowing students to practice language skills in realistic virtual scenarios. For instance, students can simulate everyday conversations, business negotiations, or tourist guiding in the virtual environment, thereby enhancing their practical language application.

3. Expanding Interdisciplinary Boundaries: AI+VR technology integrates English teaching with other subjects, creating opportunities for interdisciplinary learning. For example, through VR technology, students can virtually visit historical sites abroad, learn about local history and culture, and communicate in English, broadening their understanding of history and culture.

Overall, the integration of AI+VR technology in English teaching holds promising prospects for higher education. By fully leveraging these advanced technologies, teaching methods can be improved, students' learning motivation and outcomes can be enhanced, and English talents with stronger practical abilities can be nurtured. This contributes to the construction of a more open and diverse international learning environment. However, concerted efforts from society are necessary to provide support and guidance for the continued healthy development of AI+VR technology in education.

3. Conclusion

With the rapid development of information technology, educational reform has become a focal point of society. In this context, informatized teaching has become an inevitable trend, and higher education English teaching is undergoing a series of reforms to adapt to modern life and society. The application of artificial intelligence virtual reality technology in higher education English teaching is an innovative step that has made significant contributions to the development of English majors. Teachers play a crucial role in this process, combining artificial intelligence and virtual reality technology to create three-dimensional teaching scenarios, adopting contextualized, task-based, and layered teaching methods, stimulating students' learning motivation, promoting their comprehensive growth, and improving English learning efficiency. The integration of artificial intelligence and virtual reality technology brings new possibilities and vitality to English education, providing strong support for cultivating comprehensive English talents.

References

[1] Feng, JF. (2020). The Impact of Artificial Intelligence on University English Education. Heilongjiang Education (Theory and Practice), (7), 85-86.

[2] Liu, B. (2021). Analysis of the Application of Artificial Intelligence in Vocational College English Teaching under the Information Environment. Times of Fortune, (9), 184-184.

[3] Huang, WJ. (2021). The Impact of Artificial Intelligence on University English Education. Overseas English, (5), 106-107.

[4] Gao, XQ. (2021). An Exploration of the Influence of Artificial Intelligence Education Products on University English Teaching. Overseas English, (6), 111-112.

[5] Zeng, FY., & Liu, YX. (2020). Research on English Education in the Context of Artificial Intelligence. Vision of Science and Technology, (12), 81-87.

*corresponding author: Juan Dai