



Research on the Application of Virtual Simulation Technology in ESP Oral English Teaching in Universities

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Abstract. To adapt to the development of education in an intelligent environment and fully harness the impact of the information technology revolution on foreign language teaching, this study has conducted a new exploration of the ESP oral English teaching mode under the empowerment of virtual reality (VR). VR technology can highly simulate scenarios, integrate massive resources, greatly overcome the limitations of traditional classroom conditions, and create visual, comprehensive and immersive experiential scenes for English learners, effectively meeting the environmental requirements of ESP oral English learning. By constructing virtual simulation scenarios, this paper innovates the current oral English teaching mode from the aspects of teaching process, teaching methods, and teaching materials. This research not only promotes the deep integration of big data and foreign language education but also provides a new case study for oral English teaching and learning research in the era of artificial intelligence.

Keywords: VR Technology; Oral English Teaching; Immersive Learning.

1 Introduction

At the 2023 World Digital Education Conference, Wu Yan, Deputy Minister of Education of China, emphasized: "Digital technology, represented by artificial intelligence, is changing traditional educational concepts and paradigms and reshaping the form of higher education, which has become a global consensus¹". In November 2020, The Ministry of Education issued the "New Liberal Arts Construction Declaration," marking a new phase of comprehensive implementation of the New Liberal Arts construction in Chinese higher education institutions². In the new context of the development of "smart education," artificial intelligence, 5G, and virtual simulation (VR) technologies are gradually being widely applied in the field of higher education, especially in various practical and skills-based courses, including English teaching (Li Ying, 2020)³. Among them, VR technology, combining computer graphics, somatosensory sensing, visual imaging, and other technologies, can create rich contextual language environments, providing learners with immersive experiences (Blyth, 2018)⁴. As a new type of perceptual medium, VR plays an important role in promoting language learners' knowledge construction and interactive communication (Shih, 2014)⁵, attracting significant attention in the English language learning community. By utilizing VR and other

technologies, highly realistic virtual experimental environments and objects can be constructed, achieving teaching functions that traditional classrooms lack or find challenging to fulfill. Supported by 5G communication technology, the integration of on-site and remote teaching explores new blended teaching models that combine online and offline learning.

This study comprehensively analyzes the differences between real-life oral scenarios and traditional teaching models. Addressing the existing issues, a virtual simulation immersive contextual teaching model is constructed to enhance existing ESP oral English teaching from three aspects: teaching process, teaching methods, and teaching materials. This improvement aims to help enhance students' oral practical application abilities in simulated scenarios.

2 Literature Review

The language education expert Krashen⁶ proposed Monitor Theory, which includes five main aspects: the hypotheses of language acquisition, the affective filter hypothesis, the monitor hypothesis, the input hypothesis and the natural order hypothesis. Among these, the hypothesis of language acquisition focuses on identifying two inconsistent elements in second language learning: "acquisition" and "learning." "Acquisition" is a form of immersive education similar to the development of native language proficiency, where language learners absorb and master the language through practice and communication in the external environment without conscious awareness. In contrast to language "acquisition," language "learning" emphasizes the learner's subjective consciousness and advocates mastering language through analyzing language phenomena and explaining grammar rules.

VR technology, based on interactivity and immersion, emphasizes practical training in language environments that are very similar to reality, thereby achieving the purpose of information interaction and transmission. The characteristics of VR technology align with Krashen's theory of second language acquisition, both embodying a "practical" nature. This characteristic coincides with the practical emphasis in ESP teaching on cultivating students' skills in listening and speaking

Currently, the applications of VR in the field of language teaching research primarily include language proficiency development based on VR technology and the impact of virtual environments on learner characteristics (Zheng Chunping, 2019)⁷. In terms of language proficiency development, Wang (2017)⁸ explored the impact of VR technology on second language writing concerning discourse content, discourse structure and pragmatic expressions, proposing a VR experiential writing teaching mode. Criolloc (2024)⁹ utilized VR technology to help students understand abstract concepts and strengthen their learning motivation. Zhang Yijun (2021)¹⁰ designed a situational English interpretation practice teaching model based on the cognitive abilities, on-the-spot abilities, and adaptability of interpreting learners from the dimensions of context, discourse and scenario. Chen (2022)¹¹ discussed how to use VR technology to enhance student learning efficiency. Regarding the impact of virtual environments on learner

characteristics, Li Ying (2021)¹² explored the path of foreign language teaching contexts from an embodied cognition perspective, aiming to enhance learners' autonomy and innovative thinking. Zheng Chunping et al. (2021)¹³ discussed the role of VR's immediacy, openness and interactivity in learning engagement.

3 The Main Features of VR Technology in English Oral Teaching

The characteristics of VR technology include interactivity, immersion, ideation, and sociality. Using VR technology in English oral teaching at universities can provide students with a more vivid virtual environment.

3.1 Interactivity

Interactivity means that students can autonomously operate learning content using VR technology during oral English learning. The virtual reality spaces create a conducive environment for students who can engage in oral communication and interaction using English. Through interaction, students experience different roles and create a positive learning atmosphere. After completing the learning session, VR technology can provide real-time feedback on learning outcomes. This forms a closed-loop cycle of practice through "communication-feedback-improvement-recommunication," leading to iterative improvements in learning effectiveness.

3.2 Immersion

Integrating VR technology into oral English teaching allows students to be fully immersed in the English context. Students must focus entirely on the oral training and experience a feeling similar to real-life situations during learning. For example, creating simulated scenarios suitable for business negotiations in business English oral courses, such as conference rooms, exhibition halls, and offices, immerses students in virtual reality settings to practice oral skills. This approach effectively helps students avoid feelings of difficulty in real-life scenarios, enhancing their ability to fluently handle various business situations and develop psychological resilience.

3.3 Ideation

The three-dimensional experiences created by VR technology can help students stimulate their imagination fully and better understand the knowledge. As a tool for communication, English inevitably involves content from other disciplines. For instance, it is challenging to present abstract descriptions like bearing structures in mechanical English or the structure of high-speed train compartments and business negotiations in traditional classrooms in a tangible visual format. VR technology can create fully immersive three-dimensional spaces, providing students with real experiences. By replicating

real scenes through VR technology and adding content not accessible in daily life, students can grasp the difficult points of learning, polish and enhance their oral skills within this atmosphere, ultimately improving learning outcomes.

3.4 Sociality

University students learn English oral skills to adapt to future job positions, often involving professional English in teaching. Using VR technology can help build virtual workplace environments for students, allowing them to gain work experience in situational contexts, practice interactive communication with roles related to social work, master essential language points and enhance their communication skills. This preparation enables students to smoothly apply their knowledge to future job positions.

4 The Immersive Situational Teaching Model Empowered by VR

4.1 Constructing the Fundamental Principles and Platform Development for Immersive Learning Experiences

The technologies of VR in English oral language mainly include eye tracking systems, VR virtual scene construction, AI dialogue and speech recognition systems, creating virtual oral training scenarios. This allows students to interact and communicate with AI, thereby enhancing students' oral skills. The system records students' subconscious actions and corresponding psychological characteristics during the process, improving students' oral and social skills from multiple perspectives. Using VR's eye tracking system, it recognizes and records students' viewpoint shifts and dwell times during virtual oral simulations, and aggregates data to form heat maps. This facilitates post-simulation analysis of students' psychological and behavioral aspects based on the heat maps. With AI technology, speech recognition is employed to select conversation scenarios based on keywords from students' oral expressions, record spoken content, convert it to text and assess students' actual oral proficiency.

The virtual simulation system reproduces various language environments and language usage scenarios, creating sudden events to help students enhance their oral skills. The training platform utilizes 720° stereoscopic virtual reality scenes constructed with virtual simulation technology, featuring common work scenarios such as business negotiations, product launches and product development, recreating the contextual settings of these scenarios. Teachers can also capture panoramic photos and videos on-site with customer consent for creating experimental projects, providing students with completely realistic experiences.

Teachers, in collaboration with the teaching environment created by VR, depart from the traditional rote-learning classroom, ensuring timeliness and innovation in learning for the students, offering opportunities to acquire cutting-edge knowledge. Highly matched teaching conditions can greatly enhance teaching effectiveness. Utilizing VR

technology to create 360° fully immersive simulated learning environments not only improves students' comprehensive literacy but also enhances teaching quality.

4.2 Innovating the ESP Practical Teaching System with VR Technology

Teaching content is the main source for students to acquire knowledge, skills and abilities. Each English teaching course may seem independent, but integrating the knowledge learned in the actual application process is essential to achieve educational goals and needs. Multimedia virtual reality will fundamentally change the external form and internal structure of teaching. Specific practical course is often interdisciplinary, integrating and applying knowledge from various disciplines. In traditional practical teaching, students usually rely on practical guidebooks to complete their training step by step. Generally, they cannot deeply understand the knowledge involved in practice, especially when faced with difficult issues, particularly those related to other courses, they are unable to take measures to solve the problems. Virtual reality systems can use computers to provide information such as images, graphics, audio, video, animations, etc., to help students analyze problems. For abstract phenomena and principles, utilizing virtual reality technology enriches students' imagination, exploring and researching relevant practical content.

The traditional practice of teaching content largely depends on the teacher's teaching methods. Inherent teaching methods limit the imparting of knowledge by teachers and the learning of students. VR technology integrates teaching methods based on people's cognitive characteristics to display teaching content. It reflects the diversity of knowledge-related information forms and content, providing students with a dynamic system. Teachers use VR technology to make accurate and objective assessments of students' actual English proficiency, providing tailored teaching guidance for students with varying levels of English proficiency. The specific operational methods are as follows: first, utilizing big data analysis of students' online English learning information to comprehensively understand students' English learning situations in virtual scenes, objectively grasp students' learning levels, and based on students' individual situations, collaborate with corresponding enterprises to enhance their practical skills; second, after determining students' learning levels, teachers input detailed information into the teaching system. This system allows students to enhance their English proficiency through online and self-assessment. Third, in the discourse analysis and index calculation section, teachers analyze and evaluate students' subjective indicators to systematically understand students' grasp of ESP knowledge and the completion of practical operational tasks during training. In response to the above situations, teachers use Virtual Reality technology to simulate teaching scenarios and enhance students' oral English proficiency.

After students complete their training, the nested secondary evaluation and formative assessment data cloud platform embedded in the system will utilize speech evaluation, speech recognition, and semantic understanding technologies to multidimensionally and accurately evaluate the accuracy, fluency and completeness of students' ESP oral skills. By referencing the original text and translation in the training materials, an

initial assessment of students' training effectiveness will be conducted, recording students' learning trajectories to provide reference for teachers' secondary evaluations and improve evaluation efficiency.

5 Conclusion

Integrating VR technology into English oral teaching is a new teaching model that combines modern information technology with specialized English teaching. This model aligns with the requirements of cultivating new liberal arts talents, not only contributing to the improvement of course teaching but also promoting the development of students' comprehensive qualities. This article focuses on VR technology, advocating for the effective integration of modern artificial intelligence and information technology into professional English courses, continuously transforming teaching methods, and establishing a productive practical teaching platform as an effective way to enhance the professional English teaching.

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