

New Developments and Challenges of Immersion English Teaching Method under the Background of 5G Era

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[**Abstract**] With the support of 5G and the rapid development of information technology, virtual reality technology has attracted attention from all walks of life. English education and research have also given it significant attention. The development of information technology in the 5G era has brought new development to education research. The integration of virtual reality into the educational domain has emerged as a prevalent trend, revolutionizing immersion teaching methodologies through the introduction of a novel approach that surpasses the sole reliance on language utilization. At the same time, in conjunction with English language teaching, the immersion approach also poses a number of challenges such as technical aspects of network connectivity, hardware and software development, data security and privacy protection. The challenge at the teacher level means that teachers should have strong professional knowledge and ability, and the quality of operating virtual technology equipment. The challenges for students are that this new immersion teaching requires them to adapt to the new learning style, and have a high degree of autonomy and a strong ability to withstand pressure. Finally, this paper puts forward some countermeasures for these challenges.

[**Key words**] immersion teaching; 5G; virtual simulation; English teaching; developments; challenges

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1 Introduction

Currently, the phenomenon of teacher-centered, rote and rigid instructional methods still exists in China's English education. In the field of English teaching, contextualization has always been emphasized. According to this point of view, teachers need to create a real language environment for students and assign teaching tasks that conform to the real situation of students. The concept of immersion teaching aligns harmoniously with these principles, and consequently it is also popular in the field of foreign language teaching. In the past, immersion English teaching in China mainly controlled the proportion of English and Chinese to achieve partial immersion and complete immersion. This kind of teaching did achieve certain teaching effects, but its effectiveness gradually diminished over time. In recent years, with the development of information technology, especially 5G and virtual reality technology, immersion teaching method has achieved new development at the technical level. Through virtual reality technology, a more comprehensive immersion experience can be achieved while some challenges occur.

2 Overview of immersion teaching methodology

Originally stemming from French education in Canada, immersion teaching emerged within the context of a bilingual population where approximately one-third of them are proficient in both French and English. In Quebec, Canada, a group of English-speaking parents advocated for the establishment of the first bilingual school in the suburbs of Montreal, recognizing the importance of French proficiency for societal integration and success within the

country. Immersion teaching involves the utilization of a second language as the primary medium of instruction to impart knowledge of diverse subject areas and cultural contexts. Within the Canadian immersion model, subject teachers deliver instruction in French as the second language, enabling students to acquire content knowledge through this linguistic medium. Immersion teaching is further delineated into partial immersion where the second language constitutes 50% of classroom discourse, and total immersion where the second language usage reaches 100%, depending on the proportion of second language usage. Moreover, immersion teaching is classified into early, middle, and late immersion based on the timing of students' exposure to the immersion environment, typically occurring in preschool or early elementary years, later elementary grades, and middle or high school levels, respectively. Originating in Canada, immersion teaching garnered international attention following its success in foreign language education, attracting educators from various countries interested in adopting this innovative instructional approach.

3 New developments of immersion English teaching

In recent years, the rapid development of 5G and information technologies represented by virtual simulation has brought about unprecedented changes to people's production and living. The combination of 5G and virtual simulation technology also accelerates the information dissemination, and people are immersed in the ocean of knowledge. At the same time, 5G has been widely used in the field of education, and China also attaches great importance to the application of science and technology in the field of education. China recognized a total of 401 national virtual simulation experimental teaching centers in 2017 and 2018, and has built a national virtual simulation experimental teaching project sharing platform. The common trend of 5G, virtual simulation technology and education is immersion. In the 5G era, our immersion teaching has thus achieved new developments.

Immersion teaching achieves a comprehensive new immersion at technical level. New developments here mainly refer to the ability to provide technical support for immersion teaching, and to create a teaching scenario that is almost identical to the real world for English learners through virtual simulation technology, so that learners can truly immerse themselves in learning English. At the same time, learners are provided with opportunities for multi-modal language input and output, allowing them to achieve full immersion in body and mind and enjoy the fun of learning English. This kind of immersion teaching is no longer simply relying on the proportion of English-Chinese usage.

According to the classification of virtual simulation technology, the classification of our immersion teaching has also changed. Virtual simulation technology can be divided into: (1) Desktop virtual simulation, which relies on a computer screen to present a three-dimensional virtual environment and uses a mouse, handle, etc. to interact; (2) Immersive virtual simulation, in which users wear immersive output devices such as helmets to isolate their vision and hearing from outside world and immerse themselves in the virtual environment; (3) Distributed virtual simulation, which connects distributed virtual simulation systems through a network, allowing participants to interact freely and collaborate. Corresponding to the three immersive technologies, our immersion teaching can be divided into semi-immersion, cooperative immersion, and full immersion. Semi-immersion teaching refers to the creation of a three-dimensional virtual learning environment for learners simply by relying on a computer screen, on which learners conduct semi-immersion learning based on the materials presented; cooperative immersion teaching refers to learners wearing related devices cooperate with teachers, peers, or virtual robots to complete immersion learning activities and learn relevant knowledge in the activities in a virtual learning context; fully immersion teaching refers to learners learning freely in a context created by a virtual simulation system that is infinitely close to the real world, and conducting real-world, scenario-based communication with native English speakers. Among them, fully immersion teaching can leave a deep impression on students and stimulate their interest in learning.

4 Challenges of immersion English teaching

The above development trends are generalizations and summaries made on the basis of the theoretical research on English open classes in high schools, and reflections on the specific practical aspects of English open classes in

high schools are described here.

4.1 Technical challenges

The issue of network connectivity poses a significant challenge. In 5G era, achieving comprehensive immersion teaching through virtual simulation technology requires real-time, high-quality audio and video transmission, thus demanding extremely high stability and speed of network connectivity. However, the construction of 5G network broadband in primary and secondary schools in China is still in the development stage. Many schools have inadequate network infrastructure. Once there is a network disruption during class, immersion teaching will be interrupted, leading to the inability to conduct courses normally, which will affect the quality of teaching and students' learning experience.

On the other hand, the teaching environment required by immersion teaching needs to be highly interactive and responsive, which places high demands on the design of software and hardware for virtual simulation technology. Firstly, the software must possess excellent stability and fluency, which is the basis for accurately simulating a real-life language environment. Through precise simulation, the software can create an immersive learning experience for users, making them feel as if they are in a real-life language environment, thereby enabling them to more deeply understand and grasp language knowledge. Stable and smooth software not only helps to improve learning outcomes, but also enhances users' motivation and interest in learning, providing powerful support for their language learning journey. Secondly, the hardware must possess high efficiency and precision, ensuring that it can stably support large-scale data processing tasks and quickly and accurately complete data transmission. This requirement is crucial for modern teaching systems, especially in immersion English teaching, as it concerns the smoothness of the learning experience and the improvement of teaching quality. Therefore, choosing hardware equipment that can meet these demands is crucial for achieving high-quality immersion English teaching. At the same time, the cost of developing and updating this technology and equipment is too expensive, and most schools and institutions cannot afford it.

Moreover, in the technical practice of immersion English teaching, data security and privacy protection pose a challenge at the technical level. Data security and privacy protection occupy a pivotal position, as sensitive data such as students' personal information, learning progress, and grade records are frequently collected and deeply processed during the immersion teaching process. The data are not only related to students' personal privacy rights, but also serve as an important basis for school teaching management. Therefore, how to ensure the secure storage and legitimate use of the data, and avoid unauthorized access and leakage, has become an unavoidable and important issue for schools and institutions in promoting immersion English teaching.

4.2 Challenges for teachers

Firstly, there are challenges in teaching methods. Immersion teaching requires teachers to break away from the traditional lecture-based teaching model and guide students to actively participate and experience by designing diverse and enriching practical activities and scenarios. This necessitates teachers to possess strong teaching design capabilities, enabling them to create teaching activities that are both aligned with teaching objectives and appealing based on students' actual needs and interests. Additionally, teachers need to flexibly adjust teaching strategies to cater to different students' learning styles and paces.

Secondly, there are challenges in the application of technology. Immersion teaching often relies on advanced technological means, such as virtual reality and augmented reality, to create realistic learning environments. However, the use of these technologies may be a new field for teachers, requiring them to invest a significant amount of time and effort in learning and mastering them. Additionally, teachers need to keep up with technological updates and upgrades to ensure the smooth progress of the teaching process.

Thirdly, there are challenges arising from individual differences among students. In immersion teaching, students' participation and learning outcomes are often influenced by factors such as personal interests and learning

abilities. Therefore, teachers need to fully understand the characteristics of each student and provide personalized guidance and support. At the same time, teachers also need to handle differences and conflicts among students effectively to ensure the harmony and efficiency of the teaching process.

Lastly, there are challenges related to teachers' own professional development. Immersion teaching poses higher requirements for teachers' professional literacy and teaching abilities. Teachers need to continuously update their knowledge systems and enhance their abilities in areas such as teaching design and technological application. Simultaneously, they must keep tabs on educational reform and developmental trends to adapt to evolving teaching needs.

4.3 Challenges for students

Firstly, adapting to a new learning style poses a significant challenge. Immersion teaching emphasizes learning through practice and experience in actual environments, which differs greatly from the traditional learning style that focuses primarily on listening and memorization. Students need to gradually adapt to this new learning style and learn to actively explore and identify problems, and solve them in real or simulated scenarios. It may take some time for students to adjust to and be psychologically prepared for the transition.

Secondly, improving self-management skills also poses a challenge. In immersion teaching, students are often required to have a higher level of autonomy and independence. They need to plan their own learning progress, schedule their study time, and learn to engage in learning and exploration without direct guidance from teachers. This necessitates strong self-management skills on the part of students, enabling them to arrange their time effectively, control the pace of learning, and evaluate and adjust their learning outcomes accordingly.

Furthermore, coping with academic pressure is also one of the challenges facing students. Immersion teaching often places a stronger emphasis on practice and application, resulting in higher expectations and demands for students. Students may encounter greater learning pressure and need to work harder in their studies and practical applications to achieve the desired learning outcomes. Additionally, students need to learn how to handle setbacks and difficulties in their learning, maintaining a positive attitude and mindset throughout the process.

5 Main solutions

5.1 Solutions at the technical level

To solve network connectivity, the following measures are taken. First, the network environment can be optimized to ensure that the teaching place has a stable and high-speed network connection; conduct regular maintenance and inspection of network equipment to ensure its normal operation; if possible, use a wired network connection instead of a wireless connection to reduce signal interference and instability. Second, improve the performance of network equipment; use high-performance routers, switches and other network equipment to support the stable connection of a large number of devices, providing adequate bandwidth and priority for critical equipment according to teaching needs. Third, establish a backup network plan: prepare a backup network connection plan, such as the use of mobile data networks or backup broadband lines, in case of a primary network failure; configure an automatic switching mechanism to ensure rapid switching to the standby network in the event of a network failure. Fourth, network traffic management: implement network traffic management strategies to limit non-teaching related network activities and ensure network bandwidth is used for teaching. During peak hours, network traffic restrictions or prioritization can be implemented to ensure smooth operation of critical instructional applications.

Solutions to technical challenges of software and hardware are as follows. In terms of software, it is necessary for developers to optimize the algorithm and architecture, as well as the running speed, thereby ensuring the smooth process of immersion teaching. In addition, research and development personnel should develop a variety of teaching resources, and regularly update the relevant content of the resource library, making education and teaching keep pace with the times. In terms of hardware, improve hardware performance: select high-performance processor, graphics card, memory and other hardware configurations to ensure that it can support the smooth

operation of immersion teaching; optimize the design of hardware heat dissipation and power consumption to ensure long-term stability and reliability of the device. Improve device experience: A high-resolution, wide-angle display provides a more realistic visual experience. High-quality audio devices, such as stereo headphones or speakers, provide an immersive listening experience. Enhance device portability: Design lightweight, easy-to-carry hardware devices for students to engage in immersion learning in different settings.

The high cost of hardware and software upgrading can be solved from the following aspects. First, the government can provide corresponding financial support to schools: for example, the government or relevant educational institutions can set up special funds to subsidize the cost of immersion teaching equipment for schools or educational institutions to reduce their economic pressure. Or tax relief: For schools or institutions that invest in the upgrading of immersion teaching equipment, the government can establish certain tax relief policies to encourage them to increase investment. Secondly, through school-enterprise cooperation, resources can be shared and costs can be reduced. Schools can partner with companies to jointly develop or purchase immersion teaching equipment. Third, multiple schools or institutions can establish an equipment sharing mechanism to reduce the cost of purchasing equipment for a single unit by using it in turn or renting it.

The data security and privacy protection can be solved from the following aspects. First, strengthen technical guarantee: adopt advanced technical means, such as data encryption, access control, etc., to ensure the security of student data in storage, transmission and processing. At the same time, a sound data backup and recovery mechanism should be established to prevent data loss or disclosure caused by equipment failure or human factors. Second, the relevant departments should improve the management system, formulate a strict data management system, clarify the process of data collection, storage, use and destruction, and standardize the behavior of data managers. At the same time, strengthen the training of data management personnel, and improve their data security awareness and skill level, thereby ensuring that they can effectively implement the data management system. Third, strengthen the education of students' awareness of privacy protection: educate students on the awareness of privacy protection, so that they can understand the importance of personal privacy and know how to protect their personal information. Educate students not to leak personal information at will when using immersion teaching equipment, not to believe the requests of strangers, and avoid risks such as online fraud. Fourth, relevant government departments should strengthen supervision and law enforcement. Establish a sound regulatory mechanism to conduct supervisory inspections on educational institutions for data security and privacy protection, ensuring the compliance with relevant laws, regulations, and industry standards. For violations of data security and privacy protection regulations, penalties should be imposed in accordance with the law to serve as a warning and deterrent.

5.2 Solutions at the teacher level

Challenges at the teacher level are relatively complex. First, teachers' professional skills and literacy should be improved. Schools can carry out regular training on immersion teaching, so that teachers can be familiar with and master the concepts, methods and skills of immersion teaching. Second, teachers should maintain an open and positive attitude, constantly update their teaching knowledge and skills, and adhere to lifelong learning. Third, teachers should innovate in teaching methods and strategies: according to the age, interest and cognitive level of students, design diversified immersion teaching activities and tasks to stimulate students' interest in learning and participation. At the same time, pay attention to the individual differences of students, and provide appropriate learning support and challenges for each. Fourth, schools should establish effective evaluation and feedback mechanisms: formulate scientific evaluation standards and methods to conduct objective and comprehensive evaluation of the effect of immersion teaching. Schools can timely collect and analyze students' feedback to understand the advantages and disadvantages of teachers in the teaching process, and provide targeted suggestions for improvement. Finally, exchanges and cooperation between teachers should be strengthened: establish a teacher exchange platform to encourage teachers to share their experience and knowledge of immersion teaching, and learn

from each other. Teachers can conduct collective lesson preparation and teaching and research activities, jointly study and solve problems encountered in teaching, and improve the overall teaching level.

5.3 Solutions at the student level

The main solutions to the challenges encountered by students are as follows. First, improve students' learning adaptability. For example, students can be trained for adaptation: before the formal implementation of immersion teaching, students can be trained for necessary adaptation to help them get familiar with the virtual environment and master basic operation skills. Second, provide students with learning support: for students who encounter difficulties in immersion teaching, teachers should provide timely learning support, such as one-to-one tutoring, group discussion, etc., to help them overcome learning disabilities. Moreover, immersion teaching poses higher requirements for students' autonomous learning ability, innovative thinking, and adaptability. Therefore, English teachers should not only focus on the transmission of knowledge but also pay attention to students' learning process. Through guidance and encouragement, teachers should help students gradually adapt to this new teaching method, stimulate their subjective initiative, and promote the realization of meaningful immersion learning. Third, optimize the teaching design and content, provide personalized teaching for students, enhance the interaction and interest of teaching, and stimulate students' interest in learning. Fourth, pay attention to students' mental health. Conduct psychological assessment: before the start of immersion teaching, psychological assessment should be conducted for students to understand their psychological state and adaptability, so as to provide targeted support; provide psychological counseling: For students with anxiety, pressure and other psychological problems in immersion teaching, the school should provide psychological counseling services to help them relieve pressure and maintain a good state of mind.

6 Conclusion

With the rapid development of 5G information technology and the deep integration of virtual simulation technology with education, not only has the path of education and teaching been broadened, but also new vitality and immersive experiences have been injected into immersion teaching. However, this novel teaching method also brings a series of challenges. We should carefully select the depth and breadth of immersion teaching based on our own practical conditions, students' needs, and objective factors, ensuring that it enhances teaching effectiveness while not causing undue learning pressure on students.

In conclusion, although immersion teaching brings many challenges, as long as teachers continuously enhance their abilities and pay attention to students' actual needs and learning characteristics, these difficulties can be addressed and immersive immersion can be enabled to exert greater teaching value.

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