The Application of Virtual Reality Technology in Building Immersive Foreign Language Teaching Environment

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ABSTRACT

Virtual reality technology can be used to introduce real pragmatic and intercultural communication situations to foreign language teaching class and create immersive foreign language teaching environment. In this environment, students' autonomous learning ability and intercultural communication competence can be improved, and the sharing of foreign language teaching resources can be maximized.

INTRODUCTION

The rapid development of computer and network technology has brought mankind into a new era. In recent years, “Virtual Reality” (VR) has been a hot topic in various industries and educational institutions, the application of which is enjoying explosive growth. The Ministry of Industry and Information released the “White Paper of Virtual Reality Industry” in 2016 shows that total value of the Chinese virtual reality industry market was 15.4 billion yuan in 2015 and is expected to reach 56.6 billion in 2016 and exceed 55 billion yuan in 2020. Thus, 2016 is known as the “First Year of VR Era”. [1] For this statement, Professor Zhou Mingquan, vice chairman of China Virtual Reality and Industrial Alliance and the executive director of the Virtual Reality Application Engineering Centre of Ministry of Education said that “First Year of VR Era”, this statement does not mean the birth of VR technology, and is to illustrate the virtual reality has won widespread attention and set off a climax in its development. [2] In fact, the VR technology education application means a series of optimization and changes of traditional teaching concepts and teaching methods.

In this study, the VR technology, its three characteristics, the development process and its teaching application basis are discussed. The VR technology can be used to construct the immersive foreign language teaching environment: to promote students’ grammar, discourse and cross cultural communication ability and realize the optimized sharing of foreign language teaching resources.
THREE CHARACTERISTICS OF VIRTUAL REALITY TECHNOLOGY AND ITS DEVELOPMENT AT HOME AND ABROAD

Virtual Reality (VR), born at the end of 1980s, also called as “Virtual Speculation”, is a computer system that can create and experience a virtual world. It uses 3D graphics generation technology, multi-sensor technology Interactive technology and high-resolution display technology to generate three-dimensional and realistic virtual environment. As long as the user wears special helmets, data gloves and other sensing devices, or uses the keyboard, mouse and other input devices, he or she can enter the virtual space, realize the perception and operation a variety of objects in the virtual world and get immersive feelings and experience. [3]

Three Characteristics of Virtual Reality Technology

Burdea and Coiffet (1992) summarized the important characteristics of virtual reality as “3I”s, namely “Immersion, Interaction and Imagination”. [4]

Immersion: refers to realistic and immersive feeling. Users, by using special input/ output devices can have natural interaction with the virtual world. VR technology can provide users with visual, auditory, tactile and other sensory simulation, by which the user can seemingly experience the real situation.

Interaction: refers to the user perception and operating environment. The traditional human-computer interaction realizes through human’s interaction with the computer through the mouse and keyboard, while the interaction of virtual reality is achieved in the most natural way through the sensor and the virtual environment. The user experiences the operation of objects within the virtual environment, as in a real environment.

Imagination: also refers to the creativity, means the user can interact with the objects in in the virtual environment through associative, logical deduction and other thinking process, at last possess the ability to imagine the future. The creation of the virtual environment is also imagined by the designer, it may be a real reproduction of real image or the result of their own imagination.

Figure 1. The three “I”s of virtual reality technology.
The Development of Virtual Reality Technology at Home and Abroad

VR technology was proposed by Jaron Lanier, the founder of VPL Exploration Inc. in as early as the mid-20th century. And later NASA’s Ames Space Centre, by use of popular LCD TV and other equipment, began to develop low cost virtual reality system, and promoted the progress of the technology hardware. At present, the basic research of United States in the field focused on four areas: the perception, user interface, background software and hardware. NASA has now established the spacecraft, satellite maintenance VR training system and space station VR training system, and has established a VR education system for national use.

The UK is leading in some aspects of VR development, particularly in distributed parallel processing, ancillary equipment (including tactile feedback) design and application research, especially in Europe. There are four major centres in the United Kingdom that are engaged in VR technology research. Japan is mainly committed to the establishment of large-scale VR knowledge base of research and also plays a leading role in the virtual reality of the game. China has also attached great importance to the application of VR technology education, the Ministry of Education has approved 300 national virtual simulation experimental teaching centre until 2016. Recently, the Popularization Department of China Science and Technology Association announced the construction of 35 virtual reality science and technology museums.

THEORETICAL BASIS OF APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN FOREIGN LANGUAGE TEACHING

The theory of constructivism is one of the most commonly used theories in foreign language teaching. Constructivism argues that learning is the process of constructing internal mental representations, and that learners do not move knowledge from outside to memory, but construct new understandings based on existing experience and interaction with the outside world. The meaning construction is occurred in a certain context i.e. the social and cultural context, with the help of other people, which advocates student-cantered approach, respects students’ learning needs and emphasize self-learning and creative learning. Scenario, writing, discourse and meaning construction are four factors of the learning environment, and the situation is the most critical external factors.

In the traditional foreign language teaching, the teacher often cannot provide meaningful, naturally rich foreign language learning environment. The advantage of VR technology can improve the shortcomings of traditional teaching, which is the reason why VR technology is used to construct immersive language teaching environment. Through the reproduction of the real communicative scene, VR technology can provide immersive cultural learning environment for the second language learners, with its characteristics of being interactive, being at-present and three-dimensional, which is other traditional multimedia resources fail to do. Virtual technology is also in line with the constructivist emphasis on learning in the scene to achieve the automatic acquisition of knowledge; and in the advanced stages of language learning, VR technology can provide a truly cultural environment to help users experience the cultural differences, will reduce the
threshold of language learning that the learners can gain the most effective grasp of a foreign language without going abroad.

BUILDING IMMERSIVE FOREIGN LANGUAGE TEACHING ENVIRONMENT BY USING VIRTUAL REALITY TECHNOLOGY

The essence of language is a means of communication. From the view of language teaching, is to make the students have the necessary knowledge and communication skills. The so-called language communication ability is the ability to use the language freely in the language environment [5], which includes four aspects: grammatical competence, discourse competence, sociolinguistic competence and Strategic competence. [6]

Foreign language teaching is a very complex systemic project. As a foreign language teacher, one should not only study foreign language teaching methods, but study how to use the modern science and technology to assist in the foreign language teaching. Ellis (1992) pointed out that foreign language teachers now finally understand the focus of the foreign language teaching is no longer “what should we teach” but how to create and promote foreign language learning conditions in foreign language teaching. [7]

To Improve Students' Grammatical and Discourse Competence

Grammatical rules, being the major constructing rules language, are the fundamental conditions of the existence of language. Grammar needs to be obtained by studying for a long time and a lot of practice. The traditional teaching, for being monotonous, boring and space or time constrained, leads to the students’ lack of interest or time to learn and practice a variety of grammatical knowledge, resulting in poor learning outcomes.

VR technology can be adopted to build an immersive learning environment with interactive content, situational environment and real-support service system. The students are no longer passive participant but active learners and explorers. The system can not only teach the students grammar rules, provide a lot of practice, but constantly supervise and remind students of their grammatical problems and provide students with correct grammar tips. In addition, students are not affected by time or space constraints in VR technology supported learning environment and can learn and practice grammar in any place at any time.

To Enhance Students' Sociolinguistic and Strategic Competence

By the use of virtual reality technology, learners can take a first person perspective to experience intercultural communication situations in the immersive cross-cultural environment. Learners can compare and contrast the linguistic and non-linguistic features in the real scene, receive real-time feedback information and make flexible adjustment of their verbal and nonverbal behaviour. The learners passively the reaction, converted to actively explore, knowledge and understanding of behaviour.

In addition, similar to the native language culture environment, immersive virtual reality environment, living abroad can provide virtual scene, virtual cultural activities abroad, sports activities and works of art scene, in which learners, the real
experience of its cultural heritage. Thus, can eliminate the rote learning method, obtain first-hand experience of communication.

**To Realize the Sharing of Foreign Language Teaching Resources**

The teachers, carrying out the teaching and research works, are the most important and scarce teaching resources. The overall social education resources are limited and excellent education resources are scarce. There are also the imbalance of teaching resources between first-tier cities and second or third-tier cities, the economically developed coastal areas and the underdeveloped areas.

By using virtual reality technology, the excellent classroom teaching video can be saved for sharing such as the provincial or national quality curriculum. By adopting 3D streaming media technology, the online virtual remote education can be achieved, which will help to improve the teaching quality and learning effect of distance education. For the ripening of virtual reality technology and decrease of the cost of related equipment, the virtual reality technology has more opportunities to enter the classroom. The school can purchase virtual reality camera, shoot excellent teaching video and provide them to the remote users for real-time and space learning. At the same time, the preservation of teaching video can provide students the opportunities for after-school review, assist teachers to share their teaching experience, help various colleges and universities share teaching resources and alleviate the problem of the scarcity of high-quality educational resources in a certain degree.

**CONCLUSION**

The application of virtual reality technology to foreign language teaching is still at the primary stage. In the immersive foreign language teaching practice, virtual reality teaching can provide students with vivid and lifelike learning environment and cultivate students' autonomous learning ability. The teacher is no longer the centre of teaching but the organizer, the guide and the participant of the entire teaching process. The students can take the initiative to acquire knowledge in the process of real experience. The preliminary research and investigation on application of virtual reality technology to immersive foreign language teaching described in the paper, through the trial with the students, has won sound feedback, enhanced the students' interest in learning foreign languages and achieved satisfactory teaching effect.

**REFERENCES**