

The Application of Immersive Virtual Simulation Technology (IVR) in English Audiovisual Course

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Abstract: The use of virtual simulation technology in English audio-visual courses can organically penetrate students' learning of theoretical knowledge and learning of practical skills with the help of its role, reform the traditional education model, and provide practical opportunities to all students. Enable students to better master English skills. This article aims to study the application of immersive virtual simulation technology in audio-visual English. This article first summarizes the application of imitation technology in education, the main virtual simulation technology and the concept of English audio-visual courses, and then specifically analyzes the requirements of the hardware environment and software environment in virtual teaching. Based on this, design virtual scenes in English audio-visual courses and conduct questionnaire surveys on them. The experimental results show that 92% of learners are satisfied with their learning effect under the virtual simulation learning situation.

1. Introduction

Virtual simulation is a computer system that allows humans to see the world [1]. The computer-generated world can reflect the real world or the imagined world [2]. It creates a three-dimensional representation of the world to reflect the changes and relationships of real life objects in a way that imitates them, and provides users with a three-dimensional perspective that can observe and interact with the world through visual aids [3]. Allow users to more directly participate in the exploration of roles and the transformation of the environment, creating a better environment. It will give teachers and students the opportunity to choose learning methods and means, as well as rich learning resources [4-5].

Based on the monitoring and understanding of IVR technology in many surveys, the obstacles brought by research are overcome. Wang T H used three studies to discuss the difference between photography and IVR, the difference between Live and IVR experience, and the difference between Live and VE photos in IVR. These studies show that when IVR is used for research, there is no difference between real images and VE images. The results show that compared with traditional photography, IVR may be closer to the general view of things [6]. Immersive virtual reality (IVR) is a technology that is increasingly used in nursing practice. In addition to its role as a school

environment, IVR can also serve as a natural place for a group of designers to work in real time. D'Errico M described how the international design team used IVR to develop, implement and change the mindset of licensed nursing students. The IVR module helps the team improve and upgrade these projects [7]. Teachers and students can use this technology to observe some key issues in a virtual environment, immerse themselves in the virtual real environment, and greatly improve the students' ability to understand theoretical knowledge and master practical technology.

This paper takes VR technology as a new educational tool, and gives a new research direction, namely teaching, from the perspective of the application of teaching, research and analysis technology in this field. First, it summarizes the status quo of teaching technology at home and abroad. and then specifically analyzes its definition, characteristics, modeling methods, hardware environment and software environment in virtual teaching and so on. Based on this, the meaning and characteristics of virtual teaching are studied, and related technologies are fully combined, and the platform mode of virtual teaching and application examples are discussed.

2. Research on Immersive Virtual Simulation Technology (IVR) in English Audiovisual Course

2.1 Application of Virtual Simulation Technology in Education

Virtual simulation technology completely breaks the limitations of time and space. Students can enter virtual aerospace workstations, or even atoms and molecules, to observe the internal structure of these objects [8-9]. Virtual simulation technology can overcome time constraints. Some changes can take a long time to observe, decades or even hundreds of years. Using virtual simulation technology, the entire process can be condensed for students to observe. Using computer software and peripheral equipment, archival technology can create an environment. Students at work. Activities are visible on the screen, and students can talk to them for free. The combination of imitation technology and online technology can provide students with a way to teach and open new things and learn [10].

2.2 Main Technology

(1) Real-time 3D computer graphics

Generally speaking, it is not difficult to form images and graphics by creating computer models. If the model built according to the actual situation has ample time, then the corresponding image can be formed, and it is the state of different objects under various lighting conditions, but real-time is the most important link. For example, in a flight simulation system, it is very important to dynamically update the image, and it must also have high-quality image cooperation. Coupled with a highly comprehensive and complex virtual environment, the difficulty factor of the problem instantly doubles (11-12).

(2) Display

Binocular stereo vision plays a very critical role in the VR system. The image difference observed by different eyes of the user is a display screen formed by different factors. Some systems only install a supporting display device, and after the user uses the device, the images seen by the two eyes are different to a certain extent, and the combination of the two eyes together forms a very obvious three-dimensional feeling.

(3) Sound

The stereo effect that people often say is achieved through this principle, so the sense of direction is full. In real life, when a person's head is moving, the sound that people hear is different even if it is the sound from the same sound source. However, in the current VR system, the sound

direction has nothing to do with whether the user's head rotates.

2.3 English Audiovisual Course

English audiovisual and listening courses require systematic learning to strengthen interaction and communication in the teaching process; a breakthrough in the teaching and learning of traditional English education requires students to understand and master the language features, text, semantics, and rhetoric of news English. Improve students' abilities of vocabulary and listening comprehension, and at the same time familiarize students with political and economic cultural connotations and current affairs and politics; familiar with various skills and grammar of listening, and lay a solid foundation for listening and writing.

In terms of course content design, English has its own unique aspects in terms of cultural background, vocabulary, sentence patterns and article structure, which will imply obstacles to students' listening comprehension and listening training. Therefore, the curriculum design is divided into entertainment, economics, science, politics, military, health, literature and art, society, law and sports according to different themes. The content is divided into pictures, text, audio, animation and video files.

In addition to the above content, the elective content of the course also includes current events and topics. For the audiovisual course of current affairs English, the teacher selects the appropriate news to record the instructional video. Teachers pay attention to three points when selecting talents. One is to have hot spots. The topic is popular at the moment and can arouse students' interest. At the same time, according to the cognitive laws of English learning, in order to achieve the ideal learning effect, the new content must be combined with the students' existing knowledge. The second is timeliness. The daily international events and domestic news reported by radio and television stations are the goals of selecting materials. The third is that teachers should take into account the difficulty and interest of the materials and choose materials suitable for students. The subject English audiovisual course is that the teacher selects foreign radio stations. The TV station focuses on a topic discussion on a topic, such as stem cell research, gay marriage, etc., to record teaching videos, so that students can understand the problems in the process of English learning. Different angles, cultivate students' thinking ability.

3. Investigation and Research of Immersive Virtual Simulation Technology (IVR) in English Audio-visual Courses

3.1 Virtual Simulation Platform

The nature of the virtual simulation learning environment is based on the help of virtual reality technology, which usually has requirements for the computer environment. Virtual reality technology is a combination of multiple technologies. Generally speaking, it includes technologies such as real-time graphics technology, stereo imaging technology, and audio monitoring technology. The virtual reality learning environment discussed in this research requires a high level of immersion. So choose to improve and change English learning based on the Second Life platform.

3.2 Questionnaire Analysis and Design

Whether the Second Life virtual simulation learning situation has met the learners' requirements for online learning English knowledge, whether it can increase the learner's interest in learning, and what difficulties learners encounter in the Second Life virtual simulation learning situation. In response to these problems, this article is combining learning Based on the learners' learning

characteristics, a questionnaire was designed from the aspects of learning effect, learning attitude, and context creation. After the design of the first draft of the questionnaire was completed, expert opinions were solicited, and after trial and revision, the final draft was finalized for investigation. The subjects of the survey were 100 students selected by M Academy who participated in the Second Life virtual simulation English audiovisual course. In this questionnaire survey, a total of 100 questionnaires were distributed and 100 questionnaires were returned, of which 100 were valid questionnaires, and the effective response rate was 100%.

3.3 Data Processing and Analysis

This article uses SPSS 22.0 software to count and analyze the results of the questionnaire, and conduct a t test. The t-test formula used in this article is as follows:

$$t = \frac{\bar{X} - \mu}{\frac{\sigma X}{\sqrt{n}}} \quad (1)$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (2)$$

Among them, formula (1) is a single population test, \bar{x} is the average of the sample, s is the standard deviation of the sample, and n is the number of samples. Formula (2) is a two-population test, s_1^2 and s_2^2 are the variances of the two samples, and n_1 and n_2 are the sample sizes.

4. Investigation and Analysis of Immersive Virtual Simulation Technology (IVR) in English Audio-visual Courses

4.1 Virtual Scene Design

The virtual scene is a virtual space built in Second Life. In this practice, two scenes will be involved. One is a virtual class for teachers to teach, and the other scene is a virtual forbidden city, a virtual scene for students to contact and describe. Among them, the virtual class is a virtual simulation class created in Second Life in this research, which can be used by teachers and students to carry out voice and text teaching.

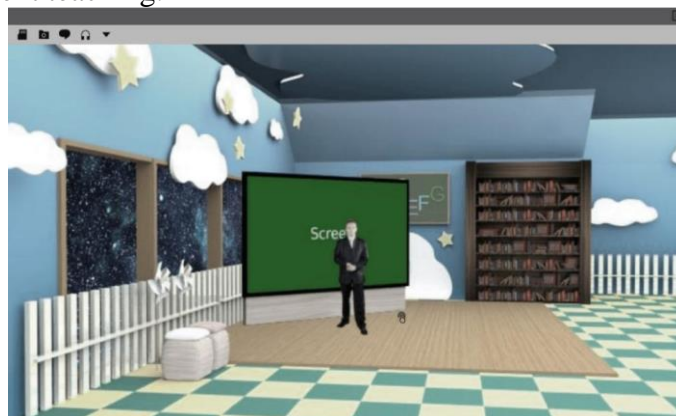


Figure 1: A virtual English classroom created in Second Life.

As shown in Figure 1, Virtual American Friend is provided for this practice, an example scene

character for students to practice language. Through the investigation, the author found a well-built American scene in Second Life, and the scene setting is more realistic, which can meet the needs of students to carry out audiovisual listening and speaking in it. Therefore, this research decided to directly adopt the virtual scene San Francisco, U.S. with the address information of Obscuro Valkyrie 24, 221, 21 (Mature) in Second Life for students to use.

To cultivate students' "communication ability" or "application ability", the language itself should first be emphasized. In other words, to improve the learner's English application ability, we must work hard to master the basic skills of the language. The training of basic language skills produces the best memory effect after acquisition in practical applications, so we need virtual scenes to consolidate the acquisition of English knowledge.

4.2 English Learning Effect of Virtual Simulation

In the part of the learning effect questionnaire survey, the survey results as shown in Table 1 and Figure 2, that 92% of learners are satisfied with their learning effect in the virtual simulation learning situation, and more than 85% of the learners believe that the avatar learning method is used to learn English in the virtual simulation learning situation. Knowledge can improve one's written and oral expression skills, and promote relationships with classmates and teachers. In addition, 82% of learners believe that they can increase their interest in learning under the virtual simulation learning situation. These data show that the design of the virtual learning simulation situation conforms to the cognitive characteristics of learners, and has been recognized by everyone. The overall design is relatively successful.

Table 1: Results of study effect survey.

Topic	A	B	C	D	E
Satisfied with the learning effect	65	27	7	0	1
Can improve written and spoken English	55	30	10	2	3
Promote the relationship between classmates and teachers	68	21	5	3	3
Increase interest in learning	54	28	11	5	2

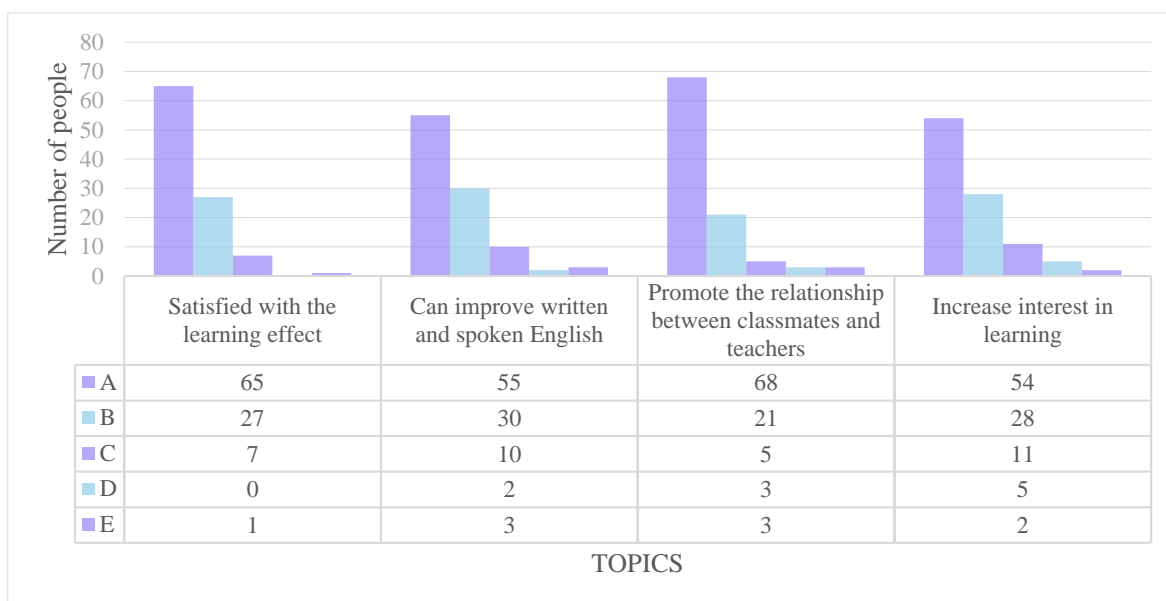


Figure 2: Results of study effect survey.

In the part of the questionnaire survey on learning context design, the survey results show that

most learners believe that a well-designed and reasonable virtual learning context has a greater impact on the acquisition of English knowledge. However, teaching in the virtual simulation learning environment, the presentation of teaching content and the organization of meaningful teaching activities have a greater impact on the effective learning of learners. In addition, the selection of communication tools in the virtual simulation learning situation, especially the selection of voice communication tools, cannot be ignored. It is conducive to the exchange of information and practice exercises for learners.

5. Conclusions

With the continuous advancement of technology and computer technology, the obvious truth has become a reality. The environment is based on advanced computer technology, which can bring people a real experience, and connect and communicate with the environment in a unique way through special tools or tools, so that users can get a real experience. It analyzes the use of imitation and teaching technology in various schools. At the same time, be careful to use analytical methods to learn how to use teaching techniques to change the way you teach. On the basis of empirical analysis, through comparison, induction and generalization, the normative analysis method is used to extract new ways of simulation technology in vocational education.

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2021 school level project: College English — Online and Offline Mixed First-class Course (PPJH202104YLKC).

References

- [1] Wei H, Chen Y. Assessment of different turbulence models on the large scale internal heated water pool natural convection simulation [J]. *Annals of Nuclear Energy*, 2019, 131(SEP.):23-38.
- [2] Chen Y, Zhang H, Villanueva W, et al. A sensitivity study of MELCOR nodalization for simulation of in-vessel severe accident progression in a boiling water reactor [J]. *Nuclear Engineering and Design*, 2019, 343(MAR.):22-37.
- [3] Okawa T, Ariyoshi M, Ishizu T, et al. Modelling and capability of severe accident simulation code, AZORES to analyze In-Vessel Retention for a loop-type sodium-cooled fast reactor [J]. *Progress in Nuclear Energy*, 2019, 113(MAY):156-165.
- [4] Knudson D L, Rempe J L, Condie K G, et al. Late-phase melt conditions affecting the potential for in-vessel

- retention in high power reactors [J]. *Nuclear Engineering & Design*, 2017, 230(1-3):133-150.
- [5] Luo Y, Liu X, Cheng X. IVR-ERVC study of 1700 MW class PWR based on MAAP simulation and coupled analysis [J]. *Annals of Nuclear Energy*, 2019, 126(APR.):1-9.
- [6] Wang T H, Wu W H, Shen L, et al. Exploring the validity of using immersive virtual reality technique on perceived crowding of recreational environment [J]. *Landscape and Ecological Engineering*, 2021, 17(3):299-308.
- [7] D'Errico M. Immersive Virtual Reality as an International Collaborative Space for Innovative Simulation Design [J]. *Clinical Simulation in Nursing*, 2021, 54(1):30-34.
- [8] Chin C S, Lin W P, Lin J Y. Experimental validation of open-frame ROV model for virtual reality simulation and control [J]. *Journal of Marine Science & Technology*, 2018, 23(2):267-287.
- [9] S Möller, Ahrens J, Altinsoy M E, et al. A cross-university massive open online course on communication acoustics [J]. *The Journal of the Acoustical Society of America*, 2017, 141(5):3556-3556.
- [10] Schillingmann L, Ernst J, Keite V, et al. AlignTool: The automatic temporal alignment of spoken utterances in German, Dutch, and British English for psycholinguistic purposes [J]. *Behavior Research Methods*, 2018, 50(2):466-489.
- [11] L, González-Calvete, R, et al. Utility of a simple lighting device to improve chest compressions learning – ScienceDirect [J]. *Revista Española de Anestesiología y Reanimación (English Edition)*, 2017, 64(9):506-512.
- [12] Vucic D, Skorin-Kapov L. QoE Assessment of Mobile Multiparty Audiovisual Telemeetings [J]. *IEEE Access*, 2020, PP(99):1-1.