



Application of Virtual Reality and Human Computer Interaction in Strategies for Improving English Reading Ability of High School Students

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Abstract. As a key technology of virtual reality, human-computer interaction is the key to promoting the popularization of virtual reality and improving users' English reading experience. With the improvement of readability and other hardware technologies, people's interaction in virtual reality has made significant progress. This article focused on the overview and analysis of the human-computer interaction methods of virtual reality, as well as the application of virtual reality and human-computer interaction technology in reading space, and the advantages of human-computer interaction in virtual reality in English reading, and put forward some issues that need to be further studied and resolved.

Keywords: Virtual Reality and Human-computer Interaction · High School Students' English Reading Ability Improvement · Virtual Reading Space · Memory Reading

1 Introduction

Virtual reality is a space where people can create and experience a virtual world. It can create and experience a virtual world. It can produce a sense of immersion through various senses such as vision, hearing, touch, smell, and perception. Virtual reality has three characteristics: immersion, interactivity, and visibility. With the aid of human-computer interaction, its interactivity can be simplified. Interacting with "virtual" objects generated by computers creates a sense of interaction between users and virtual objects, thereby making human life more natural and harmonious. Therefore, in virtual reality, in order to provide users with a better experience, application oriented, human-computer interaction is an important part [1, 2]. There is a communication channel between humans and machines, and human-computer interaction is a bridge to this channel. In theory, human communication no longer relies on machine language. In the absence of intermediate devices such as keyboards, mice, and touch screens, free communication between people can be achieved anywhere, anytime, and thus the ultimate fusion of human physical world and virtual reality can be achieved. However, due to technical conditions, the expected objectives have not yet been achieved [3, 4]. In virtual reality, describing a person's

posture, language, and body movements requires different sensory channels to perceive them. It can realize real-time perception of multiple perception methods such as user's vision, hearing, touch, and smell through multiple perception methods such as vision, hearing, touch, and smell, and can change as the user's perspective changes. From an interactive perspective, virtual reality is a new human-computer interaction mode that improves English reading efficiency to some extent.

The human-computer interaction industry has developed rapidly since its inception, from the earliest manual control to the current virtual reality, virtual reality, and somatosensory interaction technologies. The forms of interaction between people are constantly enriched, and technology is also gradually developing. Wang X believed that in the near future, humans broke away from all forms, and under the constraints of this interaction, the information they receive was simpler and more unscrupulous. In the era of combining artificial intelligence and big data, computers can intuitively, directly, and comprehensively capture users' needs and assist users in decision-making. No one wants to live in a mechanical world. In the future, interactive products that pursue natural and intelligent interaction would be a new theme [6]. Pustejovsky J proposed a human-machine interface method based on gesture recognition. Conventional image information detection methods have low computational efficiency and are difficult to achieve real-time performance. In recent years, image detection methods based on deep neural networks have begun to adopt selective retrieval. If another way of generating candidates can be found, the detection problem can be transformed into a category problem, and the training samples generated for the category problem are much simpler than for the category problem. Because body posture information is generally a foreground object, in this description, foreground information is used to generate a candidate window [7, 8]. In summary, virtual reality technology can expand the experience effect using human-computer interaction space, and its immersion based on multiple sensory dimensions such as vision, hearing, and touch can stimulate the experience of human-computer interaction.

2 Virtual Reality and Human-Computer Interaction Methods

2.1 Interactive Memory Reading Strategies

The interactive strategy is based on perceptual memory for reading and storing information. Combining read words and sentences with known or imagined image content enables students to form unit blocks of read information, increase their working storage capacity, guide learners to enhance memory by discovering or constructing the meaning between reading items, and store social and cultural knowledge, intentional materials, and image materials for a long time, extracting and using information from them [9, 10].

2.2 Improvement of English Reading Ability of Senior High School Students

High school English reading proficiency refers to the ability of students to correctly and efficiently understand the information contained in English materials within a certain period of time. Among them, reading speed and understanding level are important indicators, which restrict and complement each other. Blindly pursuing fast reading while

ignoring the meaning of the text can have a negative impact on the amount of information contained in the text. Understanding the meaning of a word has a significant impact on reading speed. To complete reading within a unit time and improve their reading ability, students are required to better control the speed of reading, comprehensively grasp the information in the article, and correctly judge the meaning of the article [11, 12].

2.3 Application of Virtual Reality Technology in Reading Space

Virtual reality technology is the use of computer technology and hardware devices to achieve virtual illusions that people can perceive through visual, auditory, tactile, olfactory, and other means. Therefore, virtual reality technology is also known as “illusion” or “mood” technology. Virtual reality has been a common topic in the international community in recent years, and its main development has also progressed rapidly. Nowadays, there is a large amount of use in English reading [13, 14]. Virtual reality technology has been increasingly used in the construction of “reading space”. The introduction of virtual reality technology into the “reading space” provides technical support for its functioning, and also brings more humanistic care to readers’ reading activities [15, 16]. The development of virtual reality technology and its widespread application in “reading space” have enabled “reading space” to better achieve information preservation, information sharing, development of intellectual resources, and provision of cultural entertainment. It illustrates the practical application of virtual reality technology in read space.

To ensure the accuracy of the calculation results, they are usually performed in a continuous form, followed by operations.

For the evolution formula of virtual reality, there is no loss of generality. Assuming that this is a spatial optimization problem for reading, the index can be removed from the standard evolution formula of virtual reality, which can be:

$$x = x + w * v + r_1(\beta_{\text{best}}(i) - x) + r_2(\beta_{\text{best}}(i) - x) \quad (1)$$

In virtual reality reading applications, the selection of parameters is directly related to the performance of space construction. Parameters are selected to enable virtual reading to converge quickly without trapping in local areas.

$$v_t = w * v + r(\beta_{\text{best}}(i) - x) + Y_2(\beta_{\text{best}}(i) - x) \quad (2)$$

By solving the above formula, it can be concluded that:

$$r < 2w + 2, w < 1 \quad (3)$$

This function can efficiently and quickly identify the long-term development results of virtual reality technology in the reading space.

3 Virtual Reality English Reading Simulation Experiment

3.1 Performance of Virtual Reality in English Reading

Among them, “immersive”, “conversational”, and “multi perception” are the three major characteristics of virtual reality technology. “Immersion” is a virtual environment created by virtual reality technology, enabling users to truly immerse themselves. This “immersive” reading method is different from ordinary reading methods. Applying virtual reality technology to classroom teaching can better stimulate students’ creativity, enable students to not only understand the content of the text, but also connect it with the future, and generate valuable ideas in the future through creative thinking. This is also the profound significance of reading.

3.2 Impact of Virtual Reality on English Reading

For English students, using virtual reality technology can enable them to enter the English environment wholeheartedly, not only feeling the language environment of English, but also feeling the way of thinking of the language, as well as feeling the cultural atmosphere of the language. Through this kind of English teaching situation, students can have a feeling of being immersed in it and achieve good teaching results. Reading well can better mobilize students’ enthusiasm for learning and enable them to change from “utilitarian” to “active” learning behavior. When reading motivation and purpose change, reading efficiency is also improved. VR products can create English reading scenarios based on the English language environment, etc. For example, when learning the history of the goddess of freedom, teachers can use VR products to create scenarios from aspects such as the goddess’s predecessor, current life, covered events, and stories that occurred. In addition, the stronger the immersion of teachers in the English reading environment, the more concentrated the attention of English learners. The stronger the sense of generation, and the better the reading effect.

4 Results and Discussions of Virtual Reality and Human-Computer Interaction

4.1 Human-Computer Interaction Forms of Virtual Reality

In virtual reality, the interaction between people is at the forefront of current technological development. This system differs greatly from traditional desktop computer interfaces. In a virtual reality human-computer interactive system, users can use body position sensors. Virtual reality devices, such as helmets, can connect people to the environment and obtain accurate, real-time, and realistic feedback by manipulating objects. In virtual reality systems, compared to other systems, it has a stronger sense of reality and stronger perceptual capabilities, which can bring more immersive experiences to users.

Table 1. Artificial intelligence and human-computer interaction direction data

A particular year	speech recognition	gesture recognition	Semantic Understanding
2019	55	74	49
2020	58	76	53
2021	62	80	56
2022	65	88	59

4.2 Human Machine Interaction Advantages of Virtual Reality

More realistic experience

To achieve human interaction, one first needs to sense external information. Vision is the most significant and widely used form of perception in human cognitive style, and 80% of the information is obtained through vision. The human visual system can perceive the size, depth, and relative distance of objects. Therefore, generally speaking, the scene people see is a three-dimensional object. The traditional visual display in human-computer interaction is based on one-dimensional and two-dimensional planar display, which brings great inconvenience to human visual recognition.

More natural and harmonious operation mode

Currently, the common man-machine operation mode is achieved by inputting commands or clicking on icons, which increases the gap between people and computers. In virtual reality technology, real-time operations are realized in virtual reality environments through virtual input devices, making operations more direct and convenient. The human-computer interaction experience of some users has been improved by 76%, eliminating cumbersome command and menu operations, making it convenient for people to operate the machine. The experience of virtual reality human-computer interaction is shown in Table 1.

As shown in Table 1, from 2019 to 2022, speech recognition increased by 10 people from the original 55, gesture recognition increased by 14 people from the original 74, and semantic understanding increased by 10 people from the original 49.

4.3 Virtual Reality Human-Computer Interaction Strategy

In the virtual world, there are also parallel virtual spaces in the real society, which play various roles. There is also a living space in the brain's subconscious mind, where relative reality is virtual. When these subconscious minds meet, they form virtual reality. Although it is only subconscious, to stimulate the significance of the existence of this space, it has a certain impact on the existing society. Therefore, using graphical data to analyze virtual machine interactions is the power source for the generation and development of virtual space, and it is also the significance of its inevitable existence.

5 Conclusions

Currently, the research and development of virtual reality technology in China is increasing, and its development pace is gradually accelerating. In terms of English reading, user experience, high school education, etc., it has achieved good results, promoted the development of multiple disciplines, promoted in-depth research on virtual reality, and enriched the content of English reading. In recent years, China has also paid great attention to the research of virtual reality human-computer interaction technology and invested a lot in virtual reality human-computer interaction technology. This article believed that with the continuous development of science and technology, virtual reality human-computer interaction technology with reading space as the core inevitably brought tremendous technological changes to human society.

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