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# *Distributed System Integrating Virtual Reality Technology in English Teaching*

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***Keywords:*** Virtual Reality, Distributed System, English Teaching, Skehan's Cognitive Method

***Abstract:*** Virtual Reality (VR) technology is an emerging information technology. It can create virtual situations and create a virtual language environment for students, so that students can subtly master language knowledge and exercise language application in this environment. In order to solve the limitations of the current traditional English teaching, this paper designs and applies the distributed system of virtual reality technology in English teaching. Based on the discussion of Skehan's cognitive method, the theoretical basis of the application of distributed systems of technology in English teaching, the communication protocol and experimental objects of distributed systems integrated with virtual reality technology in English teaching are designed and outlined. Secondly, the overall process of the distributed system integrating virtual reality technology in English teaching is designed. Finally, based on the system design and application, a specific experimental test is carried out. The experimental results show that the students who learn English in the virtual reality technology distributed system and the students in the traditional English teaching group have similar scores in various question types. Even in the comparison of the question type scores of grammar matching, filling in the blanks and writing, Students in the virtual reality technology distributed systems group scored higher than those in the traditional study group, and their grammar matching scores were 0.78 higher than those in the traditional study group by an average score of 0.78. Fill in the blanks score of 9.46 is higher than the traditional study group's 8.63. which was 8.63. The final result proves that the application of the distributed platform system integrated with virtual reality technology in English teaching has high applicability.

## 1. Introduction

With the continuous deepening of education informatization reform, Internet communication,

VR, AI and other technologies have emerged, and are active in education and teaching. Among them, through the application of VR technology, VR technology is introduced into the learning of knowledge, which not only reduces the transfer ability of learners, but also can be better applied to English teaching.

With the continuous development and popularization of virtual reality technology, more and more scholars pay attention to its application in various teaching. And with some research results,Vakaliuk T We describe some of the possibilities of using virtual reality when teaching mathematics to students in grades 10-11. There is no doubt that advanced mathematics courses hold great promise in education. The widespread use of virtual reality technology in mathematics teaching has proved its effectiveness. Virtual reality technology can be used for learning from elementary to high school. The research object is the process of using virtual and augmented reality technology to form spatial imagination in the process of mathematics teaching [1]. Tasi-Miti I sees huge advances in virtual reality technology. Tasi-Miti I sees great progress in virtual reality technology. In language learning, virtual reality can provide an immersive virtual environment to obtain language materials and also increase the motivation of learning. This study aims to explore students' perception of English learning in an immersive virtual environment. A total of 120 students were selected by convenience sampling.and regression analysis. The research results show that the idea of using virtual display technology is liked by most students [2].According to Ochilova V R, scientific knowledge and formulas alone are often insufficient to understand abstract learning materials. Frequent communication with learning materials is a key part when learning in a virtual environment. Virtual reality technology can immerse learners. Ochilova V R's experimental data show the powerful role of VR in the interaction between teachers and students, but there are still many problems to be solved in the design of the real application of VR technology in teaching and learning [3]. Although the application of virtual reality technology in English education is very rich,there are still some deficiencies in the application research of English teaching in the specific distributed system of virtual reality technology.

Therefore, in order to solve the problem of English teaching English in the existing distributed system of virtual reality technology, this paper firstly conducts a brief introduction to the characteristics and realization functions of the distributed system and the Skehan cognitive method of English teaching. The communication protocol of English teaching in the distributed system of virtual reality technology and the hardware and software configuration of the system are introduced. Secondly, the overall process and specific course flow of English teaching integrated in the distributed system of virtual reality technology are designed and outlined. The effect of the design and practice of the system proposed in this paper in English teaching is compared with the traditional teaching group. The final experimental results show that the final score of English learning in the technical system proposed in this paper is different from that of the traditional teaching group. The scores of some questions are even higher than those of the traditional teaching group, so the application of the distributed system of virtual reality technology has a good effect [4].

## 2. Research on Distributed Systems Integrating Virtual Reality Technology in English Teaching

### 2.1. Distributed System of Virtual Reality Technology

(1) Distributed system characteristics of virtual reality technology

Due to the rapid development of the network, English teaching can run on multiple computers connected through the network, so the Distributed Virtual Reality (DVR) technology has emerged.

Distributed virtual reality is a system generated by the combination of virtual reality technology and network technology. The location and the environment interact together through a combination of online virtual and reality, and even complete various homework and task training together [5]. Its main features are as follows:

1) Allow different users to participate in the same form of activity in different geographic locations and environments.

2) The established virtual reality environment has three-dimensional characteristics, which can make the user's hearing and vision participate together [6].

3) Every user who uses virtual reality technology participates in the form of virtual substitutes in the environment of virtual reality technology.

4) Users can communicate and interact with other users in different places in the distributed system of virtual reality, and can also interact with virtual users in virtual reality technology [7].

In a word, "dynamics, interaction, communication, and distribution" can summarize the characteristics of distributed systems of virtual reality technology.

(2) Distributed system implementation function of virtual reality technology

In the interactive control system of the distributed virtual reality system, the Mahalanobis distance calculation shows that the control area of any node role is an ellipsoid area.

From equations (1) to (4) we can easily see that this is an ellipsoid equation with the origin as the center [8].

$$T_n(v) = \sqrt{(v-\mu)}^{y} \sum {}^{-1}(v-\mu) \tag{1}$$

Use the bow distance to set the weight on the score:

$$H = \left( \frac{v_1}{R_P}, \ldots \frac{v_1}{R_p} \right) v = \left( \frac{u_1}{R_1}, \ldots \frac{u_p}{R_p} \right) \tag{2}$$

Define the gap between $u, v$, where $R_1$ is the score difference:

$$t(u,v) = t(i,j) = \sqrt{\left( \frac{u_1, v_1}{R_1} \right) + \ldots + \left( \frac{u_p - v_p}{R_p} \right)} = \sqrt{(u,v)^1 T^{-1}(u,v)} \tag{3}$$

So to the point where the scores are equal to the difference:

$$\|u\| = \left( \frac{i_1}{R_1} \right)^2 + \ldots . + \left( \frac{u_p}{R_p} \right)^2 = c^2 \tag{4}$$

## 2.2. English teaching of Skehan cognitive method

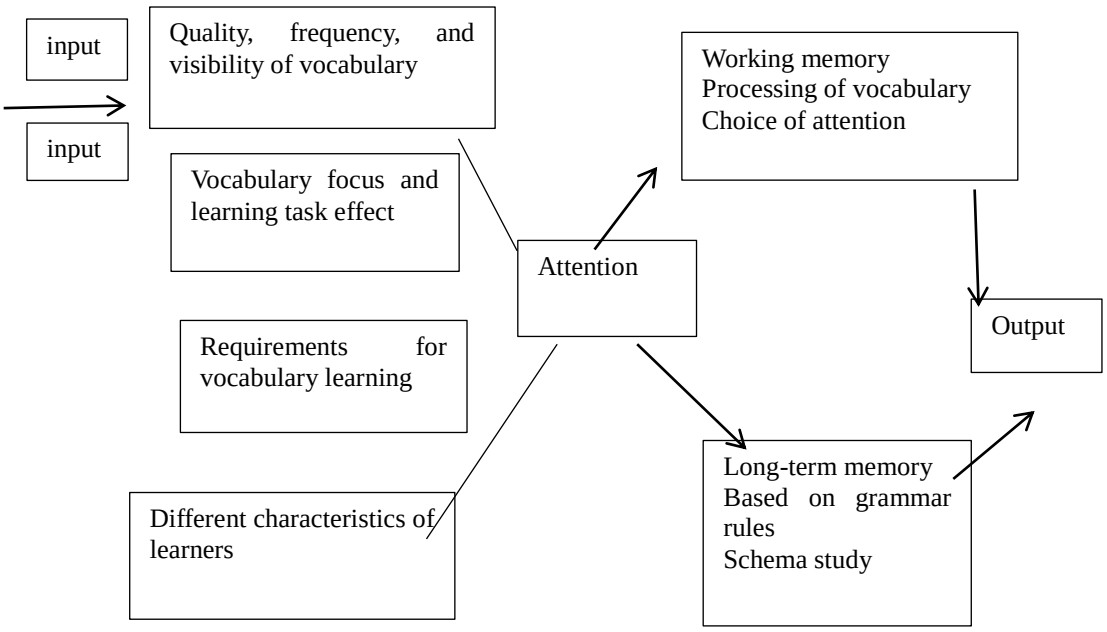


*Figure 1. Attention in the English learning process*

The above figure shows that when learning English, the key part of the English vocabulary, sentence and grammar that the learners input is their attention. The factors affecting attention are: (1) the quality of the vocabulary and sentences provided; (2) the focus of the sentences and vocabulary learned; (3) the task of English learning; (4) the different characteristics of the learners. When learning English vocabulary input, the quality of English vocabulary and sentence input should be provided, and attention should be paid to the number and prominence of certain English vocabulary, sentence input. In English learning, learners' attention can be regulated by certain means [9]. For example, increasing the number of vocabulary, sentences, grammar learning, different types and obvious fonts, bright colors and changes in different positions, etc., can improve learners' vocabulary learning. Sentence attention. Even the inputted vocabulary and sentence learning materials can be turned into working materials, and then through certain processing of the materials, long-term memory materials are finally formed [10]. Working memory and long-term memory interact and transform each other in the process of sentence and vocabulary processing, thereby strengthening the process of English sentence and vocabulary production. Therefore, according to the theoretical basis of Skehan's cognitive method, the feasibility of applying virtual reality technology distributed system in English teaching is obtained [11].

## 3. Systematic Investigation and Research on Distributed Systems Integrating Virtual Reality Technology in English Teaching

### 3.1. System Communication Protocol Design

The types of all resources required by the server-side storage system are different, and learners

need to continuously send out network requests on the client side, so an efficient, safe and stable system protocol is required. The HTTP protocol has certain stability and efficiency. Some have been set up, which can be used after simple testing and can pass through the firewall. Its main advantages are as follows:

(1) Support the program mode of the client.

(2) Simple and fast: When the guest learner sends a usage request to the server, he only needs to click the instruction of the request. The general request methods are GET, HEAD, and POST. Different learner users and different uses of the server do it differently. Because the HTTP protocol is simple and secure, it is efficient and stable to use.

(3) Good flexibility: does not limit the type of data resources.

(4) No connection: It means that only one request is processed per HTTP connection. The server processes the request sent by the learner client, and disconnects immediately after receiving the response from the learner client, which can save the transmission time and ensure security. According to the needs of learners and the distributed system of virtual reality technology and the advantages of HTTP, this paper adopts HTTP protocol for network communication between learner client and server. Since the HTTP protocol is used, it is necessary to perform HTTP parsing of network data, such as HTTP headers, and to be able to set proxy, user authentication and other modes, which is relatively complicated. Therefore, this article abandons the direct use of socket programming, and instead uses the open source library libcurl. It supports FTP, HTTP, HTTPS and other protocols, and is cross-platform, supports URL request, thread safety, and supports IPv6, which is convenient for future expansion. In addition, the communication model between client and server is C/S structure, and they are connected and communicated through IP and port number.

### 3.2. Software and Hardware Settings

(1)What this software uses is windows200 with the highest performance among the currently internationally recognized systems. Provides a server for scalability and availability, as well as an ideal tool for critical business applications with built-in comprehensive security and communication capabilities, and at the same time has the ability to manage high traffic requests through built-in functionality. As well as the ability to develop languages, users can easily manage and control websites, create and use powerful solutions.

(2)Configuration Processor for Web Browser: III450MHz Memory: 256MB Hard Disk: 6.5 Network Card: 1 Database Server Configuration Processor: 133MHZI or higher data processor. Memory: 250MB Hard Disk: 12.GB of hard disk space.

## 4. Research on the Application of Distributed System Integrating Virtual Reality Technology in English Teaching

### 4.1. The Overall Process Design of the Distributed System Integrating Virtual Reality Technology in English Teaching

From the perspective of the functional composition of the system, the design of the distributed system of virtual reality technology in English teaching is divided into three categories: teachers who teach virtual courses, whose function is to simulate the teaching of teachers, such as the speed of speech, content, Various BTC information such as form and method. At the same time, the simulation of immersive learning is realized, for example, the real characters designed by virtual reality technology can have a dialogue; the function of virtual learning materials is to realize the

function of inputting each part of the learning content, and receive the input of the course content designed by the virtual reality technology. The input and output commands complete the in-depth processing of the learning materials and transmit the learning results to the system; the virtual central monitoring machine, its function is to use the virtual observer method to display the status of the system at multiple points in a multi-channel centralized manner to realize simulation. The centralized display and management of educators is convenient for debugging and decision-making.The specific structure is shown in Figure 2:

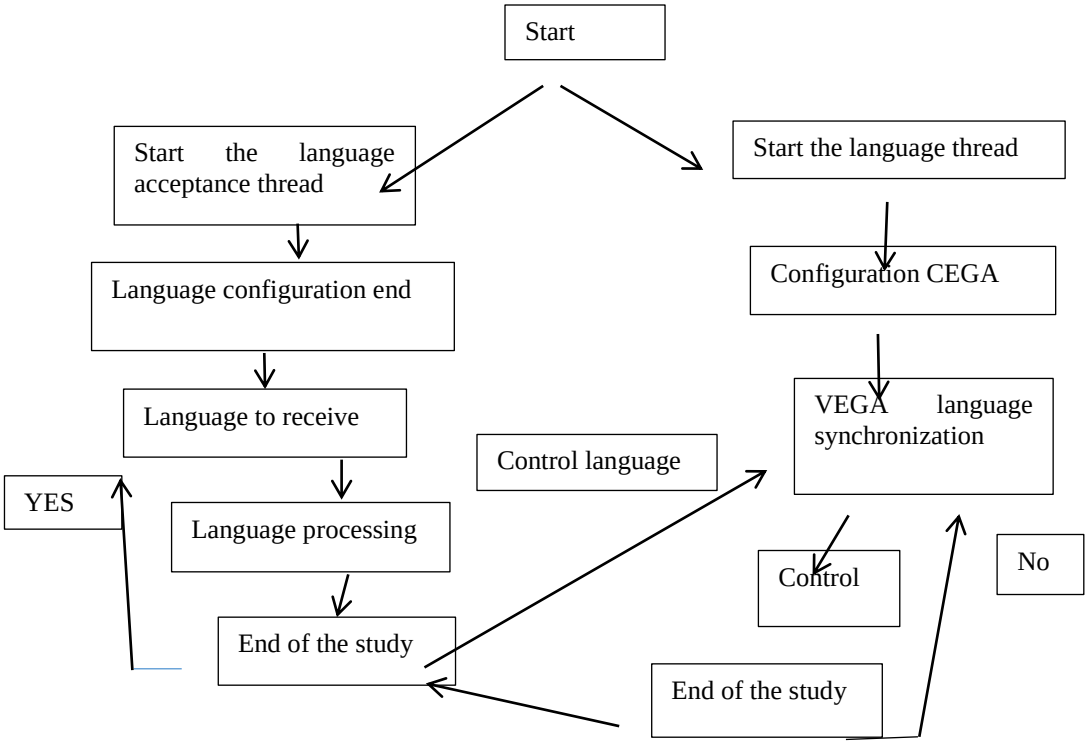


*Figure 2. The overall process of the English teaching system*

## 4.2. Application Design of Distributed System Integrating Virtual Reality Technology in English Teaching

(1) Classroom teaching design of distributed system integrating virtual reality technology in English teaching.

The implementation steps of the whole course are carried out in combination with the English course teaching mode of the distributed system of virtual reality technology. The specific implementation steps are shown in Table 1:

1) Pre-class systematic review The main tasks of this link are: use virtual display technology to guide key words to memorize voice, bilingual teaching, and students to read and understand the meaning.

2) The scene introduction using virtual reality technology shows the real language communication scene, conducts a real interactive communication experience, and processes the learned language materials through communication and interaction.

3) The group form selects and expresses independently in the scenes designed by the distributed system of virtual display technology, and finally shows, through interactive exercises, the processed

materials are transformed into long-term memory materials.

4) Students use virtual reality technology to conduct centralized review on the platform, and consolidate language through the connection of the platform.

*Table 1. Specific steps of course implementation*

| | |
|---|---|
| Before class | Using virtual display technology to guide and memorize key vocabulary |
| In class | The scene introduction using virtual reality technology shows the real language communication scene, and conducts a real interactive communication experience |
| | The form of the group is selected and autonomously expressed in the scene designed by the distributed system of virtual display technology, and finally displayed |
| After class | Students use virtual reality technology on the platform for intensive review |

(2) Analysis of the application results of distributed system integrating virtual reality technology in classroom teaching design in English teaching

In this paper, the pre-experiment test scores of the students in the scene group and the traditional teaching group in the virtual reality technology distributed system are entered one by one according to the question type, and the average score of each question type is calculated, and the average scores of the two groups of students are compared. Table 2 is obtained, and a column chart analysis of the two groups of average scores in Table 2 can be obtained, and Figure 3 can be obtained. It can be seen from the figure that the comparison of the two groups of students before and after the comparison between the virtual reality technology group and the traditional teaching group There is little difference between the two groups of values, and the difference between the average scores is very small, indicating that the two groups of students have the same level of academic performance, and the English teaching in the distributed platform of virtual reality technology meets the expected results.

*Table 2. Comparison of performance data*

| The title | Virtual Reality Group | Traditional Teaching Section |
|---|---|---|
| Vocabulary spelling | 5.26 | 5.38 |
| Choose fill in the blanks | 9.46 | 8.63 |
| Grammar match | 13.11 | 12.33 |
| Writing | 12.63 | 12.56 |
| Oral communication | 3.61 | 4.80 |

Through the data comparison of the bar chart in the above figure, it can be seen that the scores of the students in the traditional virtual reality technology group are lower than those in the traditional teaching group in the vocabulary spelling and oral communication questions, but the score gap is very small. In the fields of filling in the blanks, grammar matching and writing, the scores of the virtual reality technology group were 0.83, 0.78, and 0.07 higher than those of the traditional teaching group, respectively.

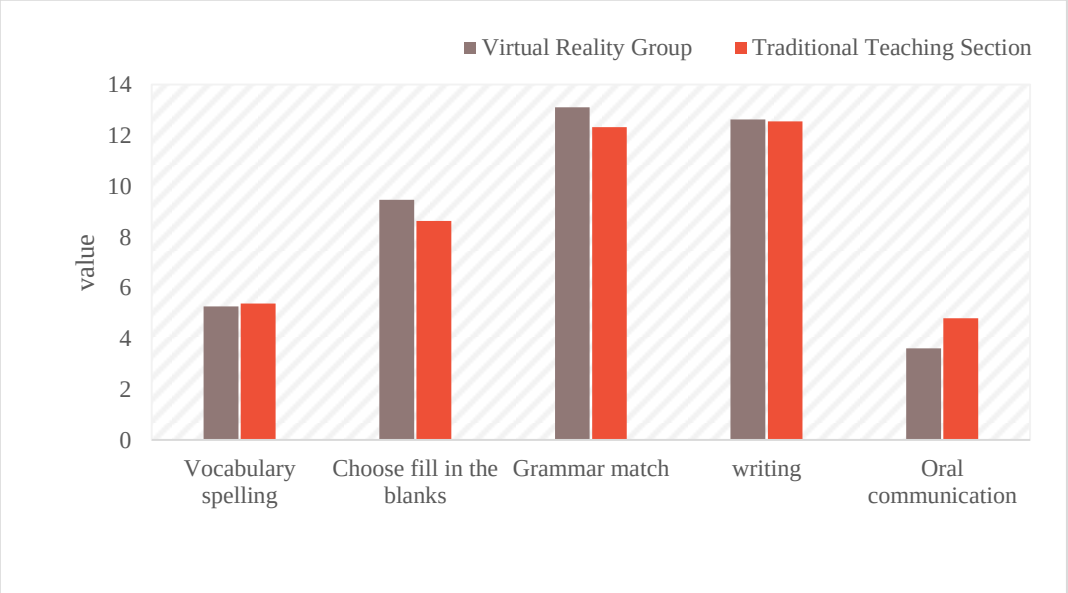


*Figure 3. Comparison of results before and after system application*

## 5. Conclusion

This paper firstly discusses the related technical theory of distributed system and Skehan cognitive method of English teaching, and then briefly introduces the communication protocol and software and hardware configuration of this system application experiment. The overall process and specific course process of the distributed system in the technology proposed in this paper are designed and analyzed in English teaching. Finally, the experimental comparison of the virtual reality technology distributed system in English teaching is conducted. The results show that the application of distributed systems in English teaching in the technology proposed in this paper is worthy of promotion.

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## Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

## Conflict of Interest

The author states that this article has no conflict of interest.

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