English Teaching System Oriented Digital Virtual Reality Combined with CAD Method

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Abstract. In view of the problems existing in the English teaching system, the digital virtual reality technology is introduced into the computer aided technology (CAD), so as to get the corresponding optimization model. The accuracy of the model is verified by overall analysis and secondary analysis of relevant data, indicating that the model can well reflect the relevant indicators in the English teaching system. The research shows that the development of virtual reality technology can be divided into slow increase stage, rapid increase stage, slow decline stage and stable stage. The development of virtual reality technology has come to a stable stage. In order to further promote the development of this technology, it is necessary to select M and N points as the best advantages of this model. By analyzing the calculation errors of the computer-aided model in the teaching link, it can be seen that compared with the standard data, the error of the model in the teaching feedback (C) is the largest, indicating that there are certain problems in the teaching feedback of the model, which need to be further optimized. The errors of the model in pre-class preparation (A) and in-class teaching (B) are relatively small, indicating that the model is suitable for pre-class preparation and in-class teaching. Using the method of digital virtual reality combined with CAD to analyze and study the English teaching system, the overall index change curve of the English system is obtained: The integrity of different indicators is good, which can meet the needs of corresponding teaching, among which the teaching effect index is the largest. Finally, the optimization model is verified and analyzed by experimental method, which proves that the optimization model can provide basis and theoretical support for the design and application of English teaching system.

Keywords: Digitization; Virtual reality; CAD; English teaching; The optimization model
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1 INTRODUCTION

Digital virtual reality technology has a wide range of applications in various aspects: Aiming at the application of virtual reality technology in three-dimensional biology, Jurda et al. [1] applied digital virtual reality technology to virtual repair of bone fragments, and verified relevant technologies with relevant data. It can be seen from the laboratory experiment that the digital virtual reality technology can well describe and characterize the related work of bone fracture and modification. By using this model, other aspects of medicine can be studied, so as to test the application of digital computer aided technology. The optimization model can provide theoretical support and reference for the application of digital computer assistance in medical field. Sharma et al. [2] introduced the latest review of researches carried out in virtual reality (VR) environment, and further discussed the psychological mechanism of VR device use experience. (2) through the summary and analysis of the related digital virtual reality technology, find out the related links, digital theory and computer aided based on virtual reality technology theory, deduces the corresponding computer aided model, the model through the application of virtual equipment monitoring and analysis, by analyzing the monitoring results to verify the accuracy of the model. In order to explore the mechanism of object interaction in virtual environment, Alessandro [3] analyzed the application of virtual reality and digital technology in 3d scene simulation model, which can provide scientific reference for the research of 3d urban street view and the development of related software system. This model mainly through introducing digital virtual reality technology to the traditional model, in order to related parameters of the model, which can identify the computer aided technology iterative analysis of model parameter, and then find out the optimal model parameters, the parameters in optimization model can be described the theoretical model of three dimensions mesoscopic scene, The optimization model is verified by digital map and other detection results. The research shows that the model can describe the three-dimensional space well. In order to explore the application of virtual reality technology in digital tourism system, Pan [4] used virtual reality technology to simulate and create surreal scenes and construct three-dimensional virtual tourism environment, and verified the model with relevant experimental methods. Digital computer aided technology can be applied in a variety of different environments. By analyzing and importing the specific data, the corresponding model parameters can be kept in virtual reality technology, and the specific scene model can be obtained by bringing in the model parameters, and it can be transferred from theoretical derivation to practical application. In order to cultivate high-quality talents in the field of digital art and design of social needs, Fan [5] digital virtual reality technology is adopted to establish the digital art teaching system, according to the relevant problems in the teaching system, put forward based on the technology of interactive virtual digital art design and implementation of teaching system, and through the related numerical simulation method is validated. Relevant numerical simulation results show that the reason why the existing model cannot describe the mathematical system is that the model parameters are not optimized, and the corresponding optimization model is optimized by digital virtual reality technology, which makes the model more accurate.

Virtual reality technology is obtained, as shown in Figure 1. With the increase of time, the corresponding virtual reality statistics show different trends. According to the different trends, it can be divided into four stages: (1) slow increase stage. With the increase of time, the corresponding value shows a slow increase, and the slope of the corresponding curve gradually increases. It shows that the numerical change of virtual reality technology corresponding to this stage is small and can be regarded as the initial stage of virtual reality technology development. (2) The rapid increase stage, with the further increase of time, the corresponding curve will increase rapidly, the slope of the curve is approximately constant, the curve in this stage changes greatly,

can be used as the rapid stage of virtual reality technology development. (3) In the slow decline stage, after the rapid development stage, virtual reality technology comes to the slow development stage, and the slope of the curve gradually decreases until it tends to 0. (4) In the stable stage, after a series of changes, the curve finally remains constant, indicating that the development of virtual reality technology has come to a stable stage. In order to further promote the development of this technology, the model needs to be optimized and analyzed accordingly, and the optimal advantages of the corresponding optimization model can be selected as M and N points.

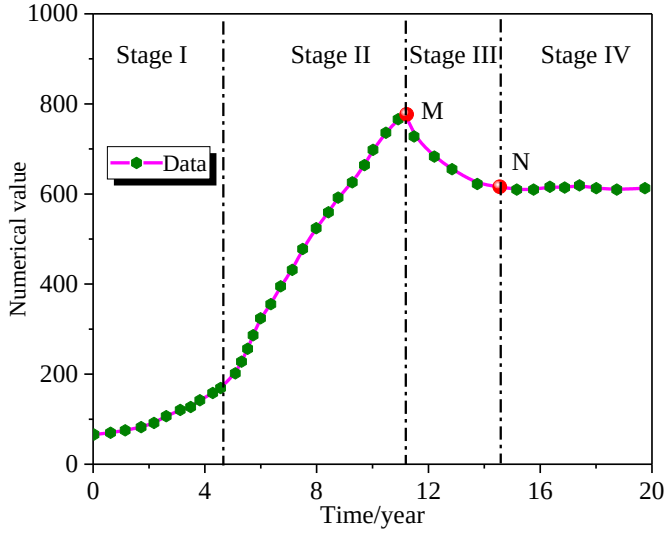

Figure 1: Development and change of virtual reality technology.

The above studies were mainly analyzed from the perspective of industrial application, but failed to analyze the English teaching system from the perspective of digital virtual reality. In view of the shortcomings in the above research, this paper, based on computer aided technology (CAD), adopts digital virtual reality technology to optimize the original English teaching model, so as to obtain the optimization model of the new English teaching system. The experimental data were used to verify the model, and finally the relevant parameters of the model were evaluated by the method of integrated analysis and secondary analysis. This study can provide theoretical reference for the application and promotion of digital virtual reality technology.

2 DIGITAL VIRTUAL REALITY TECHNOLOGY

2.1 Characteristics of Virtual Reality Technology

VR is a multi-disciplinary practical technology, it is a high-end human-computer interface, through the real-time simulation and real-time interaction of visual, auditory, tactile, smell and taste and other sensory channels [6]. Virtual reality system has four basic characteristics, also known as the four elements of virtual reality, they are immersion, interactive, unreal and lifelike.

The composition of virtual reality technology mainly includes four main parts: index composition, technical state, corresponding result and final index. As shown in Figure 2: Corresponding indicators are composed of virtual reality technology, software technology and hardware technology, and then these three parts are imported into the corresponding model state. After processing the technical states such as virtual environment, application development, data

tools and 3D view, the corresponding model results can be obtained. Model results can be divided into visualization, multimedia, interactive and system integration results according to different algorithms. In order to further analyze the model results, the model data is collected and imported into the corresponding equipment, technology, interface and equipment to obtain the corresponding indicators of the model.

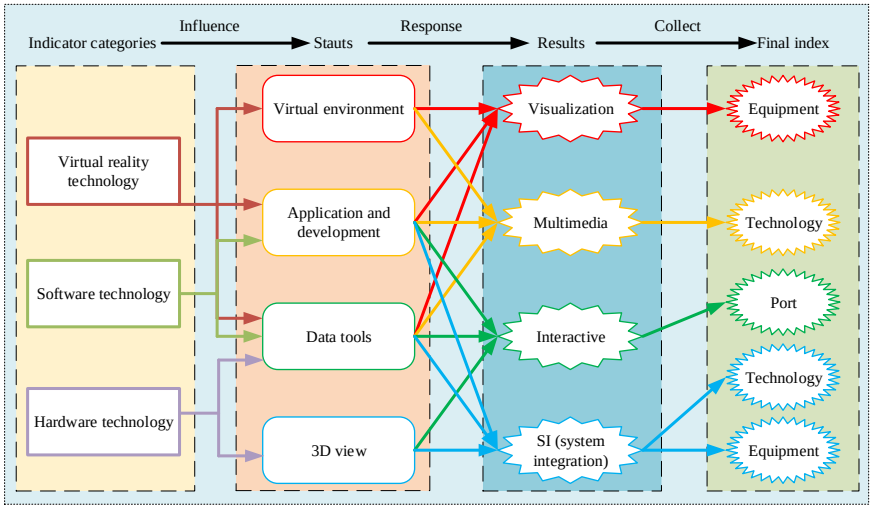

Figure 2: Virtual simulation system structure diagram.

2.2 The Composition of Virtual Reality Technology

VR is the use of computer and a series of sensing auxiliary facilities to achieve people can be in the real experience environment. Users can naturally inspect and operate objects in the virtual world through sensing devices according to their own feelings, thus creating an immersive feeling [7]. According to different classification standards, virtual reality system can be classified into different categories: (1) Projection virtual reality system: on the basis of desktop virtual reality system, a large screen projection or digital display wall is added to display 3d environment. (2) Simulated virtual reality system: this system requires participants to wear special coats or place themselves in the closed space installed on the sports platform to produce more realistic environmental effects.

The VR is shown in Figure 3. The VR is transformed into the real system and the virtual system for analysis. The real system also includes five systems including tracking, tactile, audio, graphics and visualization. Thus, the corresponding signal, data, audio, graphics and 3d model of five parts of the conversion; The corresponding virtual system has the program library and VR software. The global database is obtained through input and simulation [8]. In order to build a harmonious interaction between people and computers and immerse people in the virtual environment created by computers, the hardware needs the support of the following types of devices: (1) The tracking system: whose task is to detect the head, body and hand of the virtual reality system in real time. (2) Tactile system: which is the key factor to produce "immersion" effect, users can operate virtual objects with active limbs, and feel the object's reaction force during operation, so as to achieve force feedback. (3) Audio system: the auditory environment system consists of speech and audio synthesis equipment, speech recognition equipment and three-dimensional sound source positioning equipment. (4) Image generation system: in the virtual reality system, image generation and display technology are particularly important, its goal is to create virtual

environment for users and achieve operation management. (5) Visual display equipment: to display the immersive virtual reality environment, the generated images are sent to the two screens of the helmet display to generate a stereo image.

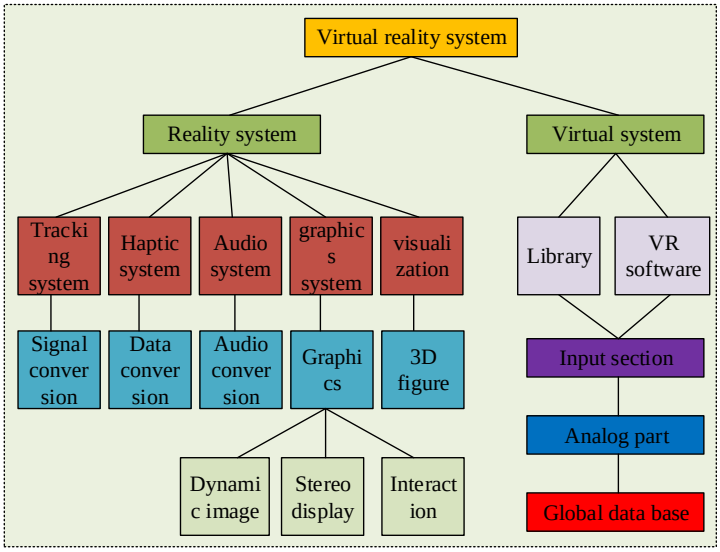

Figure 3: Virtual reality system composition diagram.

2.3 Digital Virtual Reality Technology

VR is used to imitate the scene in the real world, and the attributes of objects in the scene are also determined according to the corresponding objects in the physical world [9]. Most of the objects in the scene are static three-dimensional scenes, and objects in the scene are static, passive and inanimate. However, in the scene of the real world, many objects are alive. In order to imitate the real world more lifelike and make the participating users have a sense of immersion, necessary living objects should be added to the virtual world according to the need to form a digital virtual reality technology (DVR). The physical layer mainly stores geometry and texture information. These objects are represented by Agent in the realization, and the corresponding digital virtual reality system structure is shown in Figure 4.

As can be seen from Figure 4, the digital virtual reality system is started by importing users and objects into the high-level concept representation layer, and then communicates with the physical layer and concept layer by imposing the status of commands and messages [10]. Finally, the corresponding data is imported into the display layer for expression and output. The key technical problems to be solved in DVR include: (1) object modeling method with complex behavior and life characteristics: DVR system can adopt object-oriented methods to maintain and organize scenes, and each object has different geometric properties, behavior and life characteristics. (2) DVR-oriented human animation: In DVR, the way of interaction between users and the environment or between users largely determines users' impression of the system. (3) Simulation of intelligent life: According to the actual situation of a specific DVR system, the DVR technology selected is determined, and fuzzy cognitive graph (FCM) is used to describe the dynamic uncertain behavior of virtual creatures and guide their decision-making. (4) Real-time graphics rendering: In DVR, because there are multiple living objects and Avatars, the interaction between multiple objects and Avatars will greatly increase the amount of computation. (5) Digital interaction in virtual environment: virtual environment technology fully attempts to provide users

with a more natural and efficient human-computer interaction. (6) Knowledge representation and reasoning in DVR: In DVR, the environment needs to be abstracted so that the system can describe the evolution of objects and virtual worlds at a higher level of abstraction.

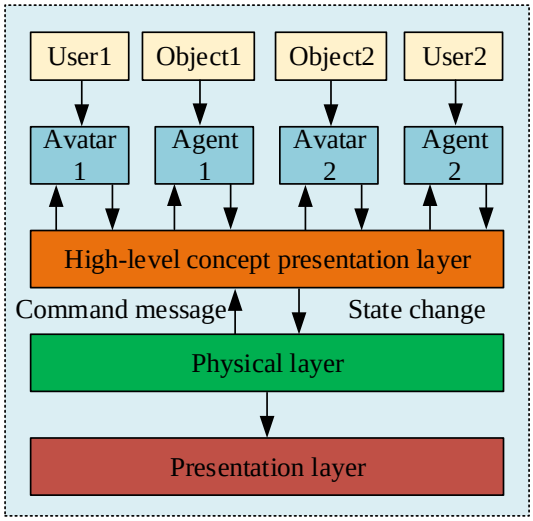

Figure 4: Digital virtual reality system structure.

3 COMPUTER AIDED METHOD

3.1 Basic Principles and Steps of Computer-Aided Design

CAD is designed based on the sample data from the science, on the basis of the basic characteristics of the design samples, combined with the actual monitoring data and design experience knowledge, intelligent technology, statistical analysis technology, information technology, virtual reality technology to support, automatically from the samples of knowledge learning, and the law of mining data contains. A variety of intelligent models are established to simulate the computer-aided correlation behavior, so as to realize the evaluation of computer-aided quality and the optimization design of relevant samples.

CAD is a mind-centered design concept, and its design process can be divided into the following steps: (1) The proposal of design tasks: the proposal of design tasks is actually the issuing of design tasks. (2) Conceptual design: After the design objective is determined, the conceptual design of the design object can be started. In this stage, the main idea of the overall scheme, generally, the designer can divide a large system into a number of subsystems, each subsystem needs to be designed again, through the use of different data analysis methods and the combination of fuzzy neural network and other algorithms, so as to achieve the optimization of related design objectives. (3) Detailed design: through the use of the above research methods can be used to determine the scheme under computer aided technology, when the conceptual design is determined, in order to further improve the efficiency of design and optimization, the specific implementation scheme of the product can be checked hierarchically. In order to put forward drawings for each part in detail, to determine the structural shape of parts, quantity and assembly relations.

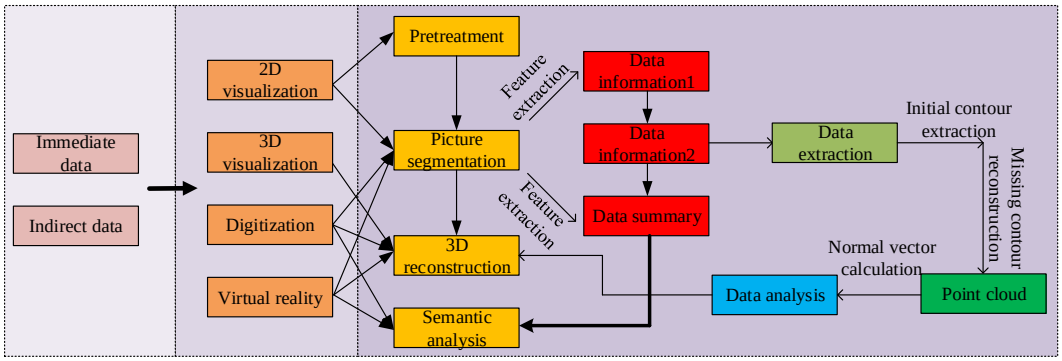

Figure 5: Flow chart of computer aided key technology.

Through the above analysis, a computer-aided key flow chart can be obtained, as shown in Figure 5: By direct and indirect data imported into the corresponding 2 D, 3 D, the structure of the digital and virtual reality, on the basis of this structure leads to image segmentation and pretreatment technology, put forward for further analysis of the data and pictures and, finally, and through the analysis of the point cloud data processing steps such as to further optimize the computer-aided technology.

3.2 Computer-Aided Education and Teaching

The deep integration is one of the important development trends of contemporary education. We should vigorously promote the application such as virtual reality and digital technology in teaching, and explore the implementation of intelligent, personalized education. Computer-aided education and teaching is a comprehensive application of big data, multimedia, artificial intelligence, network communication and knowledge base and other information technology, the function of the computer system and the teacher's classroom teaching organic combination, to provide students with a good personalized cognitive approach and learning environment. The advantages of computer-aided teaching include: First of all, the computer aided teaching model overcomes the drawback of traditional teaching model of a single, one-sided, in constructing the ecological environment of technology integration, not only enables teachers to exert deploy productively teaching method, and allow learners to obtain appropriate personalized learning services. Second computer aided education teaching technology can be a great liberation of teachers and students, from the teacher's point of view, as more and more young teachers to join the teachers, make the reform of the education teaching method is more urgent, because young teacher contact computer aided related concept is more, the computer aided technology can further reduce the time of the teacher blackboard writing, Further improve classroom efficiency; From the students' point of view, computer aided system is a new type of education and teaching, can maximize the students' attention, increase students' interest in the classroom. Especially in the context of the serious global epidemic, it is urgent to adopt computer-assisted instruction.

The framework of subject-object relationship of education system constructed by computer aided technology consists of two kinds of educational subjects and two kinds of educational objects. (1) The main content of the subject-object relationship frame: The education theory under the computer aided technology takes the educator and the educated as the main body, takes the teaching material, teaching AIDS and other tools used in the education process as the object, and establishes the inter-subject communication relationship between the educational subjects under the connection of the education object intermediary. (2) Analysis of object relation framework: Students, as a subject of education with subjective initiative, can acquire and learn knowledge with the help of educational objects, discover its internal laws, and achieve the purpose of knowing its origin.

In order to further analyze the difference between the cad model and the original model, the training values and test values of different data were imported into the two models for analysis, and the calculation results are shown in Figure 6: It can be seen from Fig. 6 that training values and test values in the original model have great discreteness, among which the discreteness of test values is relatively higher, indicating that the original model cannot well solve the problem of great discreteness of data in the calculation process. The discreteness of the test value and the test value under the corresponding computer-aided (CAD) model is small. It can be seen from the analysis that the discreteness meets the corresponding error requirements, so the computer aided model can better process and analyze the data.

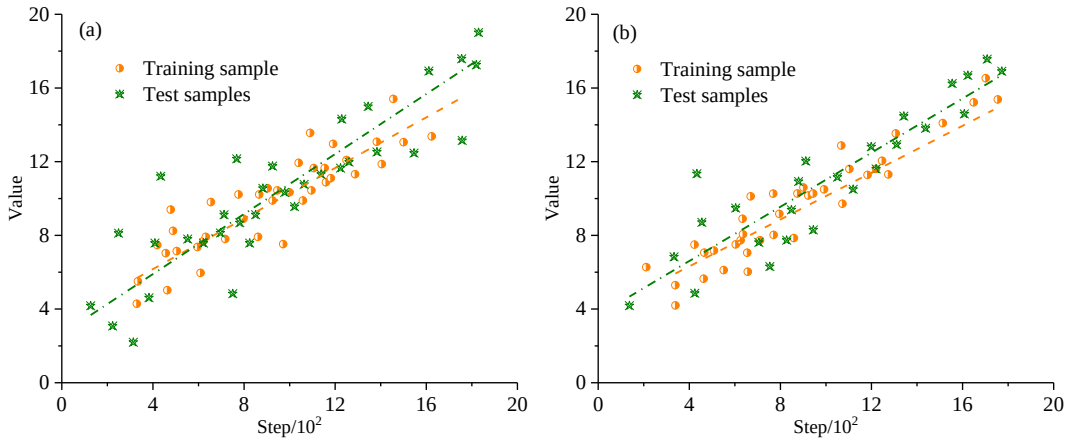

Figure 6: Comparison between test values and test values of different systems (a) The original system (b) the CAD auxiliary system.

4 DIGITAL VIRTUAL REALITY COMBINED WITH CAD METHOD OF ENGLISH TEACHING SYSTEM

4.1 Construction of English Teaching System

With the gradual advance of the new round of basic education curriculum reform, accelerating the establishment of an evaluation system to promote the development of students and teachers has been increasingly valued by the academic community. Whether the evaluation index system of English education is scientific and reasonable will directly affect the effect of teaching evaluation to some extent. An effective teaching system will have a positive guiding and feedback effect on teachers' teaching, so that teachers can adjust their teaching process according to the evaluation results and remedy and correct the defects and problems in teaching in time.

Teaching process	Level indicators	The secondary indicators
Prepare before class A	Teaching objectives	Meet the requirements of compulsory education stage
		Emphasis is placed on the cultivation of students' cultural
		The goal is clear, specific and has strong operability
	Teaching design	The teaching structure is rigorous and complete
		The number of teaching activities is reasonable
In the teaching B	Content of courses	Grasp the important and difficult points in English class
		Highlight the guidance of students' values
		Combine English with students' real life

	Teaching method	The cultivation of students' interest Guide students to study in context Teach students in accordance of their aptitude
	Teaching atmosphere	How active the classroom atmosphere is Student feedback Multivariate evaluation of student performance in class
After class feedback C	Teaching efficiency	Students' understanding of English Students' cultural vision and perspective Students' enthusiasm and enthusiasm in learning English

Table 1: English class evaluation table.

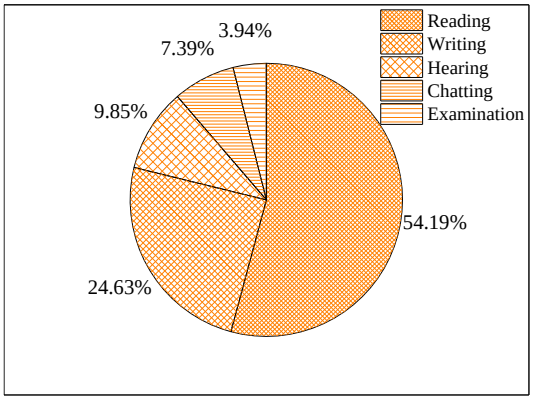

Figure 7: Survey map of English section.

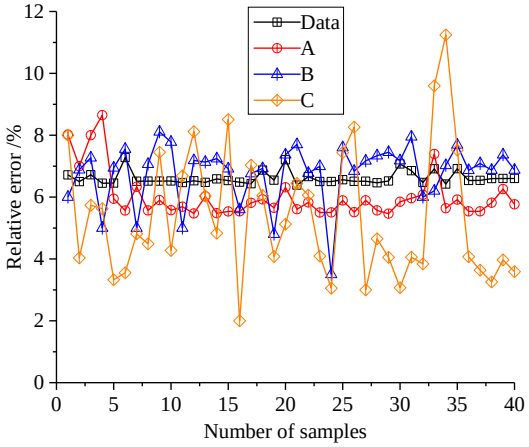

Figure 8: Analysis diagram of different parameters.

English classroom teaching evaluation is an important premise and foundation of English teaching system. In order to have a more accurate grasp of the existing problems in English teaching, a survey was conducted among 500 students to find out which part of English students liked best. The survey chart of English section that students liked best was obtained through investigation and

analysis, as shown in Figure 7: As can be seen from Figure 7, reading is the most important English section for students. More than half of students choose reading, while 24.63% choose writing, and 9.8% choose listening. More than 7% of the students chose communication, indicating that they thought communication and communication were very important for learning English. Only 3.9% of the students chose the test. In order to better analyze the English teaching system, the digital virtual reality technology is introduced into the CAD method to obtain the corresponding optimization model, which can better describe and analyze the English teaching system. The corresponding English classroom evaluation is shown in Table 1: From Table 1, the optimization model divides the English teaching process into three parts, and divides corresponding first-level indicators respectively, including teaching objectives, teaching design, teaching content, teaching methods, teaching atmosphere and teaching effect. And on the basis of the primary index, the corresponding secondary index is divided in detail.

In order to further analyze the computational errors of the computer-aided model in teaching links, model errors in different teaching links are summarized as shown in Figure 8. As can be seen from Figure 8, compared with standard data, the error of the model in teaching feedback (C) is the largest, and the corresponding curve fluctuation amplitude is relatively obvious, indicating that there are certain problems in teaching feedback of the model and further optimization is needed. The errors of the model in pre-class preparation (A) and in-class teaching (B) are relatively small, and the corresponding fluctuation range of the curve is small, indicating that the model is suitable.

4.2 Evaluation of Numerical English Systems

By using the method of digital virtual reality combined with CAD to analyze and study the English teaching system, the overall index change curve of the English system is obtained, as shown in Figure 9. As can be seen from Figure 9, different indicators have good integrity and can meet the corresponding teaching needs. Among them, the teaching effect index is the largest (21), followed by the overall index and teaching design index, followed by teaching objectives, teaching atmosphere and teaching content, and teaching method index is the smallest (about 15).

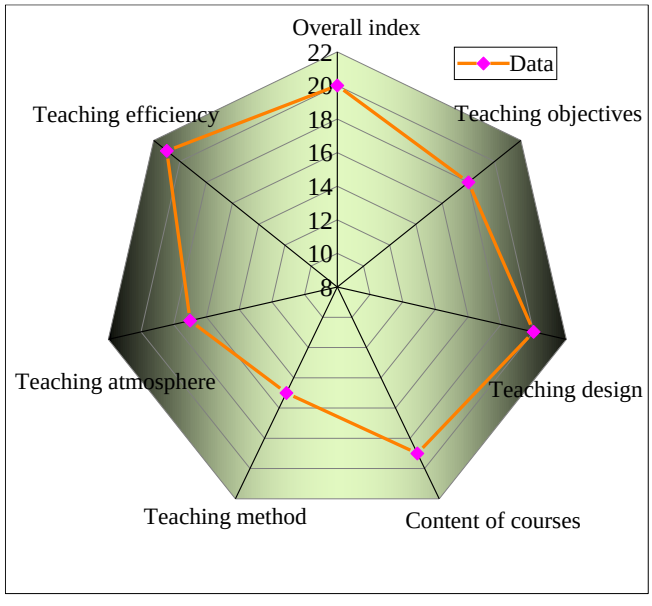

Figure 9: Analysis chart of overall indicators.

After the overall evaluation of the classroom teaching quality of English teachers, in order to describe the English teaching system in more detail, it is necessary to analyze the secondary indicators, so as to obtain the significant factors affecting the quality of English teachers. The corresponding secondary indicators are shown in Figure 10. Indicators higher than 60 include data 1, 2, 4, 10, 13 and 14, and indicators between 60 and 20 include data 3, 6, 8, 9, 12 and 15. The highest index is Data 13, while the lowest index is data 7, which respectively correspond to teaching feedback in teaching methods and guidance of students' values in teaching content.

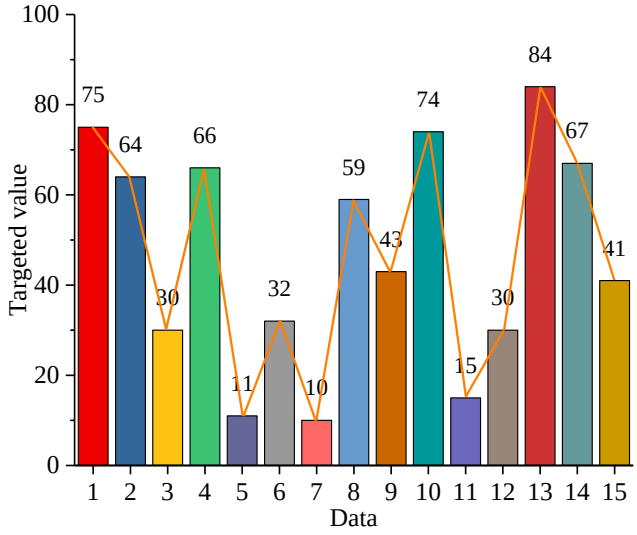

Figure 10: Bar chart of secondary indicators.

5 CONCLUSION

By comparing the computer aided technology model with the original model, it can be seen that the original model has a large discreteness of training values and test values, indicating that the original model cannot solve the problem of large discreteness of data in the calculation process. The discreteness of test values and test values under the corresponding computer aided (CAD) model is small, so the computer aided model can better process and analyze the data. By analyzing the survey chart of students' favorite English sections, it can be seen that reading is the most important English section for students, and more than 7% of students choose communication. In the end, only 3.9% of the students chose the exam, indicating that the students paid more attention to the practical use of English. Through the analysis of each second-level indicator in the English system, it can be seen that indicators with different data are different, among which there are 6 indicators higher than 60 and 6 indicators between 60 and 20. The highest index is Data 13, while the lowest index is data 7, which respectively correspond to teaching feedback in teaching methods and guidance of students' values in teaching content.

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