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Retraction

Retracted: Computer-Aided College English Teaching System Based on Virtual Reality and Artificial Intelligence

Wireless Communications and Mobile Computing

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Wang, "Computer-Aided College English Teaching System Based on Virtual Reality and Artificial Intelligence," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 9613587, 9 pages, 2022.

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Research Article

Computer-Aided College English Teaching System Based on Virtual Reality and Artificial Intelligence

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People are realizing that linguistic competence is a vital aspect of communicative competence as language study and instruction have progressed. Grammar instruction is not only important but also the primary means of achieving communication skills in foreign language classes. This article focuses on the computer vision and machine learning-based virtual reality technology college English immersive context teaching approach. The goal is to increase pupils' capacity to learn English. The experimental groups used VR innovation immersive environment education from the standpoint of constructivist theory in a compared teaching experiment with 2 classifications of freshman at a university, while the control class used standard multimedia equipment and conventional teaching techniques. Students only passively acquire a lot of material from instructors in the class, they have limited opportunity to engage in the exchange of information and express thoughts in the chosen language, and they are "immersed" in the Chinese environment most of the time. With an average score of 2.8 points higher than the control group, the overall English level was likewise higher. English teaching system based on computer big data method, optimization of oral English teaching system based on computer-aided technology, and artificial intelligence are the existing methods used for comparison. This demonstrates that using constructivism theory and virtual reality technology in college English immersing contextual education may genuinely increase students' English levels.

1. Introduction

There is an ever-growing lexicon of computer technology terms as the field continues to advance rapidly. A lot of new computer technology comes from outside of the United States. Consequently, one must be able to comprehend computer English papers fast so that one may swiftly grasp these new abilities. There are computer-related majors at colleges and institutions that have built up computer-language classes for students. Learning English vocabulary is the most important part of learning computer English. The use of computerised English learning systems has not received much attention or been made widely available because to the specificity and limits of the major.

An instructional paradigm that incorporates the use of computer technology in classroom education, experimentation, one-on-one teaching, and teaching administration is known as computer-assisted instructional (CAI) [1]. Computer-aided teaching has been around in my nation for more than 20 years. Numerous breakthroughs have been achieved in the fields of theoretical analysis, hands-on investigation, and the creation of educational software. CAI has achieved significant progress in recent years in terms of both depth and breadth of growth, by using foundational concepts such as cognitive learning theory, system science theory, and instructional design theory. It has been a successful year for theoretical and practical CAI research, as well as courseware development. Because of the fast advancement of information technology, studies into computer-assisted instruction have never been better supported. In the information age, a computer-aided English teaching system based on C++ and Windows technology must be designed to guarantee that computer-aided English instruction may be employed in teaching. This will be the subject of a detailed investigation in the next article.

1.1. Comparative Study of Conventional English Instruction vs. Computer-Assisted Instruction. Teaching English in a traditional manner begins with the establishment of educational goals and the overall curriculum and ends with an evaluation of students' progress. Figure 1 illustrates the contrast.

Teachers and students work together to create a teaching system, as shown in the diagram above. In order to complete the process of teaching and learning, both teachers and students must process and transfer instructional material. This information is processed by the instructor, who then conveys it to pupils through language, writing on the chalkboard, and other instructional aids. This diagnostic and evaluative step is crucial for determining how well students comprehend and apply the material they are being taught [2]. Then, provide them with timely feedback so that they may begin the following cycle. There is no one-way street in the teaching process, as this exchange reveals. As seen in Figure 2, the fundamentals of computer-aided education are depicted.

On the basis of this diagram, it can be shown that computer-assisted education relies on programmers controlling computers. Varied information is shown to people, and the input device receives various kinds of information from the user, which is then assessed, transmitted, and targeted; prompt information is supplied as a result of the judgment. As a result, with the right software and computer, a computer may act as both a teacher and a student in order to carry out certain instructional duties.

This article focuses on the computer vision and machine learning-based virtual reality technology college English immersive context teaching approach. The goal is to increase pupils' capacity to learn English. The experimental groups used VR innovation immersive environment education from the standpoint of constructivist theory in a compared teaching experiment with 2 classifications of freshman at a university, while the control class used standard multimedia equipment and conventional teaching techniques.

2. Related Work

In the current structure, no one is in charge of overseeing the growth of college football specifically for young people. In this research, players found intelligent FTT's teaching mode to be enjoyable, which suggests that the system might help motivate players to learn and practise. The following is a brief summary of the main points [1].

As computer and multimedia technology matures and advances, computer-aided teaching (CAT) reflects cutting-edge teaching concepts and methodologies. The use of computer help in English teaching has become a popular trend as a result of the present change in English education [2].

Because of the rapid growth of digital language systems and multimedia technology, English language instruction may now take use of the most up-to-date teaching approaches. The purpose of this essay was to examine how to create an artificial intelligence-based learning centre system to enhance the capacity of English language learners to learn on their own. The strength of technological progress brought forth by artificial intelligence is also required to develop the autonomous learning system [3].

As a result of limitations such as safety, traditional sports courses at the stadium can be simulated using virtual reality technology to provide scientific and accurate teaching and learning. A number of preset virtual locales may be used to pique the attention of the user, allowing them to immerse themselves in the content. Using a VR device, you may thus engage effectively in a virtual scenario and enhance your VR device experience [4].

English majors need to be able to speak fluently in order to succeed in their studies. In contrast, the conventional spoken English education approach relies mostly on classroom instructors' real analysis and practise, as well as pupils' rote memorization and basic practise outside of class. Through the use of computer-assisted learning, this project was aimed at creating an oral English teaching system.

Speech recognition, semantic analysis, and speech synthesisers are all included in the system's design, which is used to enhance the teaching of spoken English. Using the computer-aided oral English teaching method presented in this work, the experiment found that the students were able to better study on their own, get a better understanding of the material, and enhance their information-based teaching management skills [5].

As a result of AI's ability to supply teaching materials, a variety of teaching models, and a more efficient method of teaching administration, education has been transformed. A systematic strategy to developing smart teaching in college English classrooms is provided in this thesis, as are some innovative suggestions for the expansion of English teaching in the future [6].

There is a lot of room for the use of AI technologies in foreign language acquisition as globalization continues to progress and the use of a multiangle foreign language learning method to bedmaking [7].

It is tough to construct realistic teaching settings in most of the already created virtual classrooms. When it comes to virtual teaching systems, an in-depth look at how they are organised, along with how they are used, is completed. For practical education, fidelity and interaction seem to meet expectations, as shown by survey findings [8].

For the development and deployment of the intelligent computer-aided teaching system, an artificial intelligence-based teaching system model is proposed. The digital network learning platform based on artificial intelligence computer-aided art teaching mode played an essential part in the study and learning process of logo design subject. Learners' design inventiveness is substantially aided by educators and other participants in the learning process. It was found that the artificial intelligence-based computer-assisted art teaching model outperformed the conventional art teaching model in terms of student learning [9].

The use of multimedia-assisted education in real-world classrooms is becoming more vital as science and technology advance. It makes use of previous research findings. Teachers and educators alike are likely to embrace multimedia education as part of the national curriculum reform process [10].

Computer-aided education has become an increasingly frequent method of teaching in schools as the field of science and technology continues to advance. This method, as shown by the results of the experiments, has certain impacts

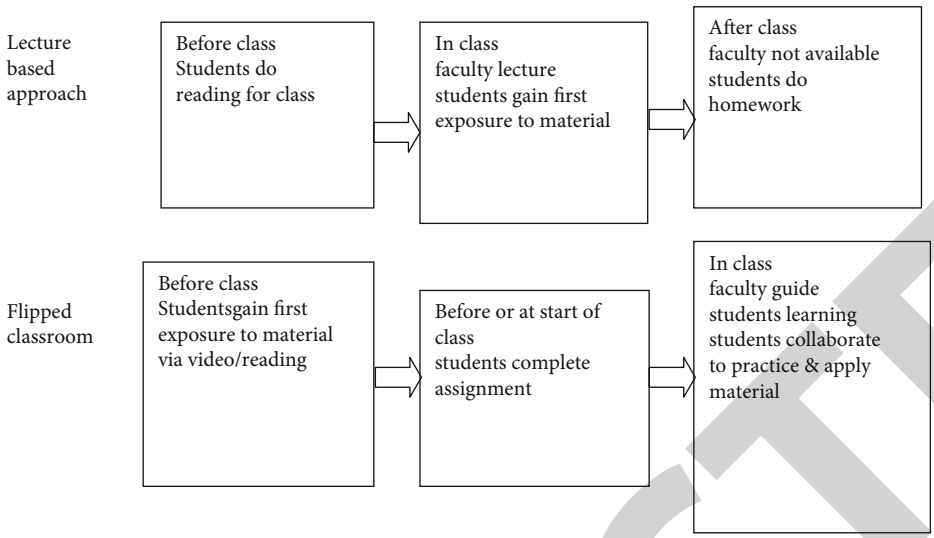

Figure 1: Comparative analysis teaching.

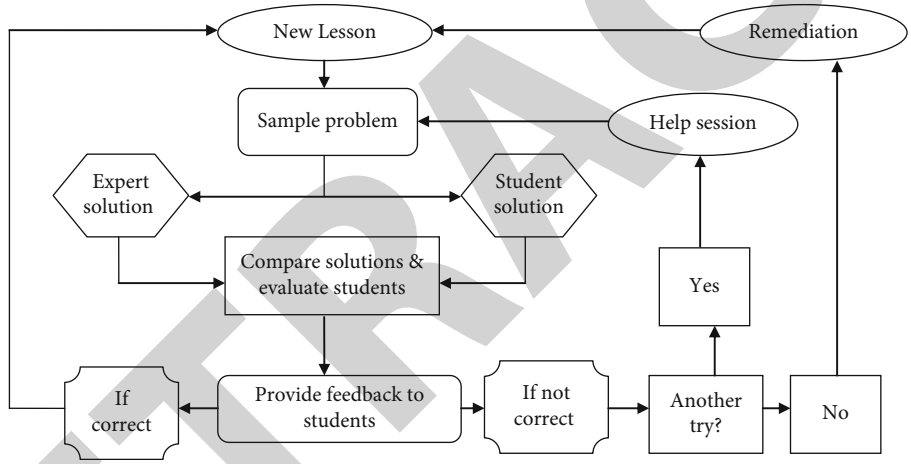

Figure 2: Flow of work of basic computer assisted teaching.

and may be utilised as a teaching aid and theoretical reference for further study in the field [11].

Research on AI and deep learning approaches in education has been resurrected from the last twenty years of educational research. Research topics in AI and DL were examined using a computerised text analysis in prominent academic publications. To begin a conversation on the advantages and disadvantages of integrating AI and DL into classroom instruction, this paper was written [12].

The Engineering training course is responsible for fostering students' creativity, teamwork, and practical operating skills. There are now two strategies to increase the performance of the innovation training in the practical course of engineering. The VR-based training system for engineering practise assistants has already been used by younger students, and some feedback has been obtained [13].

People in China are becoming more interested in studying English as a result of the country's expanding globalization and internationalization. This approach is capable of analyzing speech signals and providing appropriate feedback, as shown by the results of a series of experiments [14].

This study examines the challenges and prospects of English language acquisition in an era of rapid technological advancement and emphasizes the need of a strong command of the language. The author concludes that the benefits of multimedia computer-aided English language learning outweigh the disadvantages of conventional English language ability acquisition [15].

In this paper, a virtual reality laboratory system is described that makes use of this cutting-edge technology. The application of advanced virtual reality technology in engineering education courses has improved mechanical structure cognition and training, structural assembly training, and curriculum design [16].

The use of computerised English learning systems has not received much attention or been made widely available because to the specificity and limits of the major. Most of multimedia computer-aided English language learning are

highly complicated. These complications are removed by this proposed method [17].

3. Methodology

Internet-based networked teaching aids are built into the system's B/S mode framework. The system consists of two parts: an aided expert system for college English teaching and a self-learning module for students. Students, English teachers, and system administrators are the only users of the whole system. Each user will have access to a separate set of permissions when they log in, depending on their identity. Figure 2 depicts a user's operational privileges. Every day maintenance personnel, such as user administration, item bank management, and password change, are referred to as "system managers" in this context.

The term "domain expert" refers to seasoned English instructors who have taught for many years. English test samples may be provided in a variety of formats including knowledge base maintenance, neural network sample maintenance, and password rectification. They can also examine knowledge points, degrees, and certainty levels included in the English test [18].

The term "teacher" is used to describe someone who teaches English as a second language. Each instructor is assigned a certain number of pupils and a set number of courses. Their primary responsibilities include organising tests, posting results, and assessing the pupils' knowledge points [19].

When a system administrator gives a user name and password to students, they are referred to as "students." Participation in exercise, self-diagnosis, historical exercise diagnosis, improved practise of knowledge points, and password modification are all key authorities in their eyes [20].

3.1. System Module Division

3.1.1. Student Model. Intelligence education relies heavily on the use of a student model. After completing the system's learning and assessment, students' knowledge, cognition, learning goals, learning style, and learning history all change. This is a system characterization of these changes. By providing a judgement base for realizing instructional goals, material, and strategies, it helps the system tailor instruction to the unique needs of each learner.

3.1.2. The Role Model for Students Is the Teacher. It is important to have a system in place for planning, administering, and executing the whole of a school's educational activities. It has the impact of combining the goal and practical ability of students, integrating the learning outcomes supplied by students' modules, analysing the present state of students, and making teaching strategy. Individualized instruction may be achieved by using a teacher model that selects the most successful technique of teaching for each student.

3.1.3. The Model of a Domain Is Called a Domain. The knowledge base of students and teachers is included in the domain model. Detailed information on each student is recorded in the students' knowledge base. This includes information such as the student's history of knowledge acquisition as well as their current level of knowledge. Data on students' decisions about learning material, content structure, and difficulty arrangement are provided as a system reference.

3.1.4. A Model for Diagnosing the Problem. Diagnosis and evaluation are the two parts of the diagnostic paradigm. Student faults and flaws are diagnosed and remedial training is implemented based on personal characteristics via the diagnostic function of diagnosis.

3.2. English Expert System Design

3.2.1. The Data Layer Implementation. Knowledge base, basic database, and mining database make up the data layer's three components. It is primarily the definition and uploading of data, such as the management list, domain expert list, instructor list, students list, and students' answers, that is the core of a basic database. The most significant aspect is the list of students and the data collected from their responses. Expert systems are built on knowledge bases that include domain-specific information. Grammar and vocabulary analysis, item bank, item analysis data, etc. are all stored in the knowledge base for English education.

During system operation, data created by data mining modules, including intermediate step data, is stored in a mining database.

Knowledge base expression and design are the most critical aspects of an expert system. A person's knowledge base consists of two parts. To begin, gather and organise system information. The knowledge base then stores information in accordance with the model rule, allowing it to be easily updated, rectified, and augmented. An English expert system has a two-part knowledge base. Fixed vocabulary and grammar are two examples of a static knowledge base. Lexicon and grammar are both subdivided into verbs and nouns; tense and sentence pattern are subdivided into the subjunctive and the infinitive.

The dynamic knowledge base, on the other hand, includes additional information on test questions and teaching requirements, such as the right and incorrect answers to test questions, as well as extensive analysis of the test questions. Once a system is up and running, professionals in the relevant area progressively add new features.

3.2.2. Engine for Making Deductions. An expert system's inference engine is the most important aspect of its functioning. First, this system uses forward inference and titles infer all the knowledge points that are involved and verified. It then uses backward inference to deduce that pupils have grasped key knowledge topics based on their responses.

Forward and backward inferences are the last steps in the inference process of an expert system. In order to run the system, teachers submit their students' answers and specialists create a rule to determine the relevant fuzzy output variables.

Then, based on the output variables, reliable inferences may be drawn. There is uncertainty in both the knowledge base rule and the intermediate outcome, which is the fuzzy output variable. Expert systems make this determination. Uncertainty in the system's eventual conclusion is progressively transferred to the system's data operation.

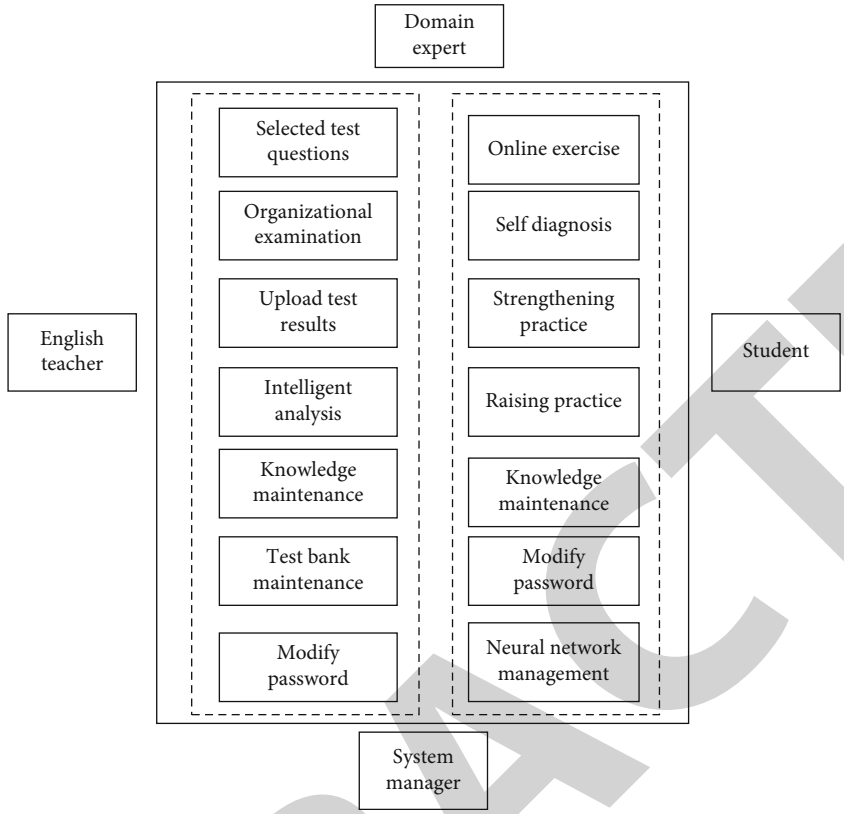

Figure 3: AI-based college foreign language teaching.

3.2.3. Interpreter. When a student's response file is uploaded to the system, instructors may see the inference findings in a table.

The interpreter has two sections. As an example, the system provides knowledge points in an expressive form based on diagnostic findings drawn from test results uploaded by users. Alternatively, you might provide hints based on diagnostic fault knowledge points and alert the reliability of the conclusions.

3.3. Weighted Inference Model. Subconditions in uncertain inference may be described by using weighted factors when there are several preconditions in the knowledge condition. Assigning different weights to different subconditions might show how important each subcondition is to the conclusion of a multicondition. Weighted components in a subindependence condition should normally grow in value if they have a significant impact on the overall result. The following graphic depicts the weight of knowledge represented in the following way.

If

$$A_1(w_1) \wedge A_2(w_2) \wedge \cdots \wedge A_n(w_n), \tag{1}$$

then

$$B = \mathrm{CF}(B, A), A = A_1(w_1) \wedge A_2(w_2) \wedge \cdots \wedge A_n(w_n). \tag{2}$$

In this case, the subpremise is $A_i nI$ and the conclusion is B. They have a true value of 0-1. It is necessary to consult a subject expert to determine the weight factor (1, 2,...) $w\,n\,I$ for the given condition A_i. It conforms to the standard.

$$\sum_{i-1}^{n} w_i = 1. \tag{3}$$

Set each A_i's trustworthiness to () CF. When using combinatorial evidence, the reliability is computed as follows:

$$CF(A) = \sum_{i-1}^{n} w_i \times CF(A_i) / \sum_{i-1}^{n} w_{i.} \tag{4}$$

$CF\,B\,A$ (,) is the dependability of rules, and it fulfils 0 (,) 1 $d\,d\,CF\,B\,A$. If B has a high level of dependability, we may use the formula

$$CF(B) = CF(B, A) \otimes CF(A). \tag{5}$$

Operator $\otimes$ characters are denoted by a character.

Rules using weighted subcondition factors may indicate varying levels of support for multicondition conclusions, independence, and dependency on each condition in the English expert system. Knowledge representation and uncertain inference may be improved by using this method, as well as solving the problem of uncertain inference under incomplete situations.

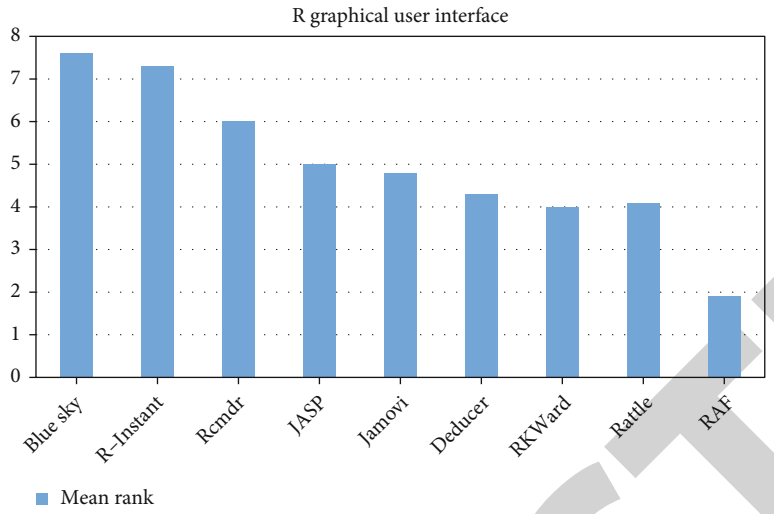

Figure 4: Graphical interface for role statistics.

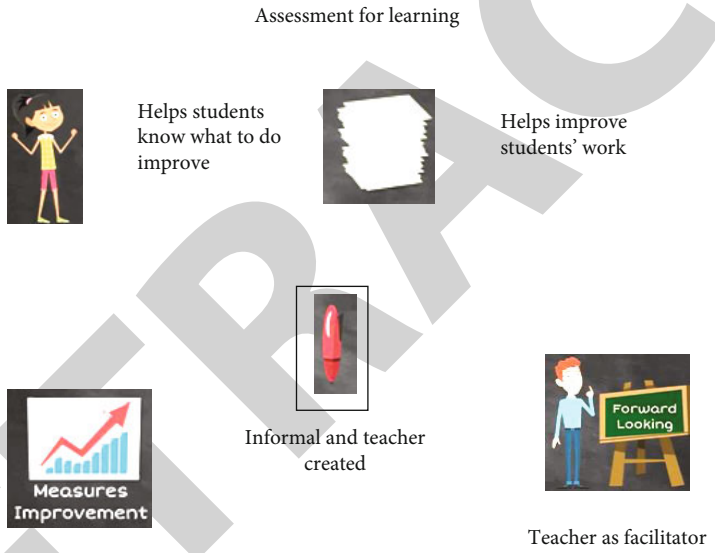

Figure 5: Online course evaluation for teachers.

Table 1: Comparison of results.

Parameter	Position	Task	Score 2	AR	VR	CC	AI	AUC
English teaching system based on computer big data (method 2) [2]	2.6639	2.22	2.23	2.22	2.252	39.50%	69.20%	2.26
English teaching system based on computer big data (method 2) [2]	2.292	2.29	2.26	2.92	2.252	93.20%	92.20%	2.29
Optimization of oral English teaching system based on computer-aided technology (method 3) [5]	2.299	2.293	2.25	2.99	2.229	99.30%	93.50%	2.292
Method 5	2.232	2.232	2.25	2.32	2.226	92.20%	99.50%	2.29
AI	2.222	2.255	2.22	2.22	2.222	95.20%	92.50%	2.99

4. Results and Discussions

Upon logging into the system, students may access a self-diagnosis module. Figure 3 depicts the home page. According to their ability, students may choose the appropriate knowledge point module. Students get their workout results once the system puts their results in a database and delivers them to them. In the meanwhile, the system will be provided with workout data for analysis in order to improve exercise.

As mentioned the Figure 3 and 4 to measure students' grasping abilities, the system will automatically save their answers into a database and use database inference functions such as right answers and question interpretation. In the meanwhile, this information will be saved to each

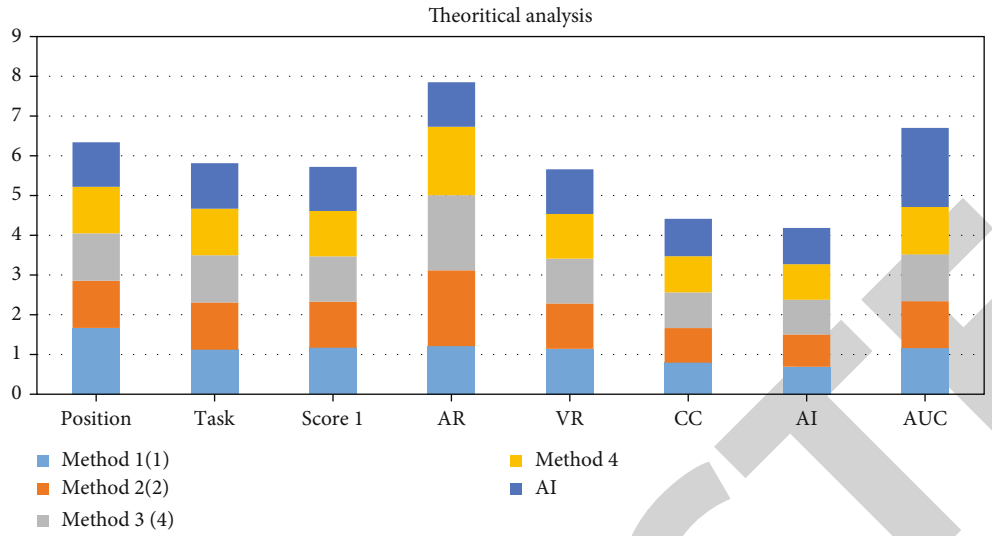

Figure 6: Theoretical analysis

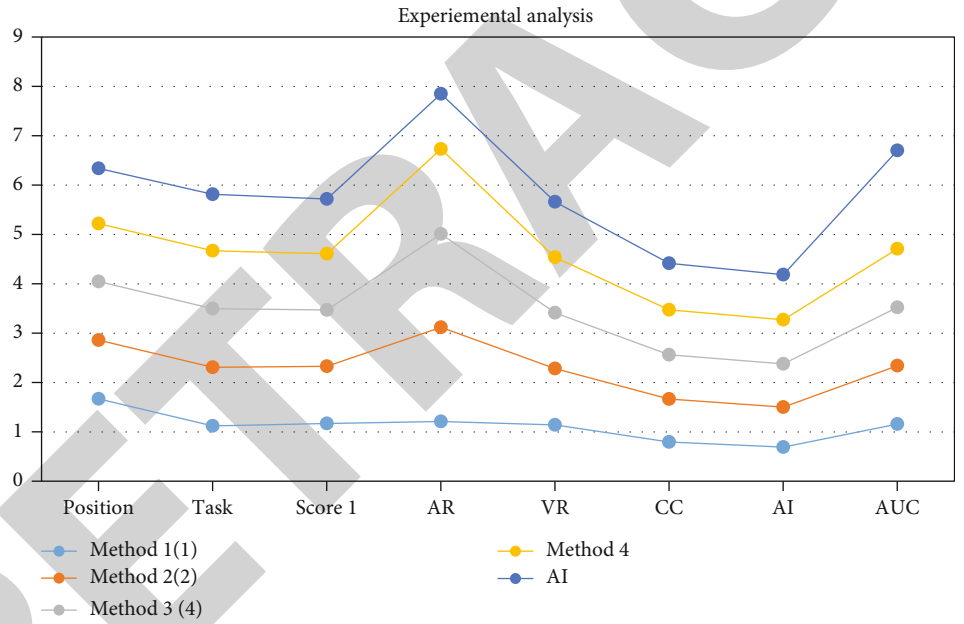

Figure 7: Experimental analysis.

student's personal account number for future reference and feedback.

Students and instructors are invited to participate in a field test to choose a computer lab for our school. Teachers, students, and management will be grouped together. Before instructors and pupils may access the site, manager characters must first approve their identities. These employees use and verify the smoothness of software system module operations, the completion of operational tasks, standard verification functions, and so on. Using the results of the tests, each character will provide their impressions on how well the system functions, how easy it is to use, and how human it seems.

It was created by the University of Wisconsin in La Crosse to assist teachers in conducting self-assessments of their online courses. There are two components to it. The first part of the book provides an overview of the content, a description of the goals of each course, and advice on how to put these elements into effect in course creation and instruction. As a faculty member, you may find this checklist useful in helping you review and improve an existing online course.

Teaching efficacy can be assessed by using a teacher evaluation form, which captures student comments. Using the free teacher evaluation forms from Jotform, you can learn what your students think of their instructors. In addition to being simple to edit and share with students, all contributions are securely kept in your Jotform account shown in Figure 5 and Table 1.

The position, task, score 2, AR, VR, CC, AI, and AUC are compared with the parameters in English teaching system based on computer big data and optimization of oral English teaching system based on computer-aided technology.

In order to better understand your statistics, you may see the responses in a spreadsheet, share them with other admins, or even transform them into graphic reports. Please feel free to modify any of the teacher evaluation form templates below to suit your school. To begin customizing, just choose the one that best suits your requirements and open it in our drag-and-and-drop Form Builder. Form fields, survey questions, photos, widgets, app connections, and your branding may all be added without any coding knowledge. This may begin collecting feedback on instructors at your school by putting up a form on your school website or emailing it directly to your pupils. A unique teacher evaluation form for your school will help you find out what your instructors are doing well and what they need to work on as shown in Figure 6.

Figure 7 clearly explains about experimental and theoretical analysis of proposed design. This proposed design attains more improvement compared to earlier models.

This method is highly efficient and the process of getting feedback from the instructor without any coding knowledge is complex, and this is considered a main limitation of this system.

5. Conclusion

This research presents an analysis of AI content, a rule-based uncertain expert system implementation, and a recommended overall implementation strategy for an AI-based college English-assisted system. Empirical evidence demonstrates that this paper's English teaching supported expert system utilizes a knowledge representation style that is a combination of generational and framework-style, as well as uncertain inference technology. It can fulfil the fundamental assessment of college English lecturers in terms of the knowledge points that students have mastered; therefore, the method has practical significance. The aggregate English level was also greater, with an average rating of 2.8 points higher than the control group. This shows that using theoretical concepts and interactive virtual technology into college English immersion context instruction may help students improve their English proficiency.

Data Availability

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

Conflicts of Interest

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

References

[1] D. Li and J. Zhang, "Computer aided teaching system based on artificial intelligence in football teaching and training," *Mobile Information Systems*, vol. 2021, Article ID 9562782, 10 pages, 2021.

[2] W. Zhu, "Research on college English teaching system based on computer big data," *Journal of Physics: Conference Series*, vol. 1865, no. 4, article 042141, 2021.

[3] Y. Zhang, "Construction of English language autonomous learning center system based on artificial intelligence technology," *Mathematical Problems in Engineering*, vol. 2022, Article ID 7900493, 12 pages, 2022.

[4] J. Zhou, "Virtual reality sports auxiliary training system based on embedded system and computer technology," *Microprocessors and Microsystems*, vol. 82, article 103944, 2021.

[5] L. Liu and R. Zhou, "Optimization of oral English teaching system based on computer-aided technology," *Computer-Aided Design and Applications*, vol. 18, pp. 147–157, 2020.

[6] Y. Liu, "Research on the construction of smart teaching in college English with the assistance of artificial intelligence," in *2021 4th International Conference on Information Systems and Computer Aided Education*, pp. 662–666, Dalian, China, 2021.

[7] W. Xiaohong and W. Yanzheng, "The application of artificial intelligence in modern foreign language learning," in *2021 4th International Conference on Big Data and Education*, pp. 34–37, London, United Kingdom, 2021.

[8] Y. Liu, M. Luo, S. Su, and Z. Yang, "Implementation of English online course teaching system based on virtual reality scene," in *2021 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS)*, pp. 558–561, Xi'an, China, 2021.

[9] C. He and B. Sun, "Application of artificial intelligence technology in computer aided art teaching," *Computer-Aided Design and Applications*, vol. 18, no. S4, pp. 118–129, 2021.

[10] R. Lin, "Integration of university foreign language teaching and multimedia resources in artificial intelligence vision," in *2021 4th International Conference on Information Systems and Computer Aided Education*, pp. 1214–1217, Dalian, China, 2021.

[11] Y. Quan, "Development of computer aided classroom teaching system based on machine learning prediction and artificial intelligence KNN algorithm," *Journal of Intelligent & Fuzzy Systems*, vol. 39, no. 2, pp. 1879–1890, 2020.

[12] C. Guan, J. Mou, and Z. Jiang, "Artificial intelligence innovation in education: a twenty-year data-driven historical analysis," *International Journal of Innovation Studies*, vol. 4, no. 4, pp. 134–147, 2020.

[13] Z. Sun, D. Zhang, X. Luo, Q. Cao, and Z. Li, "An open source engineering practice assistant training system based on virtual reality," in *2020 IEEE Frontiers in Education Conference (FIE)*, pp. 1–4, Uppsala, Sweden, 2020.

[14] Y. Yang and Y. Yue, "English speech sound improvement system based on deep learning from signal processing to semantic recognition," *International Journal of Speech Technology*, vol. 23, no. 3, pp. 505–515, 2020.

[15] C. Li, "Study on learning strategies of English language based on multimedia computer-aided," *Journal of Physics: Conference Series*, vol. 1533, no. 2, article 022065, 2020.

[16] M. Lin, L. San, and Y. Ding, "Construction of robotic virtual laboratory system based on Unity3D," *IOP Conference Series: Materials Science and Engineering*, vol. 768, no. 7, article 072084, 2020.

[17] H. Li and H. Wang, "Research on the application of artificial intelligence in education," in *2020 15th International Conference on Computer Science & Education (ICCSE)*, pp. 589–591, Delft, Netherlands, 2020.

[18] Y. Chen, "Optimization of music teaching methods based on multimedia computer-aided technology," *Computer-Aided Design and Applications*, vol. 18, pp. 47–57, 2020.

[19] M. C. Faleiros, M. H. Nogueira-Barbosa, V. F. Dalto et al., "Machine learning techniques for computer-aided classification of active inflammatory sacroiliitis in magnetic resonance imaging," *Advances in Rheumatology*, vol. 60, no. 1, 2020.

[20] A. Sobrinho, A. C. D. S. Queiroz, L. D. Da Silva, E. D. B. Costa, M. E. Pinheiro, and A. Perkusich, "Computer-aided diagnosis of chronic kidney disease in developing countries: a comparative analysis of machine learning techniques," *IEEE Access*, vol. 8, pp. 25407–25419, 2020.