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Retraction

Retracted: Rule-Based AI System Application on College English Teaching Path Based on Computer-Aided Technology

Security and Communication Networks

Security and Communication Networks has retracted the article titled "Rule-Based AI System Application on College English Teaching Path Based on Computer-Aided Technology" [1] due to concerns that the peer review process has been compromised.

Following an investigation conducted by the Hindawi Research Integrity team [2], significant concerns were identified with the peer reviewers assigned to this article; the investigation has concluded that the peer review process was compromised. We therefore can no longer trust the peer review process, and the article is being retracted with the agreement of the Editorial Board.

References

[1] Y. Ye, "Rule-Based AI System Application on College English Teaching Path Based on Computer-Aided Technology," *Security and Communication Networks*, vol. 2022, Article ID 9913450, 8 pages, 2022.

[2] L. Ferguson, "Advancing Research Integrity Collaboratively and with Vigour," 2022, https://www.hindawi.com/post/advancing-research-integrity-collaboratively-and-vigour/.

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Research Article

Rule-Based AI System Application on College English Teaching Path Based on Computer-Aided Technology

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With the development of the Internet, "Internet Plus" has been widely used in various fields, and the Internet has become a great opportunity to transform CET. People's demand for education, especially higher education, has also increased rapidly. With the attention and investment of the state in recent years, higher education has developed rapidly, accounting for half of China's higher education. However, the increase in the number of students has brought great pressure to CET. How to improve the teaching efficiency of large classes is an urgent problem to be solved. The development of sci and tech, especially computer, has brought us new hope. Computer-assisted instruction has been introduced into CET. However, there are some unreasonable points in the design of computer-aided marking system in China, which is not suitable for CET. It is very important to research and design a computer-aided marking system that can expand CET methods and maximize the integration of English instructional resources. This paper introduces the principle, characteristics, and application fields of AI; analyzes the problems faced by CET; and puts forward a CET path based on computer-aided technology.

1. Introduction

The teaching task of English linguists is to cultivate talents who can communicate in different cultural backgrounds. More and more teachers realize that English teaching is no longer just to cultivate students' language ability but, more importantly, to cultivate students' comprehensive ability of cross-cultural communication in English [1]. College English Teaching (CET) cultivates students' English ability from five aspects, and writing ability is one of the most important and difficult aspects [2]. English teaching in universities under the Internet thinking mode is to apply modern technology to teaching, achieve the goal of the perfect combination of IT and classroom teaching, obviously improve the level of CET, and reflect positive effect in promoting CET reform [3, 4]. In the English teaching reform, CET in universities has experienced the change from the traditional blackboard, chalk, and tape recorder mode to the widespread use of modern teaching equipment, and the corresponding teaching concept has also experienced the upgrade from CAI to CALL [5].

Writing ability refers to the capacity to write English compositions in tests and exercises for college students who mostly take English exams, and the criterion for evaluating this writing skill is to look at the score of English writings [6, 7]. If the college English informatization reform is effective in physics teaching equipment, the enhancement of the CET idea will definitely drive this success to new heights. [8]. Computer-aided comprehensive language learning system is a unified system of organic combination of modern media technology, so as to put into great play to the advantages of various instructional modes and fully utilize the most advanced IT as much as possible, which can provide learners with the interactive and cooperative learning environment and adaptive learning support [9]. However, in China, the growth rate of the number of English teachers is hard to keep up with the growth rate of the number of English learners [10]. The success of the reform of college English occurs in only a few years due to the collaboration of new technology and new concepts [11]. The impact of English composition practise will be substantially lessened if students' writings cannot be adequately critiqued and coached.

We can employ highly developed electrical and optical systems if we can study the operating principle of diverse natural intelligence and the structural relationship of various functional components. [12]. It simulates, extends, and expands by building similar structures to biological devices, thereby realizing artificial intelligence (AI) [13]. However, the staged success of the teaching reform of CET cannot be an excuse for the stagnation of reform [14]. Therefore, the mainstream of AI theory has moved from the road of structural simulation to the road of functional realization. The new instructional model should be supported by modern IT. The way to realize the function makes AI theory get rid of the slow progress of natural intelligence theory.

2. Related Work

Literature [15] proposed Wu's method of machine theorem proving, generalized intelligent data structure theory, information knowledge intelligent transformation theory, full information theory, universal logic, and so on. Literature [16] develops and designs a platform for assisting English teaching and strengthening students' self-directed learning according to the actual needs of teaching and combined with the characteristics, structure, and principle of the AI system. According to the literature [17], the performance optimization of the present automated marking engine used in the auxiliary marking system should be studied, and a better scheme for engine analyzer scheduling should be devised, implemented, and evaluated. The paper [18] proposes an "emotional adaption model of knowledge expression," which has resulted in a novel way of "information modelling." Literature [19] proposes using AI's technical background to provide English teachers and students with a teaching assistant expert system that has become a powerful assistant in English teaching, with good interaction, friendly interface, strong personalization, universality, easy maintenance and expansion, and resource sharing. Literature [20] investigates the problem of personalized learning material recommendations for middle school students following participation in an auxiliary review system and proposes two recommendation algorithms for model essays, collocation phrases, and famous sayings, which are implemented and evaluated. The "information knowledge intelligence transformation theory" provided in the document [21] outlines information science methodology as well as the information transformation mechanism for extracting knowledge from data and developing intelligence from data. To establish the technical selection of the system, reference [22] evaluates the system's needs and investigates and compares relevant technologies. The system's architecture and functional module design will thereafter be completed. Finally, construct the system's main framework and certain essential function modules using Symfony2. Features such as a welcoming interface, convenience of use, simple interaction, cross-platform compatibility, and extensibility are all taken into account throughout the design process. Literature [22] proposes to use a rule-based expert system, which can analyze all students in a certain group designated by the teacher, such as several classes, a college, and so on so that the system can better serve the teaching. Reference [23] proposed to combine teaching evaluation and self-directed learning. It can strengthen the connection and interaction between teachers and students and better realize the purpose of auxiliary teaching.

3. Rule-Based AI System

3.1. Overview of AI System. AI has been widely used. Multimedia and network are used in English teaching. To begin with, students may learn from their own interests, needs, work requirements, and cognitive style, breaking through the conventional instructional mode's time and space limits and creating an unlimited and open teaching environment [24]. The process of acquiring knowledge is by the means of sense making. The traditional single English instructional mode makes students feel tired, while the teaching under the internet thinking mode is mainly characterized by openness and resource sharing, which stimulates students' enthusiasm for learning English [25]. On a deeper level, instructors and researchers are searching for and implementing a variety of novel teaching ideas for college English course teaching in the context of informationization, which dramatically increases the validity of information-based physical equipment [26]. The four parts of the learning environment are: (1) context: the instructional design learning environment must enable students to generate meaning from what they have learnt; in the learning process, there is always student-to-student and teacher-to-student cooperation; (2) dialogue: students debate how to finish the learning via conversation during the collaboration phase; (3) learning tasks; and (4) sense-making: it helps students achieve a deeper understanding of the nature, laws, and internal connections between things reflected in the current learning content. The six basic components of the database and the traditional AI system structure are shown in Figure 1.

The successful application of AI system made AI get rid of the dilemma, and people began to research intelligent behavior which was changing from exploring the law of thinking, realizing the great breakthrough of AI from theoretical research to practical use, from the discussion of general thinking methods to the use of specialized knowledge to solve special problems [27, 28]. Second, English cooperative learning activities or projects based on multimedia and the Internet may create genuine communication and interaction scenarios for instructors, as well as give personalized supervision, apply personalized instruction, and widen the horizons [29, 30]. Image and simulation qualities are present in multimedia networks. It may logically integrate text, music, picture, graphics, animation, video, and other elements in an organic way, creating a vibrant educational environment for students and making them feel immersed. There are two types of automatic knowledge acquisition. One is that throughout the operation, the system contains a mechanism that allows it to continuously sum up experience, adopt, and grow its own knowledge base. The other is to develop a special machine learning system to let the automatic process acquire knowledge from practical problems and fill
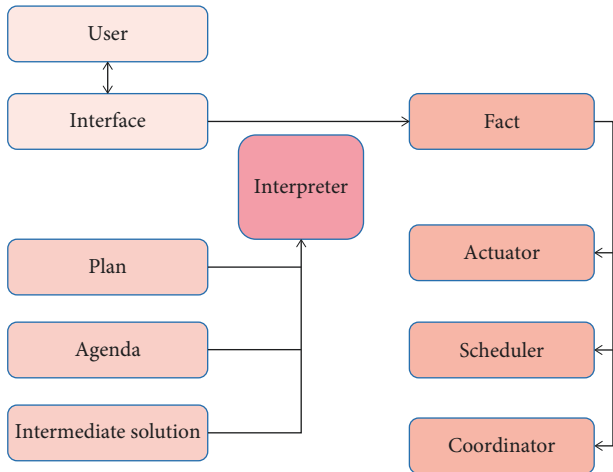
Figure 1: AI system structure.

Figure 2: Automatic knowledge acquisition.

the knowledge base. Figure 2 shows the flow chart of knowledge acquisition.

English, as a language subject with strong practicability, should master the prescribed teaching objectives and constantly expand the teaching content, understand the local customs and social features of English-speaking countries, increase students' humanistic knowledge, and improve their comprehensive quality. The basis of language teaching is a large number of corpora. Therefore, one of the key points in the informatization construction of college English teaching is the construction of a learning resource database. The construction of the resource database itself is a complicated process. One of the reasons for its complexity lies in the diversity of its resources. Teachers can choose a good learning theme when preparing lessons, let students use a variety of information media resources to independently study and find information, and then use classroom sharing teaching methods to enrich teaching content and learn together. Teachers create English teaching courseware films and music to broadcast to students in class through network media, which makes the classroom setting engaging and increases students' visual grasp of English while also providing a nice auditory experience. Network technology breaks through the limitation of time and space, breaks through the boundaries of written teaching materials, and realizes the sharing of resources. Teachers can call relevant resources on the network at any time, providing students with rich and intuitive learning reference materials, which are suitable for classroom teaching, students' self-directed learning, and other needs; improve teaching efficiency; and create a modern teaching environment. Since it started in the mid-twentieth century, the AI system has developed rapidly. In the early days, it was mainly used in medicine, commerce, and industry, and now, it has penetrated into all fields of social sci and tech life, such as medical diagnosis, agricultural production, geological exploration, real-time monitoring, education and teaching, national defense and military affairs, intelligent decision-making, and so on, which promoted the development of national economy and brought huge economic benefits to society.
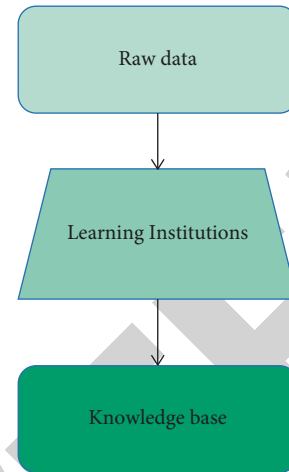
3.2. General Design of Rule-Based AI System. For an AI system, its performance convenience, validity, reliability, and maintainability can be considered from various aspects. The scene it creates is more vivid and lifelike than video and projection, and it can also create teaching materials. It is difficult to provide multimedia, which refers to computer-assisted instruction. Visible extensive use of the multimedia network teaching system that enables students to use both audio and video can create a vivid and real teaching environment. Students are immersed in a joyful world of language study because of the audiovisual resources and vibrant linguistic backdrop. At the same time, pupils are more likely to appreciate and internalize the clean and true pronunciation and intonation and the abstract and dry educational topic being pictured. The user-friendliness of AI systems relates to the ease with which people may interact with them, such as system prompts, operating modes, display modes, explanation abilities, and expression forms. The AI system's educational mode eliminates teaching time and place limitations. Students may communicate with instructors in real time through the network platform, get feedback on critical issues, and raise queries, and teachers can respond to them one by one in a focused manner. It is not only beneficial to students' subjective initiative but also may increase the quality of CET via interaction between professors, students, and students. The AI system is totally compatible with instructors and learners' psychological and learning features. AI system is superior to traditional terminals based on physical wiring transmission in terms of broad access, and its data transmission speed has reached or even surpassed that of traditional equipment. In the interactive learning environment, students can choose the content suitable for their own level and actively participate in the learning process, instead of being arranged by teachers and passively accepted by students, which is conducive to the construction of knowledge.

Students' ability of knowledge construction, interpretation, and social communication in effective cooperative activities can be cultivated. In addition to the normal class time, each student can arrange the progress and rhythm of learning according to their own level and schedule, set their

own goals, and make continuous adjustments so that the freedom of students' choice can be greatly improved. Students can fully utilize a large number of shared learning resources at any time to completely match students' demands in learning English, resulting in a noticeable improvement in students' overall English learning ability This implies that high-speed large data interchange may take place between CET's network-based learning terminal and the cloud-based network learning environment. In short, the validity of the AI system refers to the cost of time, the complexity of the problem solved, the type and quantity of knowledge, the representation of knowledge, and the method or organization of using knowledge, which are the main factors affecting the validity of the system. Through the self-test, students can immediately find their learning progress and adjust the learning difficulty and content in time, which is in line with the universality and comprehensiveness of college English to a certain extent. This advantage also makes the teaching design between college English course learning terminal and cloud computing learning network no longer limited to narrowband data communication such as text but can be carried out in the form of multiple media.

4. System Function Structure Analysis

4.1. Overall Structure Analysis. Under the traditional teaching mode, the terminals to enter the information-based learning environment are relatively single, and the computers in classrooms and language laboratories are the main access ways. After the introduction of cloud computing, this single access mode will be broken. Computer-assisted foreign language teaching is a new trend of foreign language teaching development. For the online teaching of English courses, this feature is especially suitable for oral English and role-playing exercises and tests based on teamwork. This system adopts B/S browser server architecture, that is, browser server architecture, which was improved and developed with the rise of technology in the late 1990s. To build an Internet-based online teaching assistant system, some teachers use long-term and large-capacity teaching courseware to highlight the visible role. Because the courseware is so long that it has replaced the conventional English teaching, the teaching idea of "teacher-centered" in essence has evolved into the teaching idea of "computer teacher-centered." Set the output of the first layer of neurons from layer L neuron to layer L + 1 neuron, as follows:

$$f(x) = \frac{1}{1 + e^{(-x)}}. \tag{1}$$

Each client needs to install the corresponding client program in this structure, with weak distribution function and poor compatibility. Therefore, it lacks universality and has great restrictions; B/S structure came into being. According to the empirical formula, the number of hidden layer nodes can be given by

$$l = \sqrt{m + n} + a, a \in \{1, 2, ..., 10\}. \tag{2}$$

B/S mode is an improved mode of C/S mode after the rise of the web. This mode takes the web browser as a unified client and focuses the system's core functions on the server. It can be used as long as a web browser is installed on the client. Under different eigenvalues, the comparison of mean square deviation between C/s and B/S is shown in Figure 3.

When the teaching network of the whole college English course is based on cloud computing, all kinds of services for requesting the CET network can also be obtained in this way. Fully comprehend the importance and difficulty of teaching materials; determine the cut-in point of multimedia and teaching content; embody teaching strategies; adopt various forms and methods; create all types of necessary communication situations; highlight the benefits of multimedia integrating various information and functions such as words, images, videos, sounds, and animations; and provide students with a large number of language practise opportunities. LAMP is a combination of four open-source software: Linux (operating system), Apache (HTTP server), MySQL (database software), and PHP. They are highly compatible with each other and together form a powerful web application platform. A detailed comparison of the three is shown in Figure 4.

The user interface of this structure is basically completed with the help of a browser, and the organization uses the increasingly mature and popular browser technology to realize the powerful functions that originally needed complex special software. B/S mode is free of installation. Teachers and students can use the auxiliary marking system at anytime and anywhere and using any system and any equipment as long as they can use the browser to surf the Internet. It is an important factor for efficient learning. It is a good means for students to put their subjective initiative in language practice into a great play. According to the uncertainty of the input information and the rules in the knowledge base, the system generates the corresponding fuzzy output variables with conclusion credibility. The uncertainty of information propagates throughout the reasoning process, including rule uncertainty, reasoning credibility, and conclusion credibility. Figure 5 depicts the uncertainty of two fuzzy quantifiers with varying set values.

In essence, cloud computing provides computing and storage services at the basic level. For users, they can completely abandon these infrastructures and directly request services from the cloud network according to their own needs. In the process of information processing, it is necessary to associate new exercises with known exercises to enhance learning efficiency. Long-term memory has great capacity. As long as you review it fully, the memory span is unlimited, and forgetting is slow. By modeling the memory forgetting rule, you can get a mathematical model that is very consistent with Ebbinghaus forgetting curve:

$$S(t) = \frac{1}{1 + Vt}. \tag{3}$$

The content of the instructional materials is simply and immediately implanted into the courseware in the original sequence and structure and then transported into the
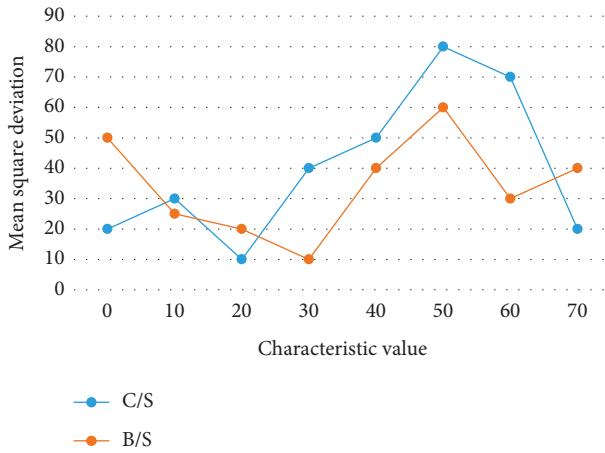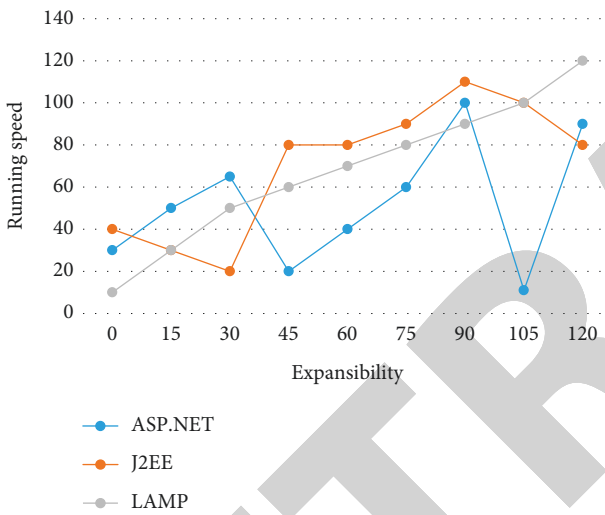
Figure 3: Comparison of C/S and B/S.

Figure 5: Comparison of the uncertainty of different quantifiers.

Figure 4: Comparison of three main platforms for web development.
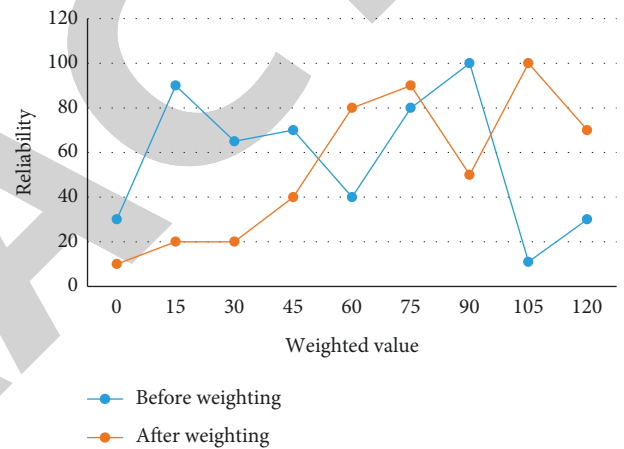
Figure 6: Reliability under different weighted values before and after weighting.

classroom in certain courseware designs. There is no English instruction, and little thought is given to whether the presentation technique of the educational material complies with the cognitive rules of the pupils. The teaching idea of prioritizing hearing and speaking above visual and intuitive learning is mirrored in courseware design. But by feeling, the original slide show instructional mode is taken to grant the multimedia courseware design, thinking that the multimedia teaching is a slide show teaching with sound, which is actually a misunderstanding of the multimedia teaching.

4.2. Analysis of Uncertainty Reasoning Model. In the actual process of research and development of the AI system, because the problem solving of the AI system is generally not as rigorous and accurate as mathematics, physics, and other disciplines, the knowledge of domain experts and the information we need to deal with are often uncertain, inaccurate, incomplete, even fuzzy, inconsistent, and time-varying. Based on the characteristics of integration and interaction of multimedia, if modern media is applied to
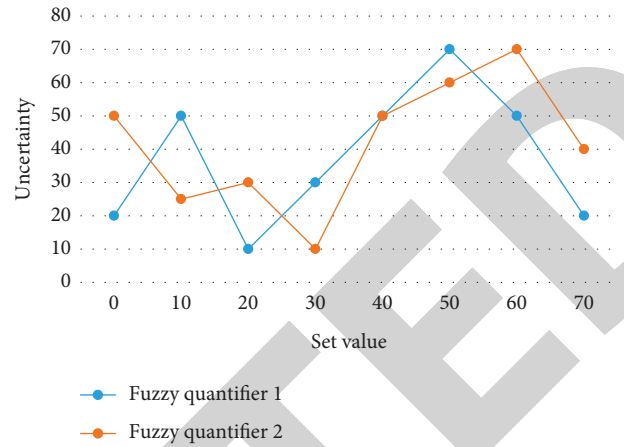
classroom teaching, students can combine learning with practice, in diversified forms. Multichannel information input is conducive to understanding and mastering the teaching content from different sides. Teachers can use the interactive function of media to provide timely feedback and adjust their learning status. In a sample, the weighted values w_i of corresponding grammar points are weighted and superimposed by the credibility C, where the credibility vector is the credibility of rules in the knowledge base. Figure 6 shows the reliability under different weighting values before and after weighting.

Teachers can call relevant resources in the network at any time, providing rich and intuitive learning reference materials for students. Because the information on the computer network is linked by hypertext, students are easy to get lost, and the guidance of teachers is particularly important; otherwise, classroom teaching will be out of control because modern educational technology is not only a teaching medium but also a tool of entertainment. For a CET network, its users can be roughly divided into two categories, mainly including learners and teachers. We need to investigate the representation techniques of uncertain and incorrect

information and examine the imprecise reasoning methods to express these uncertain knowledge in AI systems and assess, reason, and make choices using these formalized uncertain knowledge. The output of each neuron in the hidden and output layers of the network can be calculated as follows:

$$O_{Pj}^l = fi\left(\sum_j w_{ji}^l O_i^{l-1} - \theta_j^1\right). \tag{4}$$

After carefully studying the basic characteristics of constructivism, we find that learners can use computers to create a language environment under the guidance of constructivism theory. Learners can fully utilize the characteristics of computers to meet the needs of sense-making to the greatest extent. The network adopts the traditional algorithm, whose essence is the gradient descent method. The connection strength of the weighted space is corrected by the error function composed of the difference between the actual output and the required output so that the error decreases continuously. Figure 7 shows the error under different connection strength.

For many AI systems, when adopting a generative system or AI system structure, if the system contains uncertain and fuzzy knowledge, it is necessary to establish some uncertain calculation or reasoning process. Based on the level of providing services directly to users at the top of the cloud network, students can easily request learning services from the network according to their own needs, and the entire process of providing services does not require any manual intervention. The calculation formula of modified weights and thresholds is as follows:

$$w_{ji}^l(n+1) = w_{ji}^l(n) + \eta \delta_{Pj}^l o_{Pi}^{1-l} - \partial\left(w_{ji}^l(n) - w_{ji}^l(n-1)\right). \tag{5}$$

With computer-aided language teaching, the teaching content is no longer just a book as in the past, but a three-dimensional teaching material composed of textbooks, CD-ROM, and network courses. Multimedia CAI can further play the leading role of teachers. Instructors and students have equal standing in the process of inquiry learning based on networks, but teacher leadership plays a significant role, which is favorable to the formation of a new connection between teachers and students. Network technology overcomes time and geographical constraints, as well as the limitations of printed educational materials, to enable resource sharing. Therefore, studying the learning environment of constructivism will further play the leading role of teachers in realizing multimedia computer-assisted instruction. The output layer number and bit binary code can represent a smart state and select smart states to correspond to smart English knowledge points. The thresholds of different modification weights are shown in Figure 8.

When the whole teaching network is built on cloud computing, all kinds of services for requesting a college English teaching network can also be obtained. The advantages of multimedia technology and communication network are very suitable for the constructivist learning environment. Computer-assisted foreign language teaching
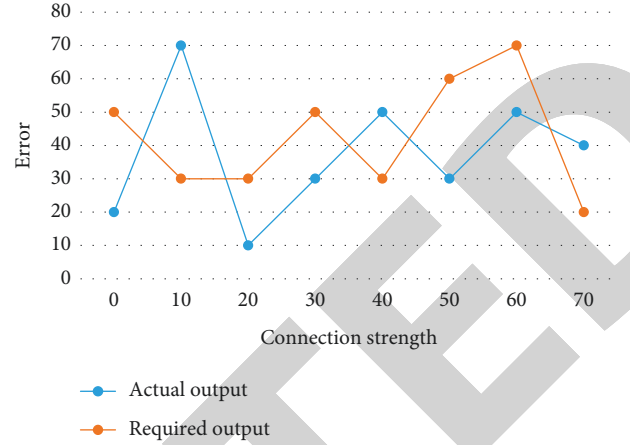

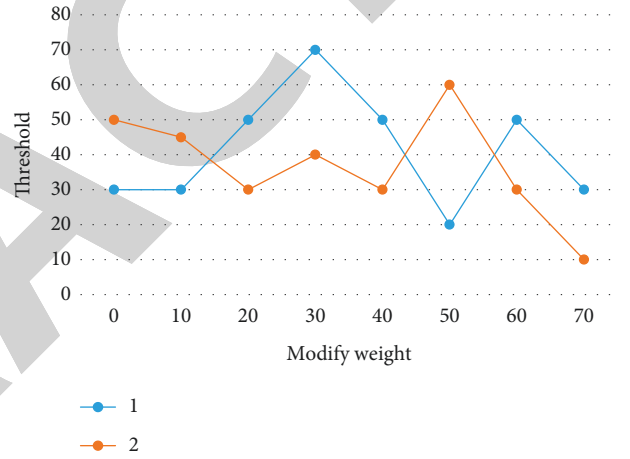Figure 7: Error under different connection strength.

Figure 8: Threshold values of different modification weights.

has made great changes in teaching materials, teaching methods, teaching means, and even the whole teaching process. Based on the integration and interaction of multimedia, modern media can be used in classroom teaching, and students can combine learning with practice. The multichannel information input is conducive to understanding and mastering the teaching content from different sides. Teachers can guide students to sort, choose, and classify the network resources to obtain relevant knowledge and information, and they can also use the interactive function of media to give immediate feedback and adjust their learning status. For teachers, the requirements put forward by the cloud network may mainly be the requirements of curriculum design, which can also be realized through the service for teachers and users at the top of the cloud network. The teaching network based on cloud computing can meet the service requirements of learners and teachers at the same time. In this process, the teaching activities have actually run smoothly in the network.

In general, each of a rule's various premises has a varied impact on the rule's conclusion, that is, the degree of support for the conclusion varies, as does the quantity of information it includes. The teacher's position is equal to that of the

students in the research-based learning process based on a computer network, but the teacher's orientation plays a major role, which is favorable to the formation of a new connection between instructors and students. If there are numerous preconditions of knowing requirements in the imprecise reasoning process, weighting factors may be used to convey the relevance of subconditions. Students may have a variety of needs. The weight coefficient of the subcondition AI is the weighting factor w_i (1, 2, ..., n), and its value must be determined by domain experts and fulfil the normalization criteria.

$$\sum_{i=1}^{n} W_i = 1. \tag{6}$$

Constructivism theory emphasizes the efforts and roles of teachers and students in the learning process. It is a relatively perfect theory. If a subcondition's independence is stronger or its relevance to the conclusion is larger, the subcondition's weighting factor should be given more weight. Based on item response theory, a cloud network may also assess a learner's current proficiency level in order to deliver personalized learning services. The weighting factor of subconditions is introduced into the rules, which can represent the different support degree of multiple conditions to the conclusion and the independence dependence of each condition in the English AI system, enhance the accuracy of knowledge representation and imprecise reasoning, and solve the problem of uncertain reasoning when the conditions are incomplete.

5. Conclusions

With the development of globalization, foreign language has become more and more popular, and foreign language teaching has been paid more and more attention. CET based on computer-aided technology is an important means to promote the development and reform of traditional CET. It meets the needs of the development of Modern CET and will also provide great help for the improvement of college English course network teaching. However, its construction and maintenance process is by no means easy, which requires the efforts and cooperation of various schools, including learners, teachers, and staff of full-time language laboratories. Multimedia computer-aided teaching increases the amount of information input, language practice opportunities, and the alternation of various teaching forms; obviously stimulates students' interest in learning; makes students always in a proactive learning state; improves students' learning autonomy; strengthens the cultivation of students' language application ability; and achieves the purpose of improving teaching and learning efficiency. After the examination, you can read the card by the scanner to get the examination results. You can also choose the online examination system to get the electronic version of the examination results. You can also choose the examination that requires students to fill in the examination paper directly. Therefore, educators should seize this good opportunity, constantly summarize teaching experience, explore teaching methods, improve instructional mode, improve English teaching quality in continuous practical teaching, and achieve English teaching objectives.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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