Research on College English Teaching System Based on Computer Big Data

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Abstract. With the development and maturity of computer and multimedia technology, computer-aided teaching represents advanced teaching ideas and teaching methods. Computer-aided learning systems can dynamically generate personalized teaching content and strategies through intelligent system inferences. The diagnosis mechanism is used to judge the learning level of students and provide a favorable basis for teachers to adjust teaching content. Based on the advancement of the current English teaching reform, the use of computer aid has become a trend in English teaching. It analyzes the current design requirements of computer aided English teaching systems and designs a teaching system based on C++ and Windows. The results prove that based on C++ and Windows, the design and realization of computer-assisted English teaching cannot increase the actual teaching efficiency by 20%, and can also play the value of computer-assisted English teaching, improve the level of English teaching by 12.0%. The conclusion shows that in the design of computer-assisted English teaching system, the design system based on C++ and Windows can effectively improve the quality of computer-assisted English teaching and have a positive impact.

Keywords: computer-assisted teaching; big data; college English teaching system; C++; windows.

1. Introduction
With the rapid development of computer technology, vocabulary related to computer technology emerges endlessly. Many new computer technologies originate from abroad. Therefore, in order to quickly master these new skills, one must have the ability to read computer English documents quickly. Computer-related majors in colleges and universities have set up computer English courses. The key to computer English learning lies in the learning of English vocabulary. Due to the particularity and limitations of the major, the application of computer English learning systems has not been paid attention to and popularized.

Computer-assisted instruction (CAI) refers to a teaching model that uses computer technology in classroom teaching, experimental teaching, individualized teaching of students, and teaching management to improve teaching quality and teaching efficiency [1]. My country has developed computer-assisted teaching activities for more than 20 years. Many achievements have been made in theoretical research, practical exploration, and courseware development. In recent years, CAI has made considerable progress in the depth and breadth of its development. Especially under the
guidance of basic theories such as cognitive learning theory, system science theory and instructional design theory. Fruitful results have been achieved in CAI theoretical research, practical research, and courseware production. With the rapid development of information technology, research on computer-assisted teaching is also fully assisted. Based on C++ and Windows technology, designing a computer-assisted English teaching system to ensure that computer-assisted English teaching can be used in teaching is not only the need of the information age, but also the basis for improving the level of English teaching. The following article will make a specific analysis of this.

2. Comparative analysis of English traditional teaching and computer-assisted teaching
The traditional English teaching process is a cyclical process, which begins with the determination of educational goals and general curriculum goals, and ends with evaluation. Figure 1 shows the comparison between the two.

Through the analysis of the above figure, it is found that in teaching activities, teachers and students constitute a teaching system. Teachers and students process and transmit teaching information to complete the task of teaching and learning. First, the teacher processes and processes the teaching information, and presents the teaching information to students through language, blackboard writing and other auxiliary teaching materials. Secondly, it is to diagnose and evaluate the students' feedback, to understand the students' understanding and mastery of the content [2]. Then, feedback to the students in time to enter the next cycle. This discussion shows that the teaching process is a two-way process. The basic process of computer-assisted teaching is shown in Figure 2:
3. Computer-aided application teaching requirements

3.1. Demand analysis
Currently on the market, the use of computers to assist English teaching, traditional software is still remarkable in function, and in assisting English teaching, the effect of teaching English in actual classroom is far from that of actual classroom English teaching, not only in-depth teaching of classroom English teaching content Development. For this system design, a computer-assisted English teaching system suitable for the actual learning needs of students in current teaching will be designed and developed. Therefore, for the design of this computer-assisted English teaching system, based on C++ and Windows technology, the practicability of the system can be improved, communicative activities can be designed, language interaction can be realized, and the system can be used to assist English teaching. In designing the system, it is necessary to know clearly that it is out of the specific context. Such an isolated teaching aid can not only not enable students to effectively acquire the correct English language knowledge, but also cannot enable students to flexibly master the English language application ability. Based on the C++ programming language and Windows technology, the optimized design of computer-assisted English teaching system will integrate the sound, text, graphics and video used in the process of English-assisted teaching, and design a system-assisted teaching interactive mode with both pictures and texts. Stimulate students' interest in learning English and ensure that the computer-assisted English teaching system can be used to assist English teaching [3].

The system is mainly to assist teachers in reviewing students' English writing achievements. The auxiliary tools provided in the system can promote teachers' writing teaching and students' writing learning to a certain extent. The system is based on the Internet environment and adopts C++ structural mode. Mainly for schools, teachers and students, each school belongs to a separate subsystem, connected to the server through the Internet. The core structure of the system is shown in Figure 3.
3.1.1. **Teacher.** Teachers need to organize the teaching activities of English writing. The system will provide teachers with corresponding functions to simplify daily composition arrangement, review and other tasks. The release of relevant notices will not be restricted by time and space. The auxiliary review system will help teachers the diagnosis information of composition and teaching suggestions are given to effectively improve the teaching effect [4].

3.1.2. **Students.** The ultimate goal of English writing teaching is to improve students' English writing ability. The system can provide students with corresponding reference materials, provide writing diagnosis and suggestions, and improve the correction services for students' writing exercises.

3.1.3. **Campus Administrator.** The system is mainly based on the school, facing the school English writing teaching, so the school administrator must have the corresponding management function.

3.1.4. **System Administrator.** Mainly for system maintenance and management.

3.2. **System operation process**

The system mainly includes four parts: homework sending and receiving and correction, class construction, student writing and multi-type user control [5].

3.2.1. **Assignment sending and receiving and correction.** This part is the most important part of the system application scenario. Teachers can create homework questions through the question bank, and arrange them by class. After students finish writing, they can correct the writing results through the system. After the correction, the teacher will make perfect corrections, and finally feedback the correction comments to the students. The specific process is shown in Figure 4.
3.2.2. **Class creation.** The English writing training for students is mainly based on the class. Teachers can create classes in the system and add students to them. Students can apply to join through the identification of relevant information. The process of class creation and student joining is shown in Figure 5.

3.2.3. **Student writing practice.** The system should not only assist teachers to review English composition, but also provide students with an English writing practice platform. The system will provide a very rich and representative question bank from which students choose more interesting composition topics for practice. Under the circumstances, the writing results can be reviewed through the automatic review system. The flow of student writing practice is shown in Figure 6.
3.2.4. **Multi-type user control.** School administrators, system administrators, teachers, and students have different divisions of labor. They have their own tasks in the system. The system must ensure that the user's work tasks cannot be confused, and define the scope of activities according to the user's authority [6].

4. **Design a computer-assisted English teaching system based on C++ and Windows**

4.1. **Overall structure design**

With the support of C++ and Windows technology, to design a computer-assisted English teaching system, you can use C++ (client, server) mode to optimize the design of the system structure. The overall design is shown in Figure 7.

![Figure 7. The overall structure of the computer-assisted English teaching system](image-url)
between the system and users are achieved, and improve the application of computer-assisted English teaching systems performance [7].

4.2. System function design
Based on C++ and Windows, in the design of a computer-assisted English teaching system, it is necessary to consider the differences in students' acceptance in English teaching and the specific conditions of each school's teaching to ensure that the integrity of the system design is improved. In the process of language teaching in the computer-assisted English teaching system, different functional models can be used to assist English teaching according to specific conditions. The system function is shown in Figure 8.

![System function structure](image)

**Figure 8. System function structure**

4.2.1. Tutorial answering function. It can effectively combine the current English teaching content and knowledge points to analyze various types of English exercises to ensure that students pass the system and pay attention to the combination of sound and animation in the system. Realistic teaching scenarios can be virtualized to ensure independent learning Convenience and assistance to consolidate students' knowledge of English;

4.2.2. The function of situational teaching. It can ensure that teachers use the system and carefully design computer-assisted teaching scenarios and according to actual English classroom teaching goals and requirements;

4.2.3. Life communication function. Focus on training students' daily English teaching conversations, and let students deal with the English communication problems encountered in daily life.

4.3. Network topology design
Combined with the actual situation of the English auxiliary teaching system, this article decides to build the network topology of the system based on the traditional campus network. In this regard, in terms of logical structure, this article divides the entire system into three parts: client, server and transmission. Among them, the transmission of teaching resources relies on the campus network, and its purpose is to maximize the security and transmission efficiency of English resource transmission, and prevent the invasion of viruses outside the school; at the same time, the construction of the virtual teaching platform is based on offline technology, which is recognized Teachers can upload their teaching content to the system server by recording videos, while students can view the teaching content through virtual teaching classrooms to make up for the lack of learning in class [8]. Therefore, combined with the above analysis, this article designs the network topology of the system as shown in Figure 9.
4.4. Technical architecture

For the construction of the system, the quality of its architecture is directly related to the operation of the system. Considering the current system development technology, this article chooses the C+++ development method. In the layering of the entire system, a three-layer architecture is adopted to divide the system into a page display layer, a business layer, and a data management layer. Among them, the page display layer mainly passes. The aspx web page method provides users with an interactive interface; in the business layer, including the server and business modules, and in order to improve the logic of the whole system operation, this article adopts C++ and Windows mode, when the user clicks on the page, it is embedded in the page The script triggers the response, that is, the view interface, the view interface interacts with the controller, and then the controller assigns different business functions to different applications, and finally completes the interaction with the data through the DAO interface, and transmits the results directly to the view interface, Show it to users. Through this deployment method, it has two advantages: one is easy to access, users only need to click on the page to complete the access to the system, without the need to update and install; second, the system runs stably. Through the logic processing of MVC, the operation of the entire auxiliary learning system is more stable. The specific architecture system is shown in Figure 10.
4.5. Smart recommendation module design

For English learning, the most important part is to combine the interests of users and make relevant recommendations to students, so as to expand students' knowledge and further improve the intelligence of the system. In this regard, combined with the current intelligent recommendation algorithm, this paper proposes a collaborative filtering English learning content. In the collaborative filtering algorithm, it is mainly recommended from content and items. This article combines the above research foundation and designs the recommended steps of English learning materials as:

First, suppose that \( L = \{l_1, l_2, ..., l_N\} \) is a collection of learners, and \( M = \{m_1, m_2, ..., m_M\} \) is a combination of all English video materials; use \( g_{l,m} \) to represent user \( l \)'s rating of video \( m \).

Second, calculate the similarity, as in formula (1).

\[
sim(x, y) = \frac{\sum_{m \in M_{x,y}} \left( g_{x,m} - \bar{g}_x \right) \left( g_{y,m} - \bar{g}_y \right)}{\sqrt{\sum_{m \in M_{x,y}} \left( g_{x,m} - \bar{g}_x \right)^2 \sum_{m \in M_{x,y}} \left( g_{y,m} - \bar{g}_y \right)^2}}
\]

Among them, \( x \in L, y \in L, g_{x,m}, g_{y,m} \) represents the ratings of user \( x \) and user \( y \) on video \( m \) respectively, \( \bar{g}_x, \bar{g}_y \) represents the corresponding average score; \( m_{x,y} \) represents the item scored by both.

Third, select learners with high similarity to the target learner \( x \) as its adjacent set, and then predict the score value of the unrated video \( m \) by the learner \( x \), which is described in formula (2).

\[
g_{x,m} = \bar{g}_x + \frac{\sum_{a \in A} \left( g_{x,a} - \bar{g}_x \right) \sim(x,a)}{\sum_{a \in A} \sim(x,a)}
\]

Among them, \( k \) represents the number of nearest neighbors of learner \( x \). Finally, sort \( g_{x,m} \) in descending order, and then recommend the \( k \) video materials with the highest ratings to user \( x \).

5. Application benefits of computer-assisted English teaching system

Based on C++ and Windows technology, designing a computer-assisted English teaching system that meets actual needs can not only effectively ensure that teachers use the system for computer-assisted English teaching; at the same time, through the use of the system to assist teaching, a computer-assisted teaching model combining audio-visual can be realized. Improve students' interest, enrich the content of auxiliary English teaching, reduce the teaching burden of teachers, and improve the effect of computer-assisted English teaching. At the same time, based on C++ and Windows, the design and realization of computer-assisted English teaching cannot increase the actual teaching efficiency by 20%. It can also play the value of computer-assisted English teaching, improve the level of English teaching, improve 12.0%, and exert active application benefits.

6. Conclusion

It can be seen from the above design that this article can provide more scientific and intelligent English-assisted learning recommendations for students through the system and recommendation algorithm built by itself. Through the design of this article, it can be seen that in terms of system construction, the C++ and Windows technology architecture systems have better advantages in system stability; in terms of intelligent recommendation, collaborative filtering algorithms are widely used. Testing or trial operation can verify the feasibility of the design. The above two techniques also provide reference for the application of other courses.
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