



## Optimization of Computer-Assisted English Teaching System Under VC Visualization Software

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**Abstract.** At present, building an information-based teaching platform for auxiliary teaching in a network environment has become a mainstream teaching method for English teaching in various schools. How to combine various multimedia teaching instruments with English classroom teaching, excite students' enthusiasm for English, and change the traditional classroom teaching model has turned into the main goal of the current English teaching reform. Visual C++ (VC) visualization is an object-oriented visualization programming language, which is widely used in graphics and images, networks and communications, and control. It has the strong point of stability and running speed rapidly, and can be used from the bottom layer to the rapid development of user-oriented software. The effective integration of VC visualization technology into English teaching can enhance the learning capability of students in the field of independent and collaborative. Therefore, based on the current status of English teaching reform, this research analyzed the needs of the current computer-assisted English teaching system design, and designed the B/S (client/server) model with the support of VC visualization software to optimize the computer-assisted English teaching system. After the feasibility analysis and overall architecture design of the system, the realization of several main functional modules, core codes and interface diagrams were studied, and the system was tested according to the software testing theory test cases. The application of this system could enhance the actual teaching efficiency, bring into play the value of computer-assisted English teaching simultaneously, increase the level of English teaching, exert the benefits of active application.

**Keywords:** Computer-assisted English Teaching System; System Optimization; Visual C++ Visualization (VC) Language;

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## 1 INTRODUCTION

In order to implement the teaching purpose of comprehensively improving the comprehensive quality of students, it is absolutely indispensable to take shape a systematic analysis with the classroom English teaching, the degree of mastery of students, the bias of oriented professional job demand, and the management of grades, and feedback to each teacher and school, easy to customize the syllabus, to provide students with a new type of two-way teaching environment. Meanwhile, building an information-based teaching platform for auxiliary teaching in a network environment has become a mainstream teaching method for English teaching in various schools. The vivid information brought by computer teaching, combined with multimedia presentation, is not available in traditional teaching [1]. Through the intelligent analysis and careful scrutiny of the computer-assisted English teaching system, it can dynamically generate teaching content and teaching strategies suitable for cultivating talents; By judging the learning ability and level of higher vocational students through the computer intelligent diagnosis mechanism, and analyzing the reasons for errors, it can also provide a set of reasonable improvement plans that meet the higher vocational talent training plan.

Visual C++ (VC) visualization is a visual object-oriented programming language. Its execution speed and high access rights to the operating system are unmatched by many other languages. It allows users to perform remote debugging and single-step execution [2]. Visual operation is mainly about the data structure and visual display of the program during operation, which frees beginners from the boring single programming environment and strengthens programming and debugging capabilities. Shuang [3] and his coworkers pointed out that the traditional C language is a process-oriented programming language, while VC is widely used in the field with graphics, images, networks, communications and control. It has the strong point of stability and running speed rapidly, and can be used for the rapid development of software from the bottom layer to the user-oriented. When programming the two-dimensional graphics with VC visualization, we can simplify the programming by using GDI, search the corpus content, and realize the intelligent prompt of the English learning content.

The English teaching classroom established under VC visual development language technology can comprehensively enrich the classroom content, increase the interactive communication in the classroom, fully mobilize the students' fervor in English, cater to the modern informatization teaching trend. Zhang [4] considered that VC visualization software was the core equipment of interactive teaching, software teaching and network interoperability, and the cloud platform supported the supplement of teaching materials. Qing [5] pointed out that the content of the development technology of VC visualization software was very rich, which could attract students' attention to a large extent and increase their interest in learning, which has become a new trend in the education industry. The purpose of using computer systems to develop and optimize software is to realize the main responsibility of human education. Xu et al. [6] considered that the development of English teaching systems involves disciplines, and the purpose of its article is to finally realize the powerful auxiliary function of computer to English teaching system.

Therefore, under the support of VC visualization software, this research used the B/S (client/server) model to design an optimized computer-assisted English teaching system to meet actual needs, which could effectively ensure that teachers use the system for computer-assisted English teaching; Through the use of the system to help English teaching, it could increase students' interest, enriched the content of assisted English teaching, cut down the teaching load of teachers, and enhanced the effect of computer-assisted English teaching.

## 2 OPTIMIZATION OF COMPUTER AIDED ENGLISH TEACHING SYSTEM UNDER VC VISUALIZATION SOFTWARE

During the process of constructing optimized the computer-assisted English teaching system, using VC visual development language for program editing can realize system functions and effectively

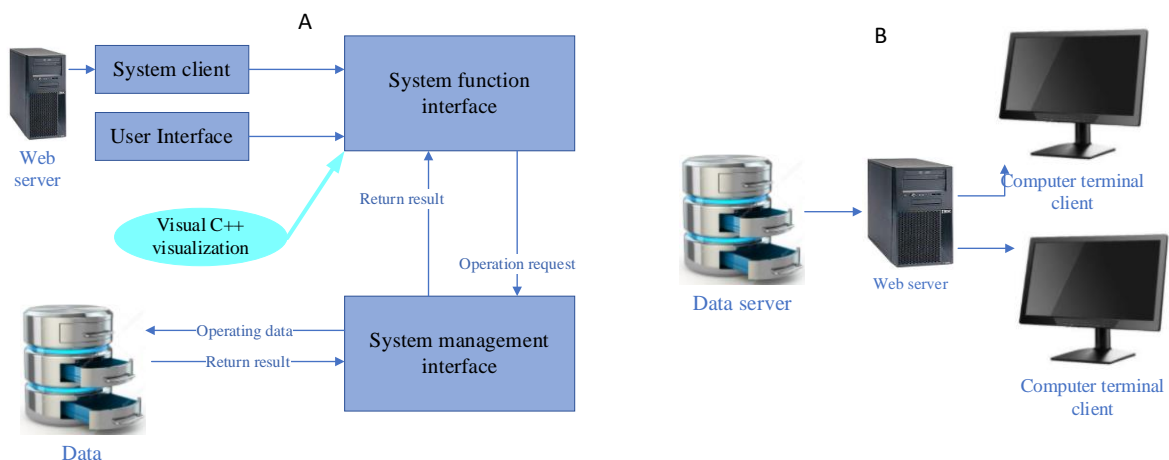
ensure that system users can interact with the system through multiple senses. At the same time, it ensures the realization of the real-time communication needs between the system and the user, and improves the application performance of the computer-assisted English teaching system.

## 2.1 Feasibility Analysis of System Optimization

Feasibility analysis is an indispensable step for realizing system software functions. Its main purpose is to clarify the necessity and feasibility of the development of the application project, that is, to consider the original intention of whether the system can be realized. For the practicability of the technology of optimizing computer-assisted English teaching system optimization based on VC visualization software in this study, network infrastructure, computers, NET platform, ASP.NET and SQL Server database are all common existing technologies. Using these hardware and software can well complete the development and realization of the various functional modules of the system, and can enhance the development practicality of the English teaching system, enhance the safety, scalability and maintainability of the system [7]. Since this system is independently developed on the existing hardware resources of the school, there is no additional increase in operating costs and management costs. The test environment only needs a laptop computer. The materials and daily teaching resources needed by the system are all obtained from the teachers. In the initial stage, there is no need to purchase additional teaching resources. Therefore, the development of this system is economically feasible [8]. At present, almost all colleges and universities have been equipped with a batch of high-performance hardware equipment and network infrastructure. The network problems needed in the system optimization process can be solved perfectly. Students and teachers only need to connect to the campus network to log in, etc., so they are already operable in terms of server, client, and network

## 2.2 Optimized Design of Overall System Structure

With the support of VC visualization technology, B/S (Browser/Server) mode can be operated to optimize the structure of the computer-assisted English teaching system. The system frame design follows the requirements of English teaching, the interface design is simple and friendly. The whole structure optimization design of this system can be illustrated in Figure 1A. The B/S architecture system does not need to install specially developed software, and can log in quickly through the webpage on the website.

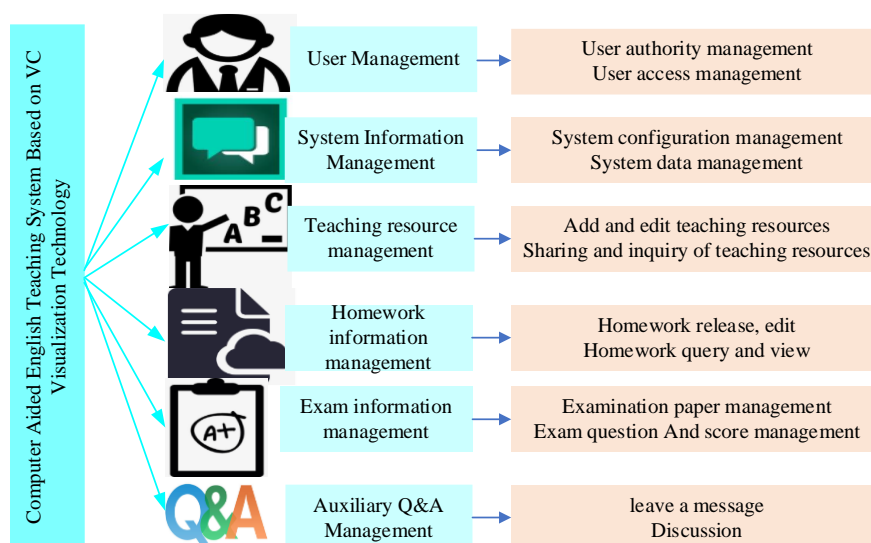


**Figure 1:** The overall structure design (A) and B/S model structure diagram (B) of the optimized system in this study.

Huang [9] pointed out that in the B/S framework, the Web browser is responsible for the display logic, and the Web App server is responsible for the transaction processing logic, so as to avoid increasing the weight of the client and reducing the burden on the user client. For access to the management system of the B/S architecture, only a computer that can be connected to the Internet and installed with a browser is enough [10]. It is suitable for the current usage habits of student groups, and its structure diagram is shown in Figure 1B:

### 2.3 Optimal Design of System Functions

Under the visual development language of VC, when optimizing the computer-assisted English teaching system, it is necessary to consider the differences in students' acceptance ability 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 modes can be used to assist English teaching according to the specific situation. At the same time, the system needs to set up independent student models for students, mainly including research and extraction of information on their learning strengths and weaknesses, daily learning habits, professional English, etc.; It is also necessary for teachers to do a good job entry, question bank, courseware download, and provide practice learning materials, etc.; Therefore, the system function optimization in this study is shown in Figure 2, which mainly designs six modules: user management, system information management, teaching resource management, homework information management, examination information management, and auxiliary Q&A management.

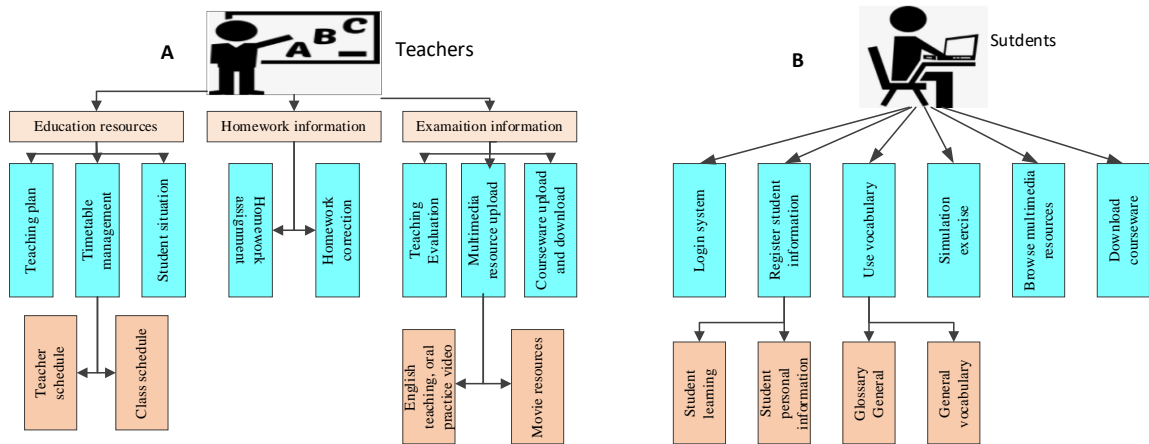


**Figure 2:** The overall functional module structure diagram of computer-assisted English teaching system optimization under VC visualization technology.

#### (1) User management

For this system, its user attributes and characteristics can be generalized from the participant of "system user" (for example, generalized to students, teachers, managers). Taking into account that teachers and students obtain system operation permissions through registration and other forms, they complete the corresponding operations. When the use case model is established, the teachers and students are combined for use case analysis. System administrators access the

system from the "back-end" of the system, and their role is often directly on the operation and management requirements of system database-related data. Therefore, taking teachers and students as examples, this research designed a user management design as shown in Figure 3.



**Figure 3:** The use case model of the teacher (A) and the student (B) in the optimization design of the user management module.

## (2) System information management

System information management is one of the most basic functions of any Web application system, mainly used to maintain the management of data, resources in the teaching management, the backup of database. The specific content includes: user information management and maintenance (including students, ordinary teachers, full-time teachers, administrator information and permissions); Configure the basic parameters of the teaching system (such as system interface settings, friendship links, main parameters, operation logs, etc.); Complete database backup and restore to ensure data security.

## (3) Teaching resource management

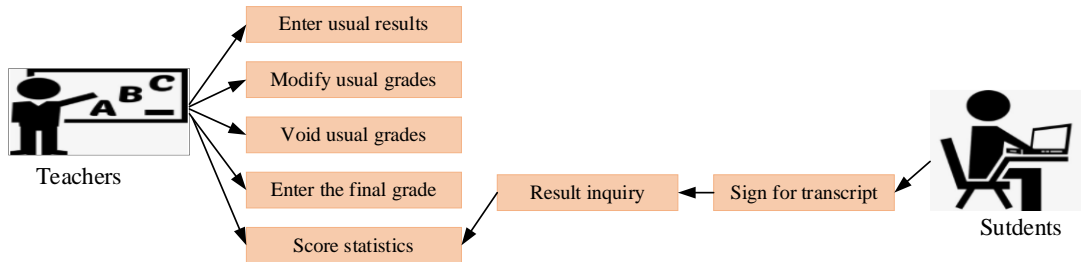
The lecturer can fill in and submit the syllabus, or upload the prepared courseware to the module in time; Students and relevant teachers can download the outline; you can also preview it, or choose to print it directly;

## (4) Job information management

Submit the student work assigned by the teacher online or offline, mainly by uploading files, such as submitting extracurricular essays.

## (5) Examination information management

English teachers can add test questions and manage test questions. The test content mainly revolves around the four ability modules of listening, speaking, reading and writing. In view of the fact that the English test basically takes the form of standardized test papers, the system can realize online review. At the same time, the optimized system can provide sub-functions of examinee performance analysis, help students view historical performance information and test rankings, etc., and monitor the effect of students' online learning, as shown in Figure 4.



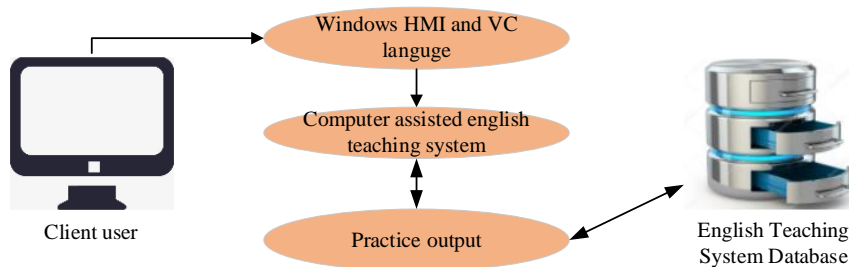
**Figure 4:** The score management use case model in the exam information management module.

#### (6) Counseling and answering management

This module can effectively combine the current English teaching content and knowledge points, analyze various types of English exercises, and ensure that students pass the system. Paying attention to the combination of sound and animation in the content of the system, which can realize virtual teaching scenes, ensure the convenience of independent learning, and assist students to consolidate their English knowledge; The specific form can be realized by means of messages, forums and online video exchanges.

### 2.4 Client Design under VC Visual Language

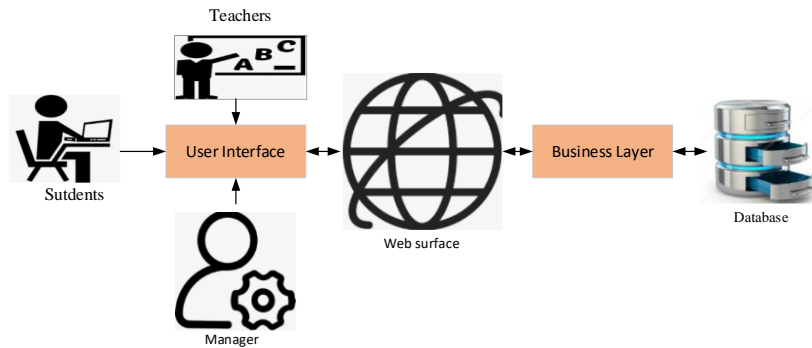
Based on VC visualization technology, design the optimization of the computer-assisted English teaching system, so that it has an optimized client interface. For ensuring that under the meticulous advising of English teachers, utilizing this system may comprehensively develop students' listening, speaking, reading, and writing abilities, and thereby provide more vivid and effective teaching aids [11]. The client mode is shown in Figure 5.



**Figure 5:** Optimized design of the client under the VC visualization language.

### 2.5 Optimized Design of Software Architecture

This system adopts three-tier-architecture, a widely used software system development architecture technology based on VC visualization. The main advantage of the three-tier architecture technology is to realize the "high cohesion, low coupling" software engineering idea, Software engineers generally can only pay attention to one level. This makes the system development process clearer and more standardized, and can greatly reduce expense and time in the later system. The three-tier structure technology consists of three parts: Representation, business and data. The schematic diagram of the architecture optimization design of this system is shown in Figure 6.



**Figure 6:** Schematic diagram of system software architecture.

## 2.6 Database Table Optimization Design

For realizing the function of this optimized system, we had designed data tables in the SQL Server database and established associations. The data tables with specific functions will be listed and analyzed. Part of the data table structure of the "student table" is now listed as follows. This table is used to store student information data. Student ID is the primary key. The specific table can be illustrated in Table 1.

Name	Types	Remarks	Name	Types	Remarks
Student_ID	Int	Primary	Student_profession	Int	Vice
Student_name	Varchar(50)	Vice	Student_class	int	Vice
Student_gender	Char(2)	Vice	Student_Registration time	Varchar(50)	Vice
Student_email	Varchar(50)	Vice	Student_state	int	Vice

**Table 1:** Optimal design of "student table" in database table.

## 3 THE REALIZATION OF OPTIMIZATION OF COMPUTER-ASSISTED ENGLISH TEACHING SYSTEM DESIGN UNDER VC VISUALIZATION SOFTWARE

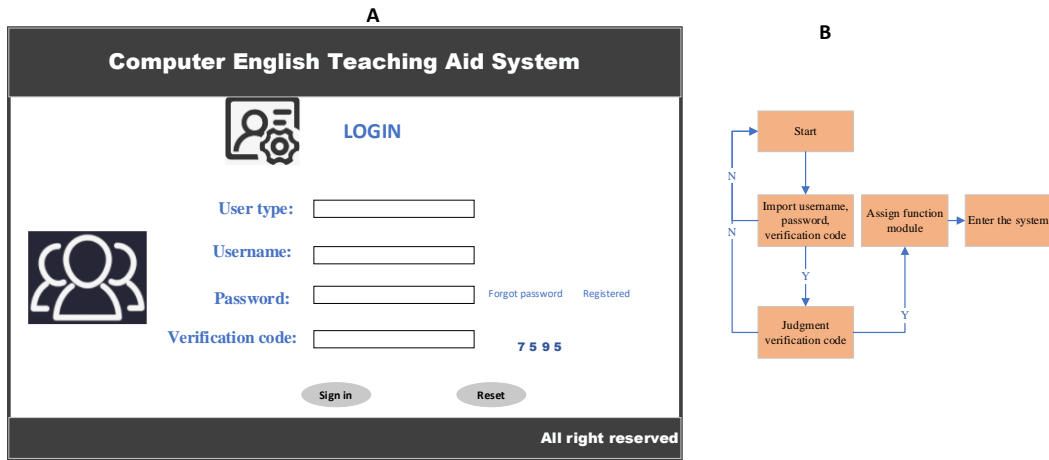
After the requirements are determined, the functional modules are clearly analyzed and the detailed design is carried out, the system software needs to be programmed. The literature points out that the quality of the written program code will affect the performance requirements of the system immediately. Therefore, the minimum requirement for the program code of the system is that the source code must be accurate and error-free. In order to make the later service and maintenance of this system more conducive to the development, the readability of the code should also be paid attention to under the condition of ensuring that the source code is correct [12]. Therefore, a structured design idea is adopted when compiling the source program. In this part, the flowcharts, core code snippets and interface diagrams of several main functional modules are explained; According to the software testing theory, test cases are designed and the test results are explained.

### 3.1 Realization of User Login Module Optimization

Users who log in to the system include teachers, students, department (department) managers, and system administrators. Users can sign in the system only after they are added by the system administrator. Students can log in during the opening period of the evaluation and teaching, and can no longer log in if they are locked by the administrator after the evaluation and teaching is



over. For ensuring the system safely, the system utilized a 64-bit MD5 encryption algorithm to encrypt the password, and adds a graphic image verification function (Figure 7A). The process of the system program to verify the visitor is shown in Figure 7B.



**Figure 7:** The implementation of the optimized system login interface (A) and the verification process of system login (B).

According to the above flowchart (7B), place text boxes for inputting user name, password, category, and verification code on the front-end interface, and place a login button. When logging in, the front-end routine verification such as non-empty is first performed, which is mainly implemented by the Required Field Validator verification control. Then perform random verification code verification. The verification code is obtained and returned by embedding in another page Create Picture.aspx. The return display in the form of an image is to prevent illegal login attacks. After passing the random verification code, it is then submitted to the server for background verification. Users of different categories can log in by selecting the appropriate category and entering the correct user name and password. This fully demonstrates the safety and practicality of the auxiliary system. Part of the key background code (ie Visual C++ code) of the login page is as follows:

```
Using System. Data. STL Teacher/Student/governor;
///<summary>
Public partial class_Acquiesce: System. Web.NI. Page;
{
Data Settings ID;
En Class p_ class=new English Class ();
Protect ed void Page_ Load (object sender, Event ages)
{Text 1. Focus on ();//Set the focus position.
}
}
///<param name="gender">
Protected void push Button1_Click(object sender, Event ages)
{
Response. Write ("Please enter your username and password");
return;
}
```



### 3.2 Realization of Optimization of Job Information Management Function Module

The main interface after login by existing users (including teacher users, student users, etc.) is shown in Figure 8. The corresponding functional modules in the interface respond differently according to different users.

Number name	Courseware number	File name	Complete path	Teacher ID	Remarks
5	Review outline	20201026	KS\20201026.doc	2018651	NA

**Figure 8:** The main interface after user login (including teacher user, student user, etc.).

Both teacher users and student users can dynamically learn the information of the English subjects taught, learned, and selected through this module. For the courseware management function module, teachers can upload the teaching courseware and teaching guidance materials of their subjects through this function; And students can download the relevant learning materials they need. Regardless of whether it is a teacher user or a student user, you can find the required courseware through the query function. The main code of the query is as follows:

```
String search=require. Obtain Parameter("search");
// Get parameters;
String search by=require. Obtain Parameter ("search by");
Result Setrs=null; if (search!= null)
// Determine if the input query value is not empty;
{
If (text value==null| |text value. Equate (""))
// No query conditions are entered, the default is to query all information
//Obtain the value from the db data table
Else {if (search by. Trim (). Equate ("0"))
// The query condition is the courseware number
}
```

### 3.3 Realization of Examination Information Management Optimization

In the system, the software code for translating English sentences is as follows:

```
Char* translate sentence ()
{
Strcpy (Buffer, sentence.); sentence
[0] =0;
```

```

intl expressions 1, I expressions 2;
for(inti=0;i<sentence. iNumDan Ci; C++)
{//If the word has multiple expression.....
} Else //1 word, directly copy the meaning of the word into the sentence to be translated strcat();
}

```

## 4 OPTIMIZED SYSTEM TEST

The ultimate goal of software testing is to find and find problems or defects in the software system by designing test cases, list the problems or defects found and analyze the causes, and take effective measures to solve the problems and avoid the occurrence of problems or defects.

### 4.1 System Test Process

This part mainly takes the "teaching resource management function" test as an example, mainly to detect the usability of the teaching resource information management function. The test the function of deleting teaching resources examples were illustrated in Table 2.

Prerequisites: The English teaching assistant management system environment has been built, and the system can be running stable.	
Steps	<ol style="list-style-type: none"> <li>1. Through the account and authority verification on the login page, successfully enter the system.</li> <li>2. Go to the home page of the teaching resource management function and hit the "Teaching resource delete" link to enter the teaching resource delete page.</li> <li>3. Enter the keyword information, and hit the "Query" button to find out the info of the case to be deleted.</li> <li>4. In the queried teaching resources, single-select the teaching resource to be deleted, and then click the "delete" button.</li> </ol>
Expected result: The teaching resource is deleted successfully, and the corresponding record in the teaching resource table in the background database is deleted.	
Test result: Consistent with the expected result of the test, the test passed.	

**Table 2:** Test case analysis of teaching resource management function.

### 4.2 System Test Results

This chapter tested the full-function coverage test of the English teaching assistant management system based on VC visualization software. The test results of these six functional modules are illustrated in Table 3.

Management models	Total test number	Passed number	Failed number	Reason for failed
User	5	4	1	The configured information does not take effect
System information	4	3	1	The view function shows that there is a garbled problem
Teaching resource	9	9	0	/
homework information	5	4	1	The save function shows that there is

				a garbled problem
examination information	4	4	0	/
Auxiliary Q&A	6	6	0	/

**Table 3:** Optimized results of computer-assisted English teaching system based on VC visualization.

This chapter started from the testing theory of the black box testing method, and implements and tests the main functional modules of the English teaching assistant system. The test was analyzed from the function and performance. The test results showed that the functions and indicators of the English teaching aid system implemented basically satisfy the design demands, have certain application and promotion value.

## 5 CONCLUSION

Based on VC visualization technology, the computer-assisted English teaching system is optimized and designed to correctly measure the amount and degree of computer-assisted English teaching, and give full play to the superiority of computer-assisted English teaching in teaching. It can create English context, provide a communication platform, and expand classroom capacity. This has played an important practical application value for realizing the perfect integration of computer-assisted and traditional classroom teaching. How to make the most of existing software development platforms, especially cross-platform professional software development, is a question worthy of consideration and research. Fully utilization of the respective superiority of different software platforms is bound to effectively shorten the development cycle and enhance system performance. This is undoubtedly of great significance to the development of professional software. The development of this system is an innovation of teaching methods. The informatization of English teaching is a long and arduous process. The English teaching assistant system based on VC visualization software solves the urgent need in English teaching management. The teaching mode that combines VC visualization technology with computer-assisted English is a revolution in teaching concepts and an adaptation to the changes of the times.

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