A Creative Research on Interactive English Teaching Based on Computer Aid

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Abstract. With the rapid development of digital technology, the advantages of the multiple interactive teaching model of college English have become increasingly prominent. The multiple interactive teaching model of college English focuses on teacher-student interaction, student-student interaction, student-teaching material interaction, and human-computer interaction. The research analyzes the characteristics of the multiple interactive teaching mode compared with the traditional teaching mode, and also points out some of the problems and challenges it faces, and compares the experimental class with the control class in specific teaching practices, and draws the conclusion: The multi-interactive English teaching mode is conducive to improving students' English learning performance, and is a practical and effective teaching mode. At the same time, the thesis briefly introduces the creation of Web-based interactive teaching system, and according to the characteristics of Web network teaching, expounds the selection of the system architecture and methods to improve the security and stability of the Web network teaching system.

Keywords: Computer-assisted, interactive English teaching, multiple interaction, teaching system.

1. Introduction
The multi-interactive teaching mode in the information technology environment has distinctive interactive features, which can fully realize the interaction between computers and students, the interaction between students and teachers, the interaction between students and teaching content, and the interaction between students and students. In the direction of interaction, it can be one-to-one, many-to-one, or many-to-many. Many scholars even think that there are problems of time-consuming and low efficiency, high scores and low ability, "deaf-mute English" in college English teaching in my country. Based on the above reasons, this research attempts to construct a multiple interactive teaching mode of college English, design teaching operating procedures, implement experimental teaching, and comprehensively study the relationship between the language learning activity of "interaction" in the digital technology environment and the effect of college English teaching. Network teaching is a new type of learning mode supported by computer and network technology, with students as the main body. It makes the "teaching" of teachers and the "learning" of students not restricted by time and place to a certain extent. It emphasizes students' self-learning and can cultivate students' independent learning ability. The online teaching process has the characteristics of interactivity, openness, collaboration and...
autonomy, and can provide students with a large number of teaching resources, build an online learning environment, promote emotional communication between teachers and students, complete many teaching activities, control and guide student learning, and be able to analyze and report on students' academic performance and academic achievements.

At present, colleges and universities in our country have begun to pay attention to the construction of online teaching. Many of the online teaching platforms used by schools are commercial software. These software’s are not only expensive, but also have a fixed interface, which is not easy to achieve interface changes and diversity, and is not easy to maintain and manage. In response to these shortcomings, we need to choose a suitable network teaching platform that can not only meet the needs of network teaching, but also has good versatility. It also requires low hardware requirements, system stability, easy use, and simple management. Web interactive teaching is a new teaching environment [1]. It provides a real-time two-way interactive multimedia network teaching environment (network virtual classroom) for online synchronous remote teaching, and provides management mechanisms such as support, supervision and control for online asynchronous remote teaching (autonomous learning). The gradual rise of this kind of teaching mode makes teaching reform move forward with the development of information technology.

2. Human-computer interaction teaching mode
The organic integration of network multimedia technology and foreign language teaching has greatly enriched the information resources of foreign language teaching. In multiple interactions, the author believes that human-computer interaction is the core of foreign language teaching, and human-computer interaction is the essence of online courses. The "machine" here not only refers to hardware resources, it should also include teaching resources and curriculum design. In the final analysis, it is the creation of a network-based virtual learning environment [2].

Constructivism emphasizes the student-centered, and the student is the subject of cognition and the active constructor of the meaning of knowledge. Modern education also has several principles, that is, individualization, self-paced, instant feedback, knowing the progress, and English online courses based on the network environment can realize these principles in design. From the experimental technical conditions, NIEE fully meets the technical environment of network operation. Its network platform is installed on the server of Beijing TV University. Students can study online through the intranet, on the campus of the learning center, or through the external network at work, home, and any place where they can access the Internet. Very high. So how is the human-computer interaction in teaching realized? Take the audiovisual listening and speaking of the NIEE network course as an example, it has four interactive systems: 1. Computer learning system, English learning and teaching software system based on the network and combined with multimedia technology. 2. Test system, using computers to test students' listening, speaking, reading, writing, translation, grammar, vocabulary and other skills [3]. Testing includes horizontal positioning testing, unit testing and level testing. Third, the teaching management network auxiliary platform, which records students' learning progress, time, results, difficult problems, homework completion, etc. at any time. Teachers or teaching managers can monitor in real time through the network, analyze and evaluate teaching, and can also realize teaching Multiple functions such as interaction, uploading of teaching resources and course release. 4. Learning resource library, including voice demonstration, grammar library, electronic dictionary, supplementary video, vocabulary list, text audio-visual and text learning resources, etc. Students can interact well with the first three of these four systems. The design of the learning system conforms to the law of language acquisition. Each unit is composed of three major links: seeing, listening, and speaking. First, "see" the general idea, then "listen" to the details, and finally "speak" to export, that is, language first the input is followed by the language output. The mode of "human-machine" activities is shown in Figure 1 below.
3. The characteristics of multiple interactive teaching mode

There is a big difference between the multiple interactive teaching model and the traditional teaching model, as shown in Table 1. All in all, the multi-interactive teaching mode is to establish a multi-dimensional, three-dimensional, and organic unity. The rapid development of modern information technology has created conditions for teachers and students to realize synchronous communication functions and asynchronous communication functions, which can realize human-computer and human-human interaction in the true sense. This unity includes the interaction between teachers and students in the classroom, the interaction between teachers and students after the class, the interaction between students and students, and the interaction between students and learning media and learning materials [4]. The multi-interactive teaching model reflects the blending of teaching methods, the openness of the teaching environment, the equality of teacher-student relations, the diversity of teaching forms, the level of interaction, and the diversity of evaluation systems. Specifically, the teaching interaction is embodied in the following three aspects.

| Teacher role | Traditional teaching mode | Multiple interactive teaching mode |
|--------------|---------------------------|----------------------------------|
| Student role | Passive receiver of knowledge | Interactive event participants |
| teaching method | Lecture-oriented | Teachers design interactive topics and students participate in the interaction |
| class interaction | There is a small amount of teacher-student interaction in the classroom | Interaction between teachers and students, students and students, and vitality |
| Interactive way | Classroom lectures | Interact at any time through the Internet before, during and after class |
| Interactive medium | Less used | Online media such as QQ, WeChat online learning platform, etc. |
| Feedback | Mainly homework or quiz | Communicate feedback at any time |
| Evaluation method | Mainly summative evaluation, ignoring students’ individual differences | Mainly formative evaluation, focusing on diversified evaluation |
| Advantage | Systematic explanation of knowledge facilitates teachers to control the classroom | Teaching methods are flexible and diverse, and students are highly motivated and involved |

3.1. Teacher-student interaction

Teacher-student interaction includes two parts: classroom interaction and after-class interaction. First of all, the interactive classroom is the most important part of the multiple interactive teaching mode, because classroom teaching is still an indispensable form of teaching in college English courses.
However, this kind of interaction does not completely negate the traditional classroom knowledge teaching form, because the main purpose of teaching is still to enable students to systematically learn knowledge and master professional skills. This kind of classroom interaction requires teachers to change and innovate teaching methods, that is, in an interactive classroom environment, teachers need to design a variety of classroom questions and answers, exercises, group activities, classroom autonomous learning tasks, etc., so that students can complete various activities in the process Learn new knowledge and consolidate it, and at the same time make the knowledge learning process from boring to interesting and easy to accept. Secondly, the interaction between teachers and students after class is also an important part of the interaction between teachers and students. The development of modern information technology makes this interaction no longer restricted by time and space. Teachers can use email, Blackboard teaching platform, QQ, WeChat and other media to provide synchronous or asynchronous guidance to students. The roles of teachers and students have undergone tremendous changes, whether it is interaction in class or out-of-class. Teachers are no longer the instructors of knowledge, but play a more diversified role—inspiring and interacting knowledge. Event designers, directors, participants and referees are also leaders and resolvers of student learning. Students have also changed from a passive recipient to an active participant.

3.2. Student-to-life interaction
Student-student interaction (that is, online or offline interaction between students) is also an important part of the multi-interactive teaching model, which complements and extends the classroom interaction between teachers and students. This form of interaction makes students' learning and communication between students no longer limited to the classroom environment, but can interact with students in dormitories or self-study classrooms wherever there is Internet, which is of great significance. On the one hand, as a communication tool, English can be better mastered by learners only in practical applications; on the other hand, students need to interact when completing homework and group tasks assigned by the teacher, which is beneficial to improve the effectiveness of the learning strategy. For example, the interaction of students generally involves two-person interaction (such as a two-person dialogue) or group interaction (such as completing a drama performance). In this process, students can understand the importance of mutual help and group cooperation, and learn how to play better Good one's role in the group will help improve their social skills [5].

3.3. Vitality interaction
The rapid development of multimedia information technology has made it possible to use the Internet for learning anytime, anywhere, and it has become more and more popular. Multimedia voice classrooms, online classrooms, and autonomous learning platforms have been adopted by more and more colleges and universities to provide students with Rich and colorful independent learning resources and a good online learning environment. As smart phones have become an indispensable communication tool in students' study and life, students secretly use cell phones to chat and play games during class, which affects the quality of education and teaching. Teachers should take advantage of the situation and instruct students how to use mobile phones to learn English independently. Various mobile apps for practicing vocabulary, reading, listening and speaking can help students increase their interest in English learning and further tap their English learning potential. At the same time, in the process of autonomous learning in which students use network resources for organic interaction, teachers also need to provide reasonable guidance at any time to help students improve metacognitive strategies, that is, how to formulate and reflect on learning plans and adjust them in a timely manner based on actual conditions.
4. Computer-aided interactive teaching system

4.1. System Architecture

The interactive Web teaching system based on NET platform adopts hierarchical structure and modular design to facilitate the expansion and maintenance of system functions.

4.1.1. Function module. The main functional modules of the system are shown in Figure 2. The role of each module is:

4.1.2. Co-construction and sharing of resources. Upload or save the PPT, CAI courseware, teacher teaching video files, and course test files of all courses authorized to enter the teaching system to the courseware resource library on the server. Establish a curriculum resource database to implement unified management of all curriculum teaching content files [6].

4.1.3. Networked teaching. Multimedia teaching can be implemented online in two ways: Web or LAN.

4.1.4. Learning Interactive Community. Similar to the BBS or message board on the website, it is used for course study discussions and exchanges between teachers and students or between students.

4.1.5. Autonomous learning by students. Log-in students choose different courses to study or review the course teaching content in the course resource library [7].

4.1.6. Networked exam. Authorized log-in students can use the test files in the course resource database to conduct self-testing and implement unified network examinations.

4.1.7. Three-tier architecture. In the current B/S system architecture, a three-tier system structure consisting of data access, business logic and presentation layer is mostly adopted, as shown in Figure 3.

**Fig. 2 The functional module composition of the interactive Web teaching system**
Fig. 3 Schematic diagram of the three-tier structure of the Web application

This three-layer structure is independent of each other between layers, and changes in any one layer will not affect the functions of other layers. In addition, some levels can also be added according to the actual situation, especially adding some sub-layers in the business logic layer to optimize system performance and form an N-tier structure system. Based on the consideration of system functions, this article has made an attempt in this regard. Between the three-tier structure, the data access layer can only be accessed by the business logic layer, and the business logic layer can only be accessed by the presentation layer. The client user transmits the request to the business logic layer through the presentation layer, and the business logic layer completes the relevant business rules and Logic, and access the database through the data access layer to obtain data, and then return in reverse order to display the data in the presentation layer. The functions of each layer are as follows:

4.1.8. Data layer. Manage data and provide standardized open access interfaces to the business logic layer. The data layer mainly provides two forms of service: database and file. The database mainly provides services for data with obvious structural characteristics such as business operation data; files mainly provide unstructured data including scanned document images, photos, Word documents, spreadsheets, PPT presentations, voice and video content, etc. Storage and access services.

4.1.9. Business logic layer. It includes multiple component services, applies different business rules to implement application logic, and completes the data processing required for application operation. Receive requests from the Web presentation layer, process the requests according to the coded business rules, obtain data from the data access layer or send data to the data access layer, and pass the processing results back to the web presentation layer. This system uses separate public classes to encapsulate and process the business logic of different functional modules, including user classes, video playback classes, network examination classes, course classes, and communication classes.

4.2. Presentation layer
In the three-tier structure of NET, the presentation layer actually represents the clients .aspx web page file. On the one hand, the presentation layer accepts client data and then passes it to the logic layer for processing after simple integration and judgment. On the other hand, it receives the Data Set or Data Reader from the logic layer, and returns it to the client page [8].

4.3. Design points of system architecture

4.3.1. Planning of stored procedures in the data layer. Carefully analyze the information exchange process between layers in the sequence diagram of the three-tier architecture (see Figure 4), and you can find that Dataset is in the process. To this end, the basic focus of the three-tier architecture design is the main composition of the data layer: overall consideration and careful planning of the storage process design. The corresponding storage process includes all data processing services such as data
creation, data storage, data query, data update, data deletion, data security, transaction support, and data backup/restore for business logic services.

![Diagram](image)

**Fig. 4** DataSet in the sequence diagram of the three-tier architecture

### 4.3.2. Optimize the business logic layer

The business logic layer is in the middle of the data access layer and the presentation layer in the system architecture, and plays the role of connecting the previous and the next in the data exchange. The design of the business logic layer is particularly critical for a scalable architecture, because it plays two different roles. For the data access layer, it is the caller; for the presentation layer, it is the callee. For this reason, in order to improve the reusability and cohesion of the objects in the business logic layer, reduce the coupling between it and the data access layer and presentation layer, and optimize the business logic layer for systems with more functions such as Web teaching. The method is to expand this layer into three sub-layers with clear responsibilities: the interaction sub-layer with the presentation layer, the business domain sub-layer, and the interaction sub-layer with the data layer. Among them, only its own business logic is included in the business domain sub-layer objects, that is, to manage its own data and dependent object data. It should not include work processes that need to manage a large number of business domain sub-layer objects in a specific transaction environment. Methods of collaboration.

### 4.4. Use data connection pool

Using AJAX technology in NET (see Figure 5), you can install ASP.NET AJAX. In fact, ASPNET AJAX has been embedded in Microsoft Visual Studio 2008.

![Diagram](image)

**Fig. 5** AJAX system composition in ASPNET
4.5. Control of access users

Among many computer security solutions, access control or authorization is the most intuitive, natural and most important. There are many types of users in Web-based interactive learning systems, including administrators, teachers (divided into classes and non-classes), students (divided into elective and non-selective courses) and visitors. The maintenance of all kinds of user self-data and access rights (visitors can only browse part of the data and do not have the rights to maintain data) control requires careful planning. Role-based access control RBAC (Figure 6 shows its collaboration diagram), because of its flexibility and economy in managing the security of large-scale network applications, has become the access control model of choice for Web-based interactive learning systems.

Fig. 6 Collaboration diagram of role access control

5. Conclusions

Compared with the traditional teaching mode, the multiple interactive teaching mode has many characteristics, such as the integration of teaching methods, the openness of the teaching environment, the equality of teacher-student relationship, the diversity of teaching activities, the effectiveness of teaching effects, and teaching management the hierarchy and so on. Network technology provides people with a fast, efficient and convenient means to realize knowledge dissemination and knowledge learning. The web-based interactive network teaching platform has opened up new education and teaching models with the support of information technology. For this reason, the research, application, development and promotion of Web-based network teaching are of great practical significance.

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