Application of Data Exchange Model and New Media Technology in Computer Intelligent Auxiliary Platform

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***Abstract*—To improve the use of computer-assisted learning, the author presents a method based on the use of new technologies. The system hardware model has a three-layer model system, including the user interface layer, the business option layer, and the data management layer. After teachers, students, and other users log in to the system, the user interface layer needs to enter personal information and advise users by including business-level options. System interaction is mainly influenced by two things: interactive learning and information sharing, interactive learning affects the online lessons of teachers and students; Data exchange is reflected in the data transmission of the data exchange model. According to the test results, after using the system, students with high self-efficacy increased from 11 to 21, and the percentage increased from 21.4 to 34.8, which can be understood as an increase in the number of good students. This interactive learning has been proven to increase students' self-efficacy and improve learning, and the use of this system has been a positive outcome.**

***Keywords*—Computer intelligent assisted teaching system; information exchange; stress testing; new media technology**

I. Introduction

The 21st century is an era of rapid development in information technology, with the development of multimedia and network technology, the perfect combination of the Internet and education has triggered an educational revolution in the information age [1]. Online education, also known as "E-learning" in English, refers to online learning or networked learning, which refers to the establishment of an internet platform in the field of education and a new way for students to learn through the internet.

Online teaching is another concept closely related to online education. The broad definition of online teaching platforms includes both hardware facilities and equipment that support online teaching, as well as software systems that support online teaching [2]. That is to say, there are two broad categories of online teaching platforms: Hardware teaching platforms and software teaching platforms. Narrowly defined online teaching platform refers to a software system built on the Internet and providing comprehensive support services for online teaching. Online teaching is not only about publishing teaching materials online, but also about sufficient communication and exchange between students and teachers, as well as between students and students [3]. The teaching support platform developed using network technology has become a tool for communication between teachers and students, providing a comprehensive information environment and support for teachers to implement teaching online. Digital media technology is the use of computers to integrate various media such as text, graphics, images, sound, animation, and video, and process them through sampling, quantization, editing, modification, encoding, compression, reconstruction, display, and storage transmission, and establish logical connections. Computers constantly refresh various records with their unparalleled advantages of convenience, accuracy, efficiency, convenient storage, and ease of modification [4]. In recent years, the rapid development of multimedia technology and the continuous upgrading of software have provided broad prospects for the widespread application of computers in the field of design and performance, multimedia technology has not only brought a revolution to stage visual expression in a new form, but also brought about significant changes in people's aesthetic concepts.

With the popularization of computer network technology, its application in computer teaching, making it play the role of intelligent auxiliary education, has been comprehensively carried out in teaching practice. As a teacher who has been engaged in computer teaching for many years, the author believes that if computer network technology is reasonably and effectively applied, it can indeed achieve the effective intelligent assistance of teachers in educating students, however, if not applied properly, there may also be some problems that need to be taken seriously.

II. Literature Review

The popularization of computer network technology has brought great convenience to people's lives and learning, and the status of computer education in school teaching is becoming increasingly high. The development of the times and technology has made the use of computers more widely distributed, the new generation of students must learn computer technology well in order to succeed in the competition of society. Computer network technology provides abundant learning resources for computer teaching, allowing students to gain richer knowledge in interactive environments, when students discover some problems in their studies, they can use powerful networks to search for the answers they need. Although computer network technology has brought great convenience to computer education in schools, it also has adverse influencing factors [5]. Therefore, the current main task is to fully utilize its advantages to eliminate some adverse

effects and fully utilize the function of network technology in computer intelligent assisted education.

Due to the current lack of emphasis on experimental courses in computer basic courses in some schools, there are very few class hours arranged, and there is a lot of experimental content, resulting in some students having difficulty mastering the experimental content. School affairs must increase the hours of experimental classes to exercise students' practical abilities and provide them with a deeper understanding of written knowledge, in order to enhance teaching efficiency [6]. The specific backup of computer data in the teaching of basic computer network technology courses is shown in Fig. 1:

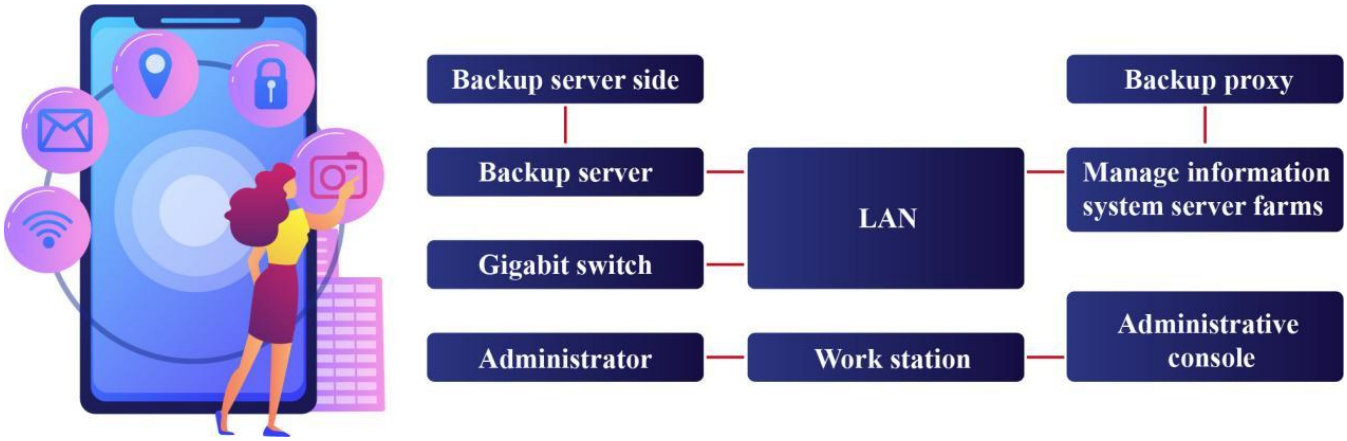

Fig. 1. Computer network technology data backup structure diagram.

With the development and application of network technology, China is gradually entering an era of "artificial intelligence". Nowadays, people's lives are filled with artificial intelligence internet products and IoT applications, which are the two mainstream directions for internet product aggregation. Take the speech recognition, facial recognition, and autonomous driving technologies currently used in China as examples, all of which are applications of artificial intelligence technology. On the other hand, with the development of information technology, the Internet of Things has also developed rapidly. Therefore, Y. Yu put forward the idea of creating artificial intelligence by combining the two new technologies. The article discusses the current state of smart internet development worldwide and predicts its development prospects [7]. With the widespread demand for intelligence in many industries, many people have begun to devote themselves to research, realizing its role in economic development and hoping to better support more businesses. Artificial intelligence speech technology is important for advertising and television news, it can improve the quality and performance of traditional voice, make it better for singing, radio advertising and recycling, and can serve the people better. Hu .M discussed the use and development of artificial intelligence technology in the context of integration, and studied its development performance, intelligent robot typing, intelligent face recognition, meaningful speech recognition, intelligent OCR recognition, automatic reporting, and other applications and developments [8]. Artificial intelligence technology, as an emerging and rapidly developing technology, has played a crucial role in many fields. In the power system, due to its complex organizational form, its deeper application in the power system is currently a challenge faced by the power system. In response to this issue, Han .X applied the concept of enterprise architecture to deeply analyze the architecture of power grid enterprises [9]. At the architectural level, they clearly planned the application of artificial intelligence in the architecture. By classifying business, application, technology, and data, artificial intelligence can be further applied in complex power systems. Finally, a successful application example in the power system is provided.

The author designs an interactive electronic technology computer-aided teaching system based on new media technology, with the aim of achieving interactive electronic technology computer-aided teaching.

III. Design of Interactive Electronic Technology Computer Aided Instruction System

A. System Hardware Design

In general, the client does not need to install any other software, just install and use the browser, reduce the connection between the server and the client, reduce the risk of exploiting the application code, and support the security of the database system.

According to the new technology, the interactive computer has a three-layer structure in the order of user interface layer, business selection layer, and data management layer. Teachers, students, and other users can access the system by entering their personal information in the user interface layer and accessing the selected business layer ; Teachers, students and other users can click on the application according to their needs in the business option layer, and the business option layer can change the message to the user to receive management information; The information management system selects the learning materials and integrates them according to the user's needs. Fig. 2 shows the three-step process of interactive computer-based technology [10].

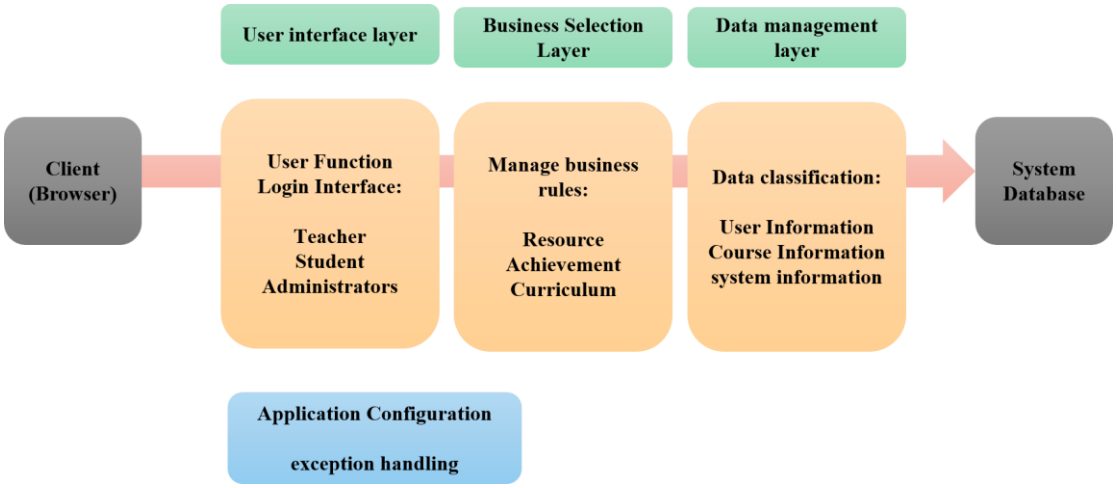

Fig. 2. Three-layer architecture diagram of the computer-aided teaching system of interactive electronic technology based on new media technology.

1) User interface layer: Users enter their personal information on the service's login interface and then click the submit button to enter the business selection process. End-to-end technology is used to complete user input and implement user input as quickly as possible in real-time. NET certificate plugin to prevent user theft and hacking [11].

2) Business selection process: After entering the business selection layer through the user interface layer, users can click on the application that suits their needs, and the business selection process redirects people to use configuration statements in the management layer. Business process options provide better access to information management through new technologies. Since there are some differences in the business preferences of users with different characters, let's take the management system as an example, Fig. 3 shows the management schematic diagram of the teacher application management system in the selected business process [12].

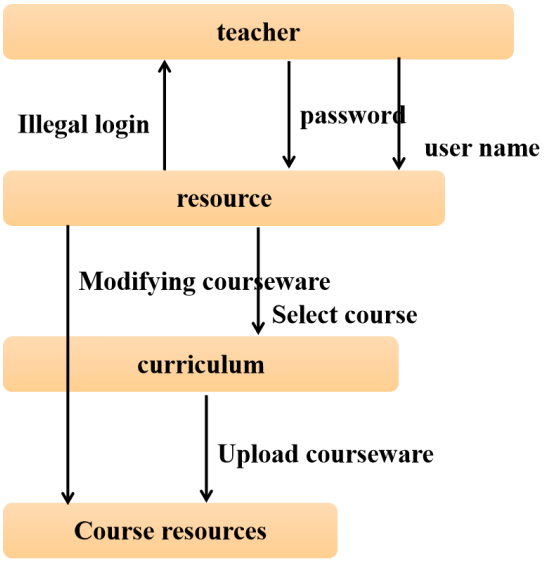

Fig. 3. Schematic diagram of the service selection layer resource management function.

In Fig. 3, the teacher enters the user name and password in the user interface layer to access the business process of the selection process, access the standard business level of the process selection process, you can choose the class or customize the product according to your needs, you can upload the material to the course materials for future study [13].

B. System Interactive Design

1) Interactive training: Interactive Learning A diagram of interactive computer learning as a new technology is shown in Fig. 4.

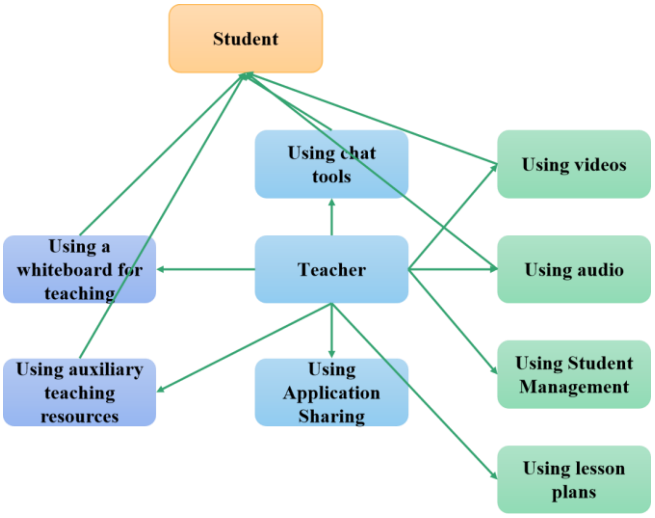

Fig. 4. Example of an interactive system.

Interactive instructions Use diagrams to illustrate the interactive operation of the system. The newsletter shows that teachers are successfully communicating with students through interactive tools, video, audio, student management, lesson plans, sharing plans, smart teaching tools, and free lessons.

2) Information exchange: Interactive computer-aided design software based on new technologies, including interactive management servers, database servers, web servers, and node applications. The communication management server is used for intelligent support and

information exchange between study group members and groups, and its functions include the following [14].

Manage data versions: Join or delete study groups, manage courses.

Manage chats: Change the chat information sent to different groups of users by all users.

Node operations include: Receiving, duplicating, compressing, decompressing, searching, and transmitting video and audio data; Distribute research materials requested by the group; Group information management; Communicate information in conversation.

C. Research on Recommended Learning Algorithms

The coordinated filtering algorithm compares the specific behavior of a user (such as rating, viewing frequency, viewing time, resource collection, download collection, etc.) with the operational behavior of other users, this enables the identification of neighbors whose behavior is closest or similar to that of the target user, the system will automatically analyze the behavior of these similar neighboring users, and after the analysis is completed, the system will recommend specific content of interest between neighboring users to the target user [15]. Therefore, the Collaborative filtering recommendation algorithm is based on the following assumptions: (1) Users have similar interests and hobbies. (2) The user's interests and hobbies can maintain a certain degree of stability and continuity within the same time period, and will automatically predict the user's specific interest needs based on their historical operational behavior. Collaborative filtering recommendation algorithms can be divided into the following two categories: (1) User based Collaborative filtering recommendation; (2) Collaborative filtering recommendation based on specific projects. Among them, the central idea of user based Collaborative filtering recommendation is that there is a certain degree of similarity between the operating behaviors of different users, for example, the operating behaviors of users A and B are very similar, user A operates specific resource A, and user B will also have a high probability to select resource A [16]. The central idea of Collaborative filtering recommendation based on specific projects is that there is a certain degree of internal correlation between projects, for example, if user A selects items B1, B2, B3, and B4, there will usually be a certain degree of internal correlation between items B1, B2, B3, and B4. Most of the Collaborative filtering systems based on specific items will use the scoring matrix of "user item" to distinguish the internal association between different items, the system will automatically calculate the final score of a user on an item through this internal association, thus generating the final set recommended to target users.

The quality of nearest neighbor selection can directly determine the accuracy of the final information resource push, therefore, the generation of nearest neighbors is the core and key of this algorithm. The author used Pearson's correlation coefficient to calculate the degree of familiarity between users. Therefore, the familiarity between user U_a and user U_b is represented by the following Eq. (1):

$$sim(User_a, User_b) = \frac{\sum_{n=1}^{N}(r_{a,n} - \bar{r}_a)(r_{b,n} - \bar{r}_b)}{\sqrt{\sum_{n=1}^{N}(r_{a,n} - \bar{r}_a)^2}\sqrt{\sum_{n=1}^{N}(r_{b,n} - \bar{r}_b)^2}} \quad (1)$$

In Eq. (1) above, $r_{a,n}$ represents the final rating of user U_a on a resource project $Item_n$; $\bar{r}_a$ represents the average score of all resource projects evaluated by user U_a.

The project-based Collaborative filtering algorithm can perform similarity calculation offline, and Top-N recommendation can be used when the nearest neighbor user set is finally selected, this recommendation refers to the set of N users with the highest similarity as the closest neighbors. Afterwards, the general formula 'prediction' can be used to calculate the current user's level of interest in any specific resource project. At the same time, sort the predicted interest levels and ultimately recommend the N resource projects with the highest interest level to the target user u.

Therefore, we can assume that the set of resource items that user u has rated is S_u, therefore, the predicted interest level of user u in any resource item j is represented by Eq. (2) as follows:

$$prediction_{uj} = \bar{r}_u + \frac{\sum_{i=1}^{n} sim(u,i)(r_{i,j} - \bar{r}_i)}{\sum_{i=1}^{n} |sim(u,i)|} \quad (2)$$

In Eq. (2), $\bar{r}_u$ represents the average score of users on the evaluated resource projects; $\bar{r}_i$ represents the average score of neighbor i; r_{ij} represents the evaluation score of neighbor i on resource project j; Sim (u, i) represents the degree of similarity between user u and user I [17].

IV. System Testing

Let's take a class of some 2nd year students as an example. This system is used in school information technology. Boys, students and teachers access the system through the user interface and perform six functions: user management and permission management. The tests in Table I show that the results of the application of six different systems are consistent with the results and exceed the performance of the system [18].

The self-efficacy index is used to determine the effectiveness of students in controlling their own behavior, which reflects their ability to learn independently [19]. In this part of the experiment, self-efficacy groups and low-efficacy groups are used to determine how the learning process interacts among students and whether teachers have a positive effect on students after using this method (Fig. 5).

TABLE I. FUNCTIONAL TEST RESULTS OF THE SYSTEM MODULE

System module function settings in this article	Optimum effect	Application results of this system
user management	If the user's login information is incorrect, it will be displayed immediately	Meet the ideal effect
Administrator permission test	Edit user information for students and teachers	Meet the ideal effect
Students' autonomous learning	Choose a course to study, test, etc. and take the test yourself	Meet the ideal effect
Application of Student Courseware	Students can choose their own courses to complete their online course	Meet the ideal effect
Teacher Course Management	Teachers can edit the relevant content of their courses	Meet the ideal effect
Teacher Q&A interaction	Teachers can respond to students' uploaded questions online	Meet the ideal effect

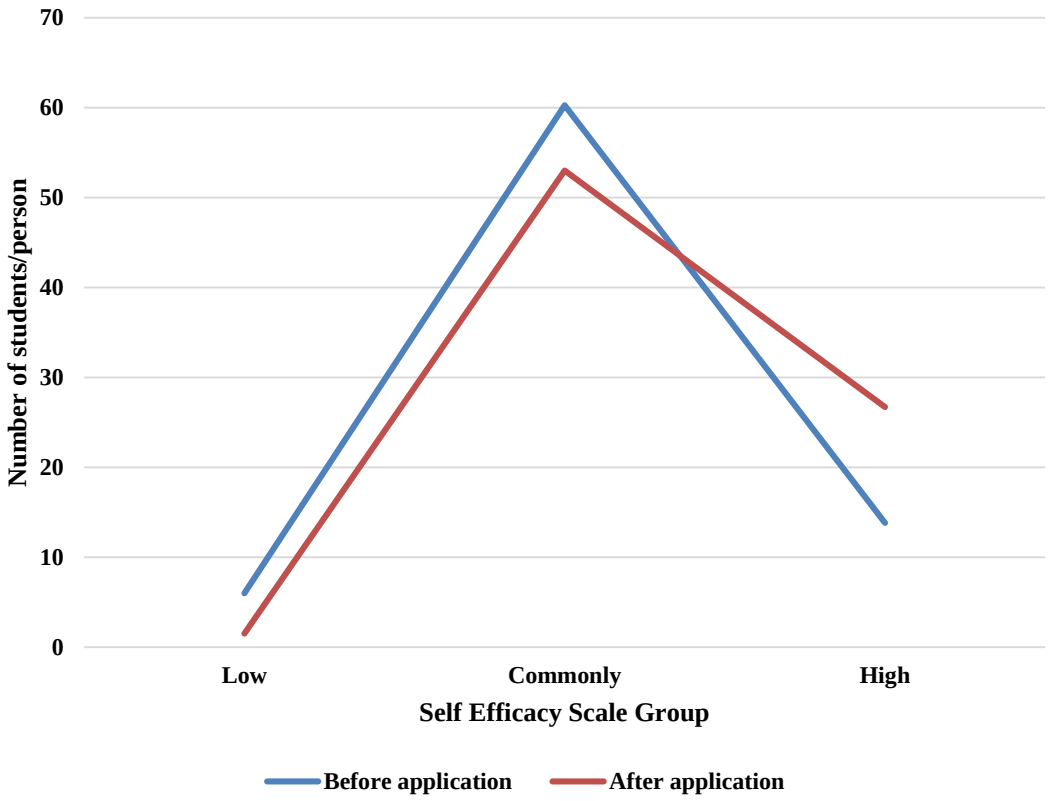

Fig. 5. Results of the system application effectiveness test (before and after application).

Fig. 5 shows that after implementing the system, the number of students with high self-reliance increased from 11 to 21, and the percentage increased from 21.4 to 34.8. By using this system, it can be understood that the number of students with good personal performance has increased [20-21]. A slight decrease in the number of students with high self-efficacy and self-efficacy after using this method indicates that the interactive learning method improves students' self-efficacy, improves their own learning, and takes advantage of this system.

V. CONCLUSION

The author of interactive design of intelligent computer technology helps to introduce new technologies, including the user interface layer, business-level options and information management systems, to achieve the intelligent technology technology support manual; Analyzing interactions in computer-based learning through interactive learning and information sharing. After testing the system, it can be seen that the number of students with high self-efficacy increased from 11 to 21 and the percentage distribution increased from 21.4 to 34.8 after applying the method described in this article. interactive teaching of the process improved students' self-reliance and independent learning; Also, applying the results of this system to six different activities will achieve ideal results, and the system has strong interactions and high resistance.

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