Artificial Intelligence-Based Design of English Teaching System

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Artificial intelligence technology has begun to enter many fields of education in recent years. Artificial intelligence can promote English teaching in many ways, providing relatively objective and instructive feedback, helping teachers to teach, helping students improve their English skills, and encouraging teachers' and students' enthusiasm for teaching and learning. To address the issue of sharing English teaching resources between many campuses of the same institution, this paper proposes the design of a system of integrated management for English teaching resources information based on artificial intelligence. The system's hardware design is based on the storage module design for English teaching resources and system server design, and the software design of the system is realized based on the architecture of the system operating environment and the database. On the other hand, how to use the curriculum design to improve English listening and speaking ability is an important topic in teaching English majors. The purpose of this paper is to construct a networked English listening and speaking teaching design model, which effectively integrates the teaching design theory with professional modernization technology, and the specific process of the model has been evaluated by the Richter five-scale method, and the average value of the results was 4.29, it demonstrated that the approach is an effective instructional strategy for English majors' hearing and speaking classes, and it is a method to enhance listening and speaking ability of students.

Povzetek: Predstavljen je integrirani sistem za upravljanje virov angleškega poučevanja med več kampusi iste institucije. Strojna zasnova sistema temelji na modulih za shranjevanje učnih virov in strežniškem sistemu, medtem ko programska zasnova vključuje operacijsko okolje in bazo podatkov. Poudarek je na izboljšanju sposobnosti poslušanja in govora pri študentih angleščine s pomočjo omreženega modela poučevanja.

1 Introduction

Teachers are still dominant in English teaching. With the development of artificial intelligence technology and the expansion of English teaching databases, artificial intelligence can greatly assist English teachers in teaching and learners in learning due to the fact that its effectiveness and function can take the place of teachers in some particular areas of English education [1]-[2]. At the same time, artificial intelligence may help instructors manage their classrooms by assisting them to plan lessons, prepare teaching materials, create classroom activities, grade students, assign and remind students to do homework, sending alerts, and track attendance [3]. English learners may also self-teach pronunciation, vocabulary, grammar, reading, listening, writing, and speaking anytime, anywhere, using artificial intelligence technologies. At this stage, for example, the domestically developed AI oral English evaluation system has achieved a scoring evaluation for the English oral test in the middle and high school entrance examinations, and the accuracy of scoring has also been recognized. The effect is also very satisfactory. There have also been positive reviews in college English teaching for artificial intelligence technology to facilitate reading aloud to help students achieve accurate assessment and feedback on multiple phonemes.

Based on the huge database, the part of the practice can be completed by artificial intelligence technology, including four skills (listening, speaking, reading, and writing) [4]. The current stage of artificial intelligence can assess the learners' language ability. For example, an AI-powered system for vocabulary practice can repeatedly display words the learner has mastered once the words are memorized [5].

In addition, through speech recognition, learners can practice pronunciation through the tools designed through AI technology but cannot have logical and creative conversations. Spelling and grammar mistakes in student essays can be automatically corrected by artificial intelligence technology. Besides, artificial intelligence technology can provide learners with translations and interpretations of complex sentences and even images of unfamiliar words, providing learners with convenience in receptiveness, reading, and listening [6]-[7].

Based on learner performance feedback, artificial intelligence technology can undoubtedly provide useful assistance for teaching evaluation. On the one hand, in terms of giving feedback according to certain standard settings, artificial intelligence machines are more objective than evaluating teachers because the former only

operates according to the instructions set by the programmer, without any emotions and special conditions. Therefore, in some provinces in China, the evaluation of the oral test by the artificial intelligence machine is completely trustworthy [8]. In addition, the formative assessment and practice of artificial intelligence in the classroom and the formative feedback generated in the extracurricular exercises can objectively discover the current language level of learners with different abilities and further guide learners and teachers for the next step. And error-correcting feedback from AI tools can also help learners to self-correct and learn from their mistakes. For example, when a learner practices with "English Fluency", mispronounced words are highlighted, and learners can self-correct by focusing on certain words in the original audio [9]. Apart from this, with the help of formative feedback, teachers can focus more on reflection on their teaching and revise relevant teaching strategies and methods, especially for inexperienced new teachers to adapt to classroom teaching, and rapid development of professional skills is supportive [10].

Undoubtedly, artificial intelligence technologies may increase students' motivation to learn [11]. First, the practical applications of artificial intelligence technologies encourage English language learners to study more often, which means that users can learn English anywhere and at any time. Under the influence of artificial intelligence technology, the interaction between learners and machines becomes more interesting, stimulating learners to actively explore foreign language learning. Because of its huge database and analysis capabilities, artificial intelligence technology frees teachers from some basic and repetitive work, improves their efficiency in teaching, and releases more creativity. Second, it is only necessary to conduct simple training for English teachers without adding other extra work [12]. AI technology has proven to successfully detect and correct mistakes by learners, thereby providing corrective and formative feedback for further improvement. The author of [13] further demonstrated that learners have a positive attitude towards corrective feedback provided by intelligent tutoring systems. Students are more motivated to use artificial intelligence technology for oral language learning, and their learning motivation is clearer [14]. English learners will be more motivated to stick to English learning because of the functionality of AI tools. The author [15] found in their research that learners' motivation to learn vocabulary can be highly improved by using technologies based on artificial intelligence [16]. In addition, using chatbots in spoken English classes can improve learners' motivation to communicate.

A complete reform of high-quality education has been facilitated by the widespread use and development of artificial intelligence technologies in all spheres of society. Compared to the conventional educational approach, network education based on the technology of AI has access to a wealth of educational materials. The typical teaching approach to English topics must be revised for pupils to absorb in-depth information. Therefore, the English teaching resources and data must be developed to support the network teaching method. On the other hand Furthermore, although there are many teaching models, this research has not been carried out to create the teaching model of the network teaching platform for English listening and speaking courses in the environment of E-learning. Therefore, based on the analysis and synthesis of the above four teaching design models, this study creates a networked listening and speaking instruction design paradigm appropriate for English majors.

2 Related works

The article [17] studied the construction of a networked English listening and speaking teaching design model, which effectively integrates the teaching design theory and modern technology and evaluates the specific process of the model by the Richter five-scale method. The average result is 4.29 seconds, indicating that the model is a suitable teaching design for listening and speaking courses for English majors and is a modern teaching platform that can improve students' listening and speaking ability.

The paper [18] analyzes the fundamental needs and general structure of the ICAI MOOC system. And adopts the BP neural network algorithm to design an ICAI MOOC system that automatically pushes individualized instructional content by students' learning effects. It also focuses on expounding the principle, training steps and heuristic rules, developed and tested the system. The outcomes demonstrate that the software can adhere to the design specifications and is stable.

According to the specific requirements of modern English education, the article [19] constructs an English teaching system based on the MVC MVC (Model, View, ad Controller, MVC) architecture and thoroughly describes and analyzes the concepts, system architecture, and system functionalities employed by the system design. The English video playback was accomplished using the third-party space while the matching development environment was developed.

The article [20] suggests the building of an integrated management system for English teaching resources information based on artificial intelligence to address the issue of sharing English teaching resources amongst multiple campuses of the same institution. The software design of the system is realized based on the design of the system operating environment and database, and the hardware design of the system is realized based on the configuration of the system server and storage module for English teaching resources.

The article [21] takes the construction of the ecological education environment for undergraduate English under the background of artificial intelligence as the research object. Based on expounding the relevant basic concepts and theories, it analyzes the current situation and problems of English ecological teaching. It discusses artificial intelligence—the backdrop construction method for the ecological English teaching system. Table 1 shows a summary of findings from existing research.

Table 1: Summary of findings from existing research

Article number	Research contents	Research contents	Result	Limitations
17	Construction of a Design Model for Online English Listening and Speaking Teaching	Construction of a Design Model for Online English Listening and Speaking Teaching	Teaching design suitable for English listening and speaking courses to improve students' listening and speaking abilities	No specific implementation details or long-term effects mentioned
18	Design of ICAI MOOC system	Design of ICAI MOOC system	System stability, following design specifications	Lack of long-term tracking of student learning outcomes
19	An English Teaching System Based on MVC Architecture	An English Teaching System Based on MVC Architecture	Detailed system function description and environment matching	The application scope and effectiveness of the system have not been specified
20	Integrated Management System for English Teaching Resource Information	Integrated Management System for English Teaching Resource Information	Addressing resource sharing issues	Lack of specific system implementation and effectiveness evaluation
21	Construction of English Ecological Education Environment under the Background of Artificial Intelligence	Construction of English Ecological Education Environment under the Background of Artificial Intelligence	Analyzed the current situation and problems of English ecological teaching	Specific implementation strategies and effects have not yet been provided

Existing research has achieved certain results in online English listening and speaking teaching, MOOC system design, English teaching system development, teaching resource management, and ecological education environment construction. However, there are still some limitations, such as the lack of specific implementation details and long-term effects, insufficient long-term tracking of learning effects, and lack of specific explanation of system application scope and effects Lack of specific system implementation and effectiveness evaluation, as well as the lack of specific implementation strategies and effectiveness.

Therefore, this article aims to address these limitations and propose more specific and practical English listening and speaking teaching solutions through further in-depth research and practice, in order to improve teaching effectiveness and student learning experience.

3 The scheme of the English teaching system based on artificial intelligence

3.1 The significance of the artificial intelligence teaching system

English listening and speaking class is a prerequisite for English majors. The '*English Teaching Syllabus for English Majors in Colleges and Universities* require various training in listening comprehension so that native English speakers can understand conversations in general social situations and grasp the main idea more easily. In terms of oral English ability, students may express themselves more clearly in English and understand communication elements like questions, requests, opinions, and advice with accuracy. On different occasions, different communicative functions are reflected in appropriate and decent language forms for other people. The teaching model of the English listening and speaking course is directly related to the cultivation and improvement of learners' listening and speaking ability. With the rapid development of modern technology, taking full advantage of network technology to mobilize the enthusiasm of English learners has become a hot topic. [22].

An essential component of teaching growth is instructional design. By mobilizing various variables in teaching activities, optimizing learning resources and steps, and using systematic methods, teaching objectives, teaching conditions, teaching techniques, and teaching methods are all derived from learning theory and teaching theory. The author of [23] pointed out that instructional design is a systematic process in which every component is crucial to successful learning. The construction of the instructional design model with the method of instructional design system began in late World War II.

The instructional design model is a simplified form of instructional design theory. At the same time, it provides a visual approach to the process of teaching activities and has the characteristics of strong operability. The universal instructional design concept is also known as the ADDIE model. Analysis, design, development, implementation, and evaluation is all part of the ADDIE paradigm. The ADDIE paradigm serves as the foundation for many instructional design frameworks. The Kemp model belongs to the teaching classroom design model, which includes all classroom environmental factors. The author of [24] pointed out that the Kemp model has three distinctive characteristics: 1) teaching is designed from the perspective of learners; 2) teaching design is based on a 3) The instructional design model emphasizes the management of the design process. The Dick & Carey model is known as the systems approach model and is one of the best instructional design models. The Dick & Carey model has 10 bidirectional links, restricting and influencing each other [25]. The SREO model is a network-based language teaching design model emphasising student interaction and human-computer communication. The model has 6 links and 16 elements.

In this article, a design of an artificial intelligence based integrated management system is proposed for English teaching resource information, aimed at solving the problem of sharing English teaching resources among multiple campuses of the same university. To achieve this goal, the BP neural network algorithm was adopted and combined with modern technology to optimize teaching design and resource allocation. In this study, the characteristics of BP neural network were utilized to achieve automatic recognition and classification of student learning status through the collection and analysis of student learning data. Based on the classification results, the system can automatically adjust the allocation of teaching resources to provide personalized teaching content for students in different learning states, thereby improving teaching effectiveness.

In addition, instructional design theory has been combined with modern technology to construct a networked English listening and speaking instructional design model. This model not only combines traditional instructional design concepts with artificial intelligence technology, but also evaluates the specific process of the model through the Richter Five Scale method. The evaluation results indicate that the model can effectively improve students' listening and speaking abilities, and is a teaching design strategy suitable for English listening and speaking courses.

3.2 Design of network english course program

The Internet is the foundation for the networked English listening and speaking teaching design paradigm, which creates English listening and speaking courses. The model analyzes and integrates the ADDIE, Kemp, Dick & Carey, and SREO models and summarizes their common characteristics; the conclusions show that all of them are suitable for network listening. Speaking of teaching design elements, a networked English listening and speaking teaching design model with core student-centred, task-centred, and interaction as the teaching strategy is constructed. The model includes 6 links and 15 elements (as shown in Figure 1).

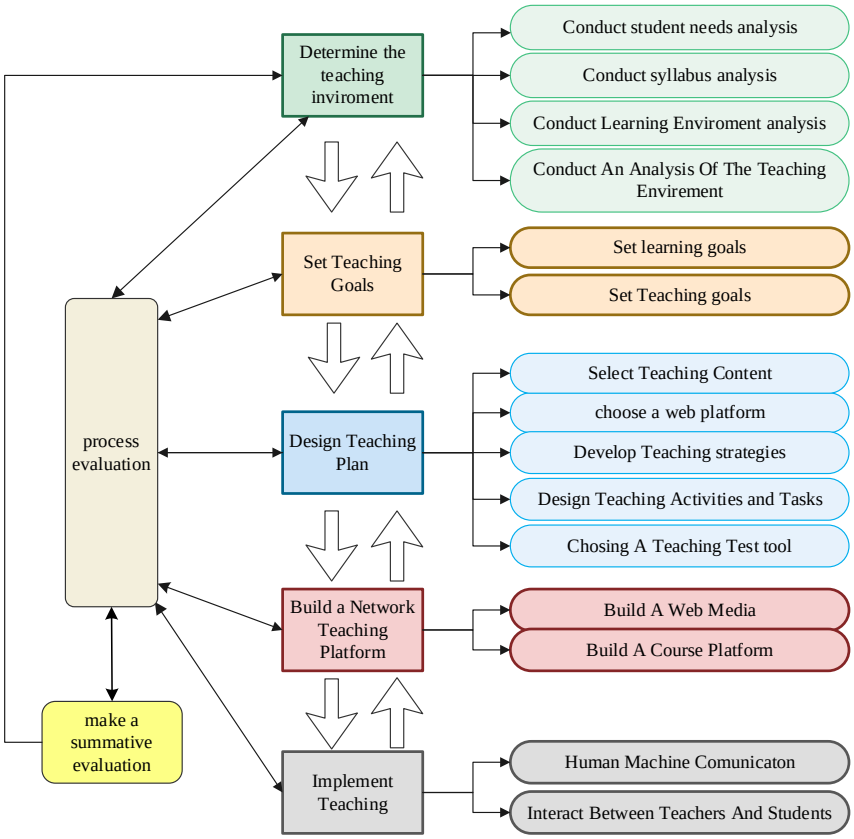

Figure 1: Model for networked English listening and speaking instruction

It can be seen from the figure that the design of the English listening and speaking teaching model mainly includes the following parts:

1. Determining the teaching environment (Identity Setting).

Before designing the teaching process, it is necessary to determine the history and present state of English listening and speaking instruction, which is the basis of the teaching design process.

(1) Completing a needs analysis and establishing the status and requirements of students' English listening and speaking learning in order to develop a foundation for those goals.

(2) Conducting syllabus analysis (Analyze Existing Curriculum). It is necessary to analyze the teaching syllabus and understand the training goals and requirements for English listening and speaking teaching as defined in the *English Teaching Syllabus for English Majors in Colleges and Universities.*

(3) Carrying out the learning environment analysis (Identify Learning Context). The evaluation of whether to develop networked English listening and speaking teaching is divided into two aspects: 1) Evaluation of equipment environment, 2) Evaluation of teaching methods.

2. Conducting analysis of the teaching environment (Analyze Instructional Content).

The key to teaching evaluation is to analyze and evaluate the needs and levels of online English listening and speaking teaching with students as the center.

3. Determining the teaching environment (Identify Setting).

The conclusions of the above analysis and evaluation are used to formulate the goals of English listening and speaking, teaching and learning. The teaching and learning goals must be complete, concise and practical.

(1) Setting Learning Goals. Determining the specific learning objectives of the English listening and speaking course. The learning objectives can be divided into three parts:1) knowledge acquisition objectives, 2) ability training goals, and 3) achievement requirements objectives.

(2) Setting Teaching Goals. Teaching goals are the starting point and final destination of all teaching activities and determine the expected results and standards to be achieved by English listening and speaking teaching activities. Teaching goals can be divided into short-term goals and long-term goals.

4. Designing Lessons.

They are concreting the teaching plan for English listening and speaking class, establishing the teaching progress, and choosing a specific media form. Programs should be closely aligned with teaching and learning objectives.

(1) Select Manage Content. Teaching content must follow the principle of authenticity of learning materials and create a real language situation.

(2) Select Platform Software. There are many network platforms for teaching, some of which are paid and some are free. According to the analysis of the

learning and teaching environments, choose a network platform suitable for listening and speaking teaching, such as Web 3.0, Blackboard, Moodle, etc.

(3) Develop instructional strategies (Determine Instructional Strategies). According to the teaching objectives, teaching tasks and the characteristics of students, the English listening and speaking teaching methods and techniques related to the combination are selected in a targeted manner. The model is based on task-based and interactive teaching methods.

(4) Design teaching tasks (Establish Tasks). Ur (1984) points out that the most effective listening practice is task-focused. Therefore, the design of teaching activities and tasks is the key to the success or failure of networked English listening and speaking teaching. The task design should be "learner-centered", and the tasks should be close to the real situation of people's use of language in daily life or work to maintain effective English listening.

(5) Select Design Testing. To test the effect of English listening and speaking teaching, it is necessary to design an effective language test. The test in this model is an online test, which includes a level test and a performance test, a normal mode standard test and a reference standard test. The test design should fully consider the speed and timely feedback of the network.

5. Build a network teaching platform (Produce Online Instructional Package).

Construct specific unit teaching content on the Internet, compile network auxiliary materials, and use corresponding media flexibly to maximize the amount of teaching information.

(1) Build Integrate Media. It is very important to effectively use various media for English listening and speaking teaching, such as text, pictures, audio, video, online books, etc. It is very important to construct and optimize the media combination to serve the training and improve students' listening and speaking ability.

(2) Encourage interaction between students (Encourage Peer Interaction). The foundation of networked English listening and speaking instruction is interaction. The interaction between students is the organic combination of language input (listening) and output (speaking). The interaction between students can be divided into synchronic communication and diachronic communication.

6. Evaluation

Evaluation means evaluating the teaching process of listening and speaking and checking whether each link works and whether the outcome of teaching meets the goals. The evaluation link runs through the entire English listening and speaking teaching design process and is not independent of other links.

(1) Conduct process evaluation (Conduct Formative Evaluation). Process evaluation is carried out within and between each link of listening and speaking teaching design. Generally, individual evaluation, small group evaluation and on-site inspection are used. According to the data collected in the review, the teaching design plan is constantly revised and improved, highlighting the networked listening and speaking.

(2) Conduct summary evaluation (Conduct Summative evaluation). The summative assessment is carried out after completing the listening and speaking teaching implementation stage to evaluate the learning effect, learning attitude and so on. The evaluation results determine whether the teaching activity is effective and whether the teaching effect achieves the teaching and learning goals.

3.3 Design of a comprehensive management system for English teaching resources

To facilitate the real-time interchange of English teaching resource information, the English teaching resource storage module was created utilizing a widely used memory architecture. Figure 2 depicts the mechanism of the storage model.

The English teaching resource document information, comprising the document data, teaching courseware, genuine questions, and other resources, is stored in the model's storage. Figure 3 displays a schematic diagram of the information storage system for English teaching resources.

The documents describing the resource information for English instruction should be kept in the proper folder, which should be created by the design system's instructional resource storage module by the kind of media content. Figure 4 depicts the storage module structure for data on English teaching resources.

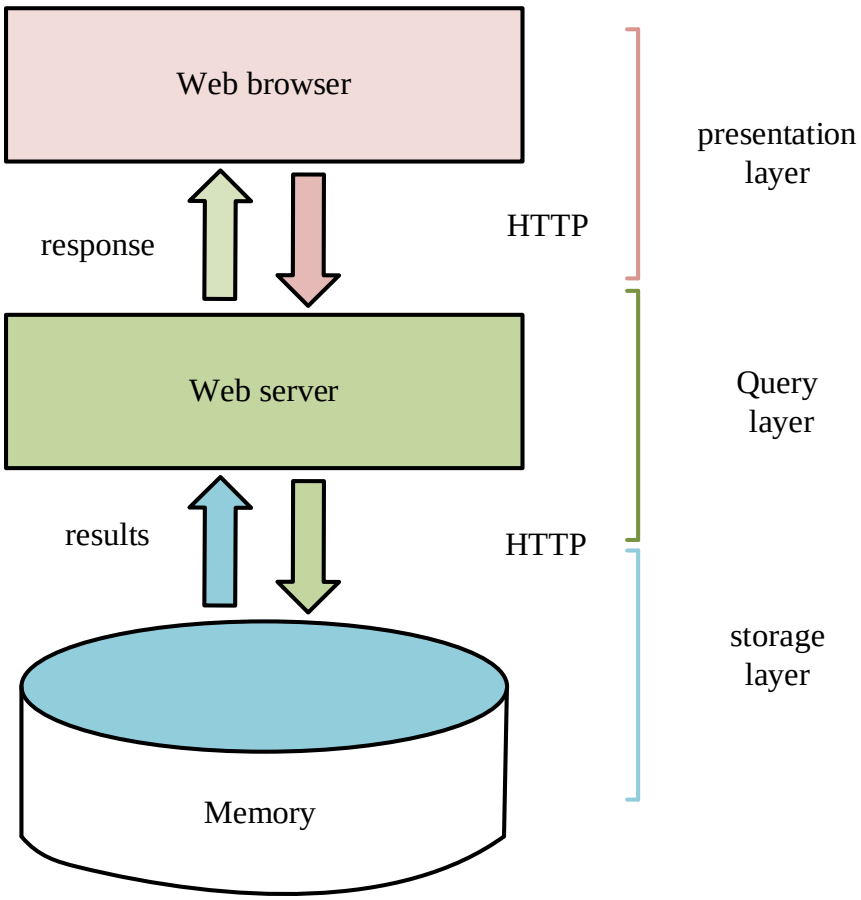

Figure 2: Reservoir mechanism model

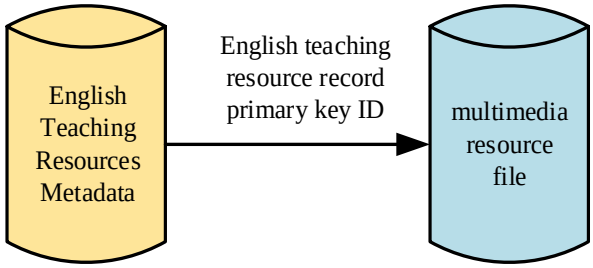

Figure 3: English teaching resource information storage flowchart

To improve the security performance of the English teaching resource information integrated management system, the user is initially dealt with authorization. According to the user's actual data, the management system will assess if a user has authorization when they log in. Figure 5 depicts the user authorization determination procedure.

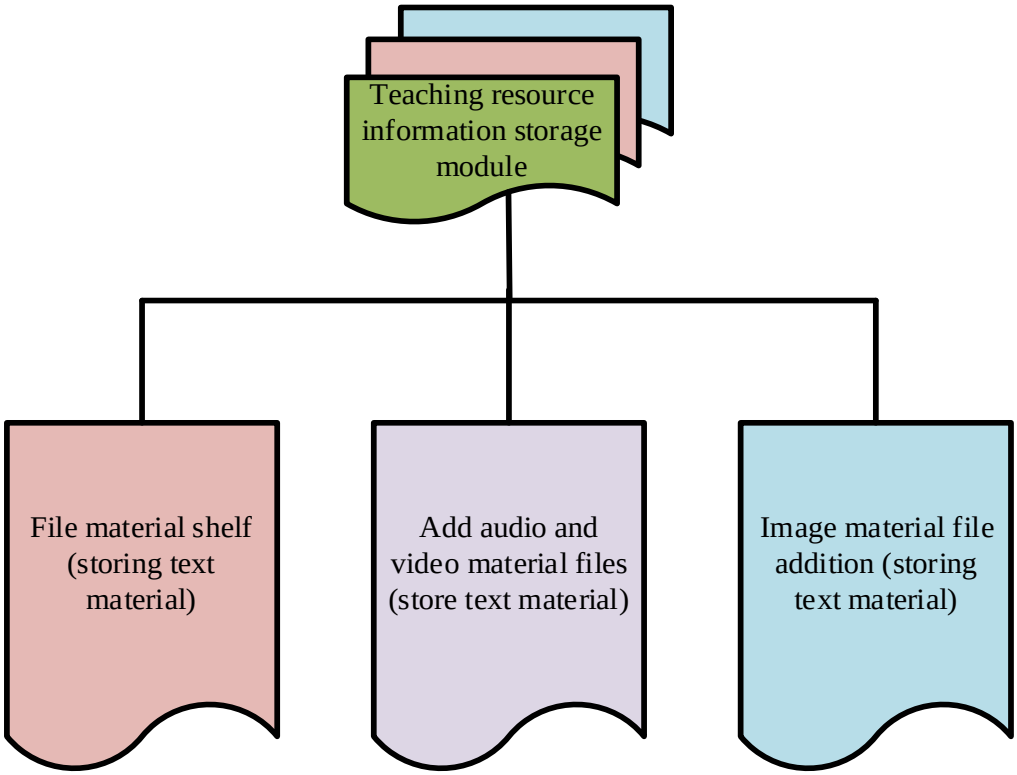

Figure 4: The english teaching resource information storage module structure

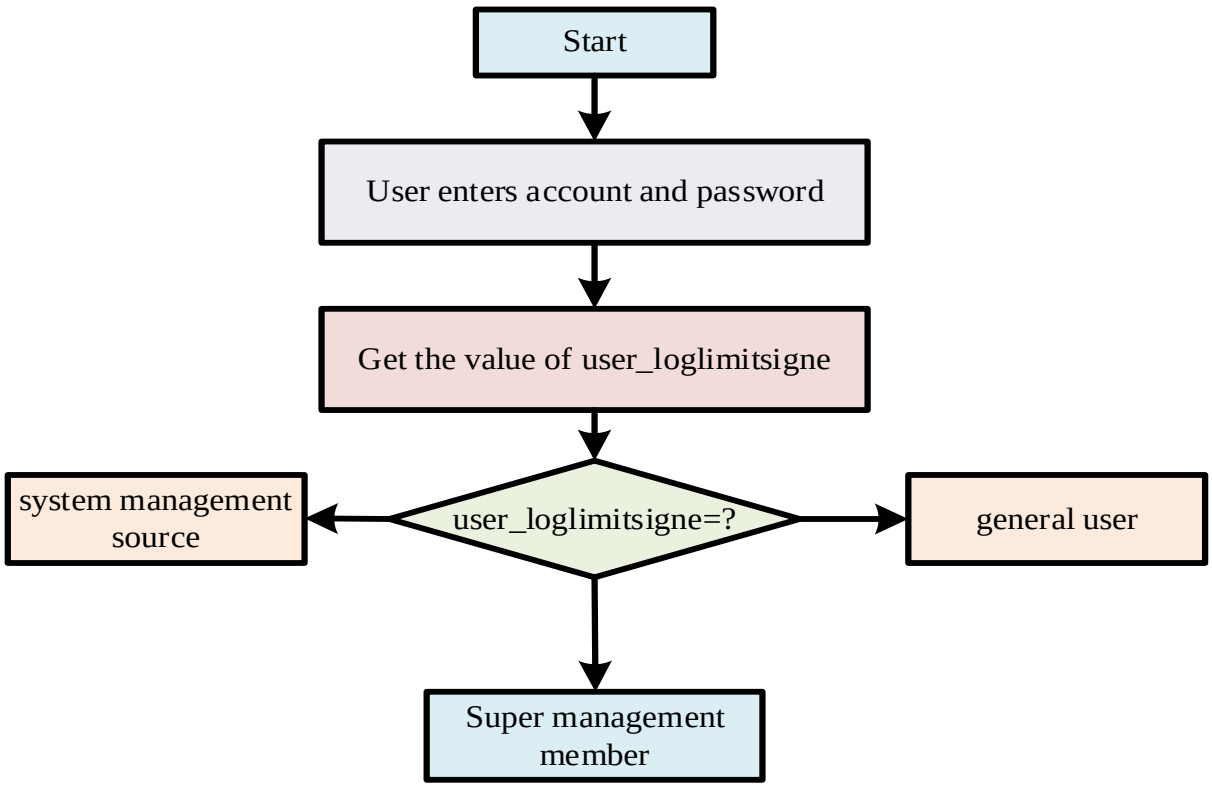

Figure 5: User permission determination flowchart

Two steps must be taken in creating and deploying the integrated management system for English teaching resources, with each step requiring a distinct operating environment. A SQL Server 2010 database serves as the system's storage platform. To debug the system's functioning, the operation of the system's background must be used in conjunction with the installation of data storage software, the usage of code development tools, and both. Installing a browser that is compliant with the system settings and the browser's related development plug-ins is required for the development environment of the system. The system's database primarily performs

queries, data insertion and deletion, and other similar tasks. It may also leap to the system's background database to get the necessary access data. Users, administrators, information about English teaching resources, and information content can all be configured as system entities after studying the system's workings. Figure 6 depicts the E-R diagram outlining the connections between each component.

The database of the system is mostly used to manage the resource information and data since it is the most fundamental component of the entire system. Through the definition of the relationship between each entity in the database, it provides logical support for the front-end function and back-end administration of the teaching resource information management system.

Summarily, the system software design includes three main parts, 1) studying the operating environment and considering the systems, 2) designing the operating environment, and 3) plotting the E-R curve according to the relationship of each system object. Next, the structure and principle of the BP neural network are introduced.

According to the difficulty of all knowledge points in the English course and the student's learning situation, sorting out the knowledge can create useful data, which can be taken as training samples for the BP neural network. At the same time, experts evaluate the training samples and the training process end on the condition that the outputs of the BP neural network meet the requirement of the experts' evaluation.

The specific operation steps of the BP neural network are summarized as follows: Picking a sample.

Randomly draw the input from the sample library sample, which can be expressed as:

$$x(j) = (x_1(j), x_2(j), \cdots, x_n(j)) \tag{1}$$

And the output of corresponding expect can be expressed as:

$$d(j) = (d_1(j), d_2(j), \cdots, d_n(j)) \tag{2}$$

Where j is the number of the dimension of the vector.

(1) Calculating the input and output values of individual populations.

Include the input value of the hidden layer $h_{ih}(j)$, As shown in formula (3), The output value $h_{\mathrm{oh}}(j)$ is shown in formula (4), and the input value $y_{\mathrm{ih}}(j)$ of the output layer is shown in formula (5), the output value is shown in formula (6)

$$h_{ih}(j) = \sum_{i=1}^{n} w_{ih} x_i(j) - b_h h = 1, 2, \cdot, p \tag{3}$$

$$h_{\mathrm{oh}}(j) = f(h_{\mathrm{ih}}(j)) h = 1,2, \cdots, p \tag{4}$$

$$\mathrm{y_{io}(j)} = \sum_{\mathrm{h=1}}^{\mathrm{p}} \mathrm{w_{ho} h_{oh}(j) o = 1, 2, \cdot, q} \tag{5}$$

$$y(j) = f(y_{io}(j)) o = 1,2, \cdots, q \tag{6}$$

Where with represents the different weights of the hidden layer, who represents the different weights of the input layer, it means the number of the hidden layer, yoh represents the number of the input layer

(2) Formula illustrates the partial derivative of the error function concerning the neurons in the output layer (7), and for the implicit, the partial derivatives of layer neurons are shown in formula (8).

$$\delta_o(k) = (d_o(k) - y_o(k)) y_o(k)(1 - y_o(k)) \tag{7}$$

$$\delta_h(k) = \left[\sum_{0=1}^{q} \delta_o(k) w_{ho} \right] v_h(k) \left(1 - v_h(k)\right) \tag{8}$$

Where d0(k) represents the different correct output values, y0(k) represents the incorrect output value, and k represents the number softmax layer.

As shown in equation (9) for the correction of the connection weight W_{ho} with and is corrected as in formula (10).

$$w_{\mathrm{ho}}^{N+1}(k) = w_{\mathrm{ho}}^{N}(k) + \eta \delta_o(k) v_h(k) \tag{9}$$

$$\gamma^{N+1}(k) = \gamma^{N}(k) + \eta \delta_o(k) \tag{10}$$

Where η is the learning rate, which is between 0 and 1.

(3) Use $\delta_h(k)$ and correct the connection weight W_{ih} as shown in equation (11). The correction to the threshold θ is shown in formula (12).

$$w_{ih}^{N+1}(k) = w_{ih}^{N}(k) + \eta \delta_h(k) x_i(k) \tag{11}$$

$$\theta^{N+1}(k) = \theta^{N}(k) + \eta \delta_h(k) \tag{12}$$

Where η is the correction factor, k is the number of connection layers.

(4) Calculate the global error E, as shown in equation (13)

$$\mathrm{E} = \frac{1}{2\mathrm{m}} \sum_{\mathrm{k=1o=1}}^{\mathrm{m}} \sum^{\mathrm{q}} \left(\mathrm{d_o(k) - y_o(k)}\right)^2 \tag{13}$$

(5) Based on the outcome of E, determine if the algorithm terminates. If E<ε or more students study the material than the allotted maximum number of times, the algorithm ends. If not, go to step 1 to pick learning examples at random. The structure of the BP neural network is shown in Figure 7.

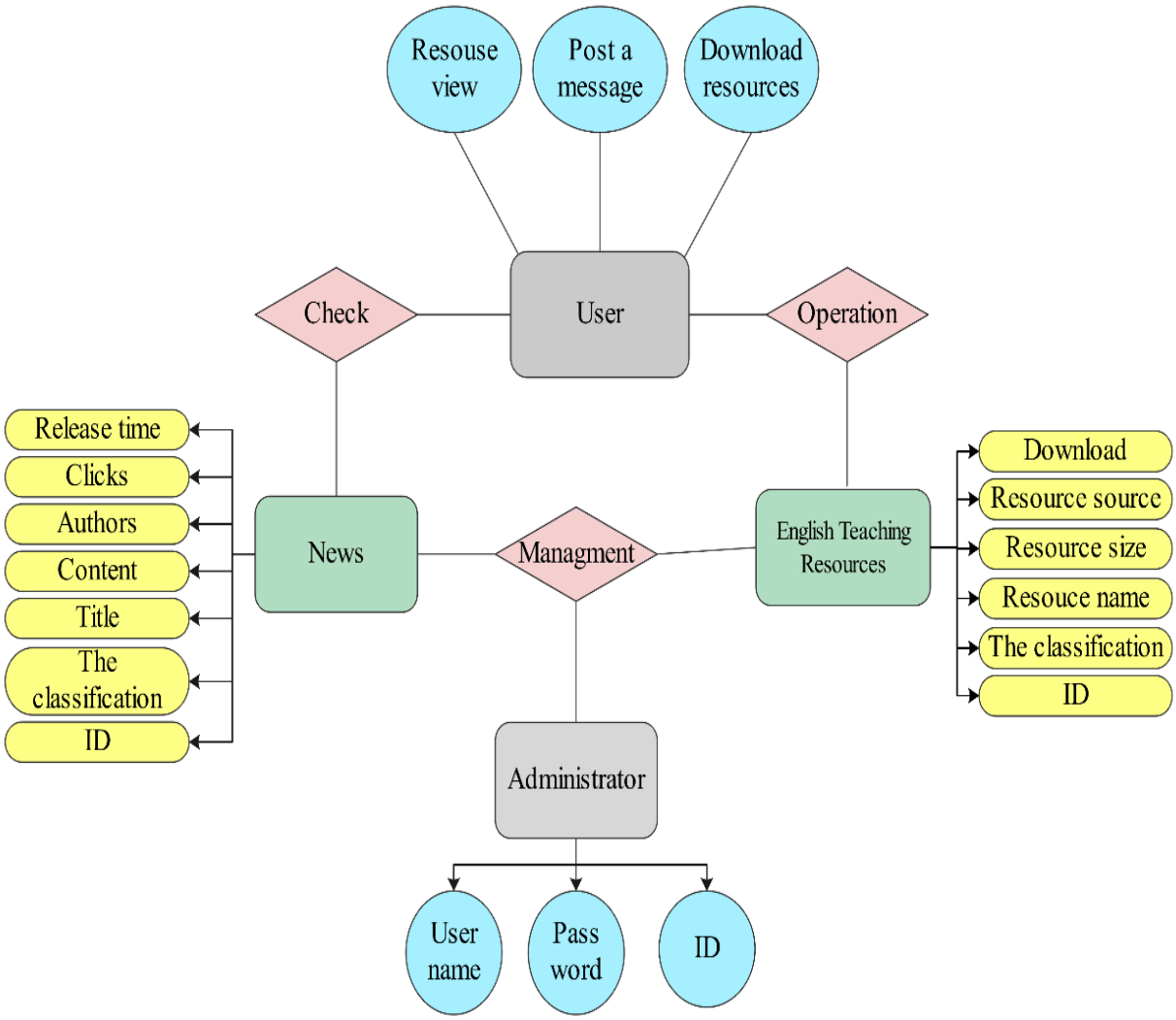

Figure 6: E-R diagram of relationship description between database entities

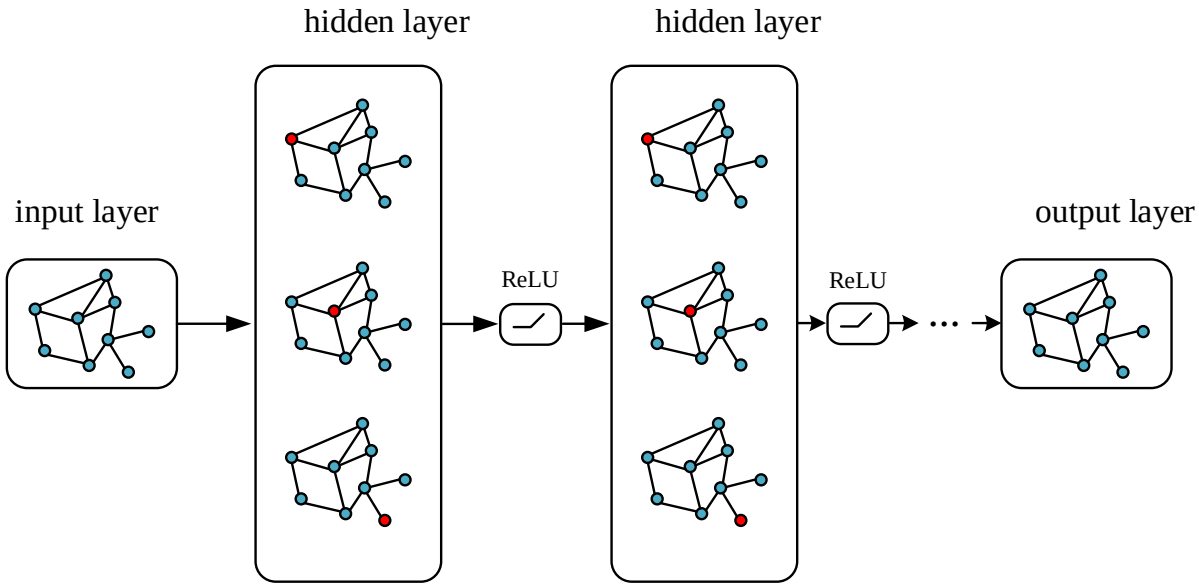

Figure 7: BP neural network structure

When designing and developing an AI based English teaching system, user experience and accessibility are two crucial considerations. The user experience is related to whether the system is easy to use, whether it can meet the needs and expectations of users, while accessibility is related to whether the system can be accessed and used by users with different abilities and backgrounds. Firstly, in terms of user experience, this article delves into the needs of students and teachers, and designs a system based on these needs. This article aims to ensure that the interface design of the system is concise and clear, and the operation process is intuitive and easy to understand, so that users can easily get started and quickly grasp the usage methods. At the same time, the research also continuously optimizes the functionality and performance of the system through user feedback and testing, in order to provide a smoother and more comfortable user experience. Considering the needs of different learning groups in terms of accessibility. For users with visual or hearing impairments, this article provides auxiliary features such as text to speech, large fonts, and high contrast to ensure their smooth use of the system. In addition, the focus is on system compatibility and cross platform compatibility to ensure that users on different devices and browsers can access and use the system normally.

4 Result in analysis and discussion

4.1 Networked english course design

After constructing the networked model for teaching English by hearing and speaking, for the validity and operability of the model, three experts in science and technology education and language teaching were invited to evaluate the model. Five-point Likert Scale), the model was assessed as "very suitable" (mean = 4.92, standard deviation = 0.283) by SPSS analysis (see table 2).

4.2 An artificial intelligence-based design experiment for an integrated management system for English teaching resources

To make sure that the performance index of the system can meet the design criteria, an experiment simulating system reaction time is carried out. The CPU in the test environment is 2×2.6 GHz, the system's background database is SQL Server 2010, and the operating environment of the client is Windows 10 operating system. The version of the browser is 6.0 and above, the memory of the system is 16 GB, and Load Runner 7.8.1 is the test tool utilized in the investigation. In the BP neural network used in this paper, the iterations number is set to 200. To show the relationship between the number of iterations and the loss value, and the relationship between the prediction accuracy of the model clearly, the curve plotted with the data of loss value and accuracy value under different iterations has been shown in Figure 8.

Table 2: Evaluation questionnaire for the networked english listening and speaking instructional design model

Questionnaire items	average value	standard deviation
The networked design for teaching English speaking and listening model is clear and easy to operate	4.67	0.577
Reasonable correlation of various elements in the networked English listening and speaking instruction design model	4.67	0.577
The elements of the networked English listening and speaking teaching design model are appropriate	5.00	0.000
Networked design for teaching English speaking and listening model can promote teacher-student interaction	5.00	0.000
Networked teaching English through listening and speaking design model can promote interaction among students	5.00	0.000
A networked model for teaching speaking and listening in English can promote human-computer interaction	5.00	0.000
Networked English listening and speaking teaching design model can provide timely feedback for teachers or students	5.49	0.000
The networked English listening and speaking teaching design model has flexibility for teaching and learning	5.48	0.000
Total	4.91	0.282

To verify the efficacy of the method proposed in this paper, a set of experiments with varied neural networks have been carried out. The results of the comparative analysis are shown in Figure 9. This graph represents the error distribution between the output results of different neural networks and expert evaluations. Figure 10 shows the change in the Winkler loss value of different neural network algorithms under different confidence levels. It can be observed from the figure that the Winkler value of the neural network used in this paper has the smallest change rate with the increase in confidence, indicating that the method has good robustness.

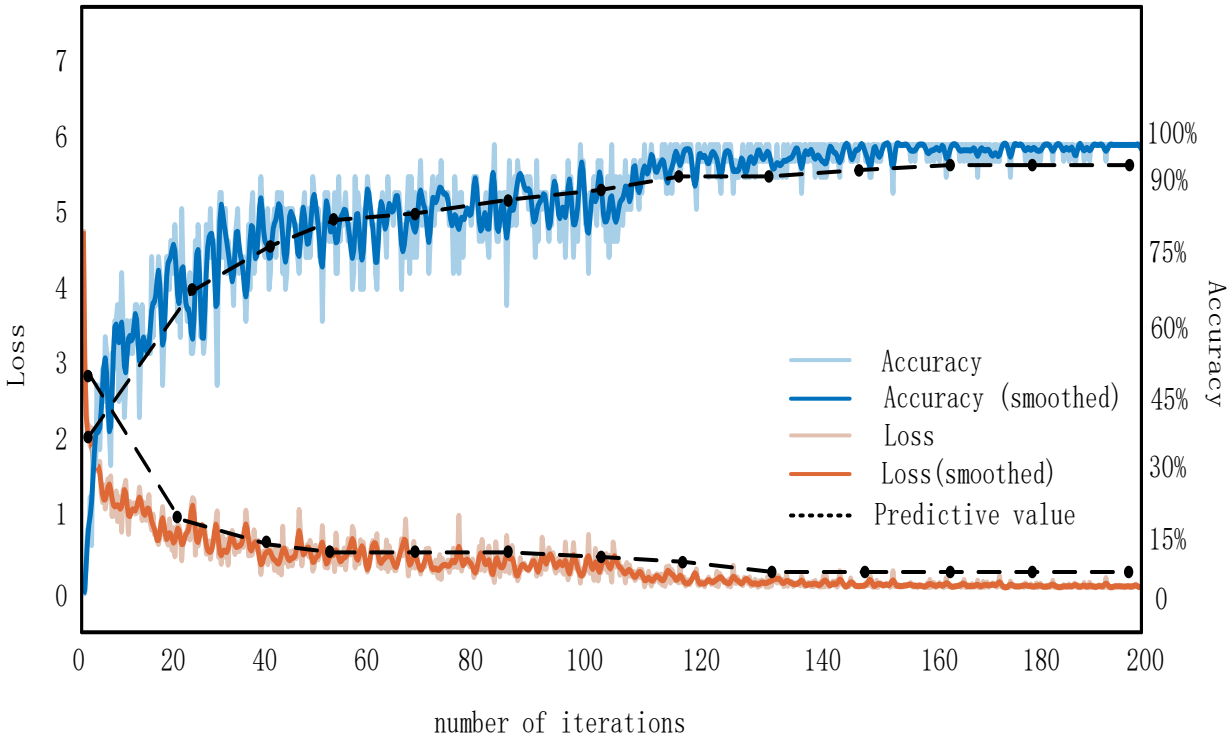

Figure 8: BP neural network training process

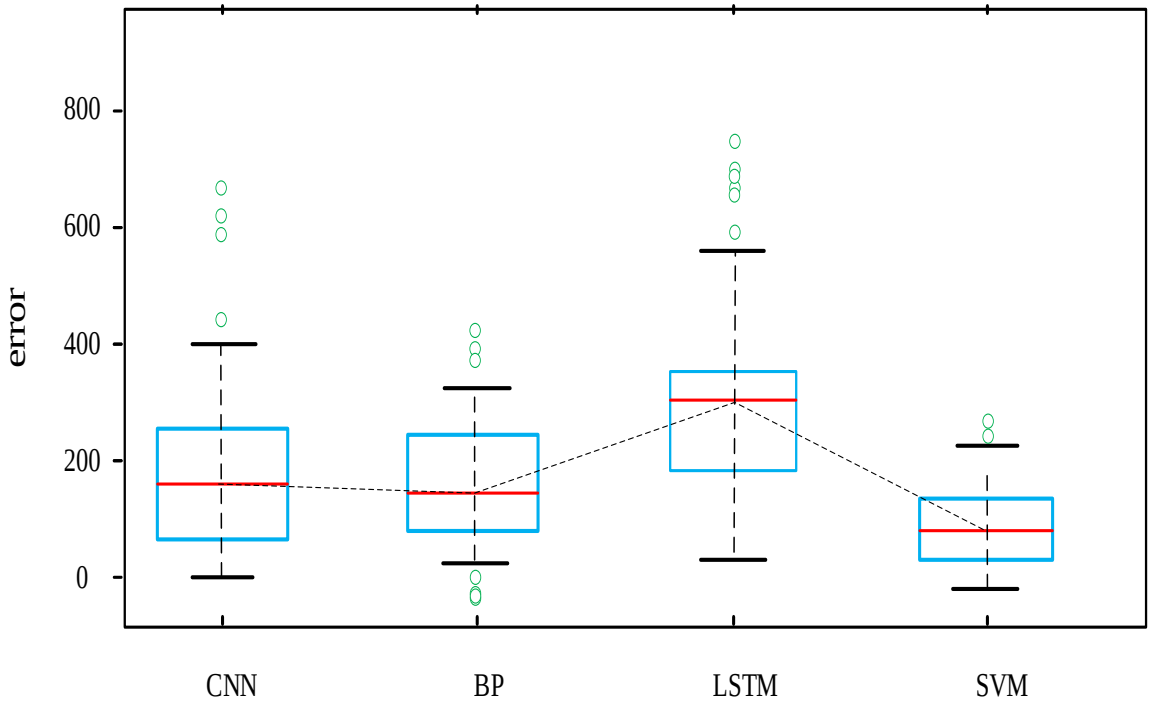

Figure 9: BP neural network training process

As the figure shows that the method used in this paper has the smallest error between the output result of the BP neural network and the expert evaluation, different quantities of information about teaching aids for English are established in the simulation test procedure, and the traditional management system is utilized as the comparison object to conduct simulation tests. Figure 11 displays the simulation curves for various informational resource quantities for English education.

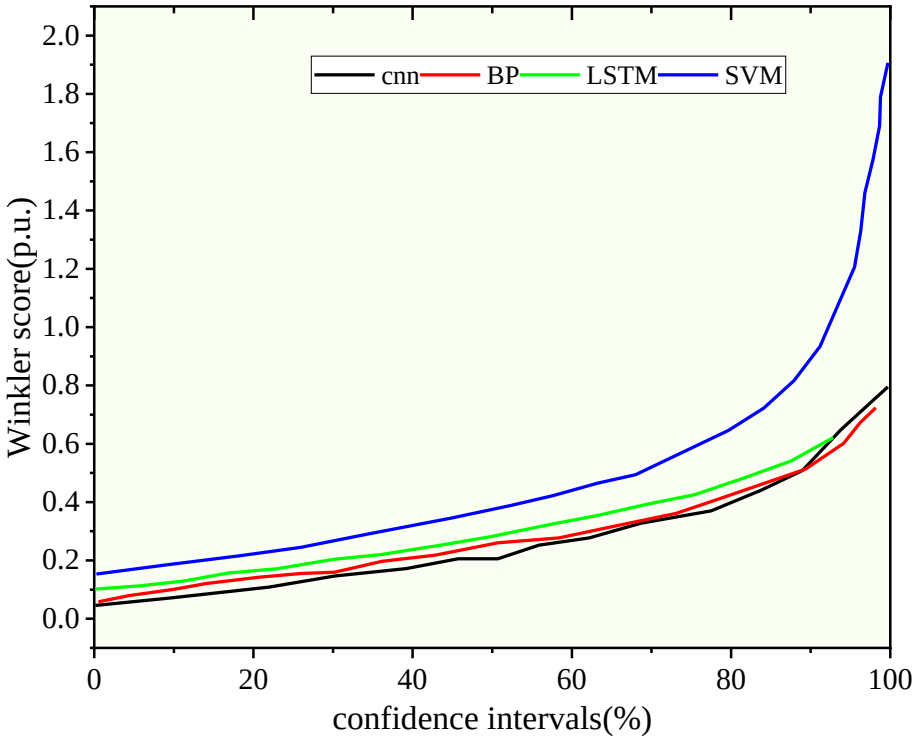

Figure 10: Winkler loss curve at different confidence levels

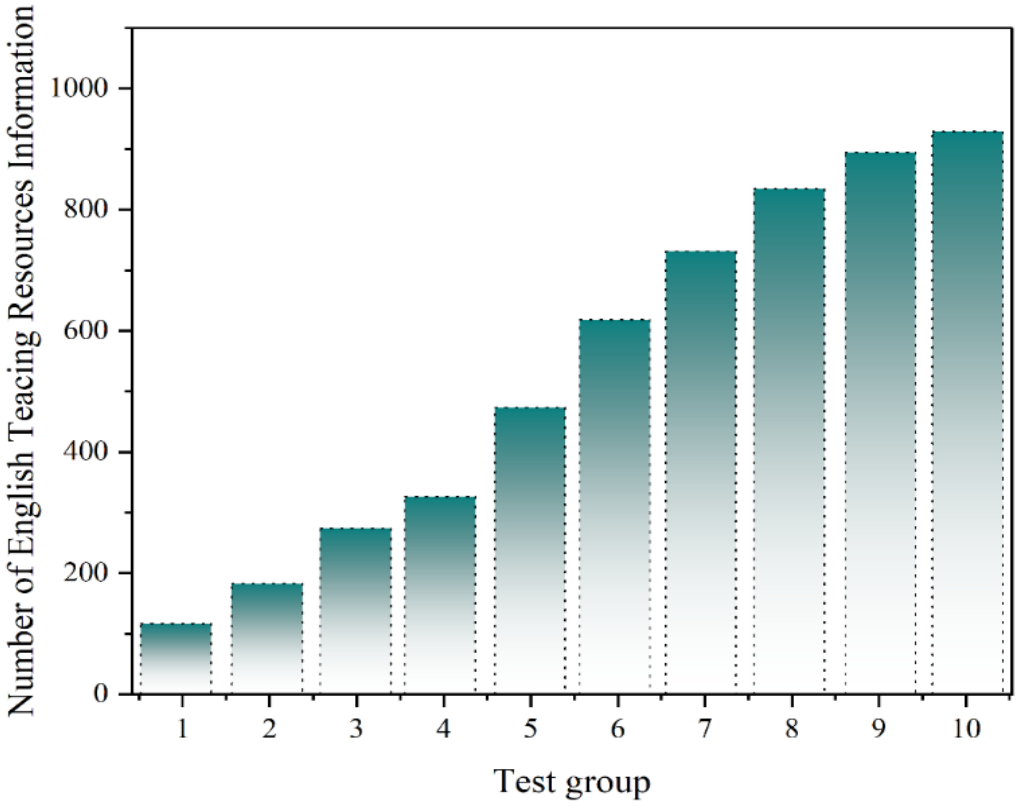

Figure 11: Simulation test simulation curve

Before the simulation test started, two computers with the same model and configuration were prepared and installed with the same software. Then 10 sets of simulation data from Figure 11 should be loaded into the simulation software. Two no-load tests were conducted before the simulation test's official start. To prepare for the system reaction time simulation experiment, the comprehensive management system of traditional artificial intelligence-based information and management system for English teaching resources are connected to the simulation software's data interface in the computer. The time when users in various experimental groups access information on teaching aids for English is finally sampled and analyzed from the data collected. The time date for plotting the curve is obtained from the simulation experiment of the user trying to get the information. And the data has been planned into a turn, as shown in Figure 12.

When there are fewer than 300 English teaching resources, as shown by the experimental results in Figure 12, it is clear that the two systems take approximately comparable amounts of time to gather data on teaching resources. However, once there are more than 300 pieces of information on English teaching resources,

the traditional management system will take less time to obtain English teaching resources. However, the management system based on the technology of AI will take even less time, and the shortest is 17.5 seconds.

Using the traditional management system takes a little longer to obtain teaching resource information than the artificial intelligence-based integrated management system for information about English teaching resources, which takes the shortest time to get information (17.5 seconds).

As shown in the experimental results, it can save 36.3 seconds for users to get the English teaching resources compared with other methods by using the English teaching system based on the technology of AI. It is more suitable for us to share the English teaching resources with the system designed by the technology of AI.

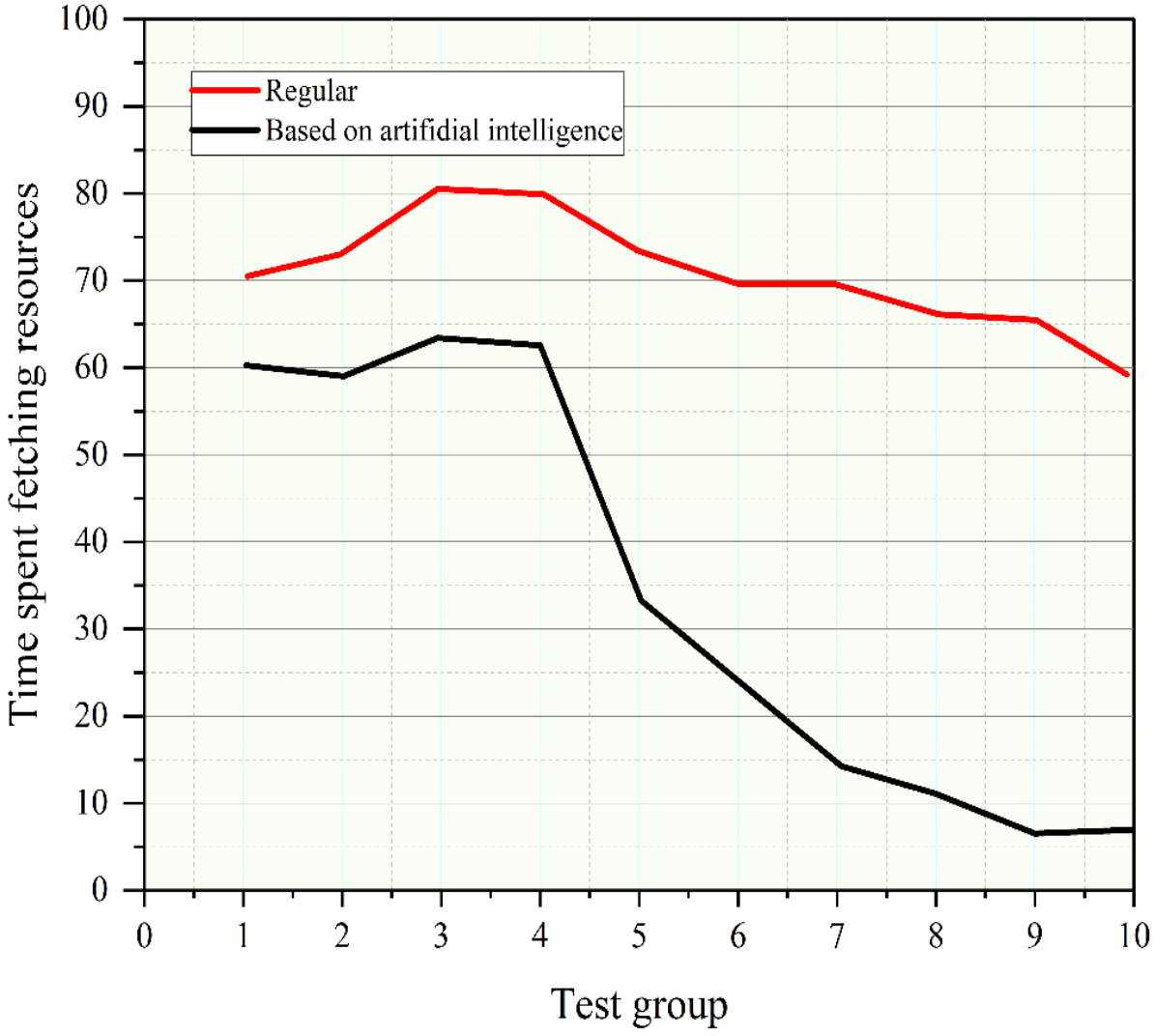

Figure 12: Simulation test simulation curve

5 Discussion

In this article, an artificial intelligence based comprehensive management system has been designed and experimented for English teaching resources. Through a series of experiments, the effectiveness and performance advantages of the system has been verified. Next, the results of this article have been compared and analyzed in detail with those of other studies mentioned in the relevant work section. Firstly, from a quantitative perspective, the system designed in this article demonstrates significant advantages in resource acquisition time. In the simulation experiment, when the number of English teaching resources exceeds 300, our system can save 36.3 seconds compared to traditional management systems. This advantage is particularly prominent in the processing of a large amount of resources, indicating that our system has significantly improved processing speed and efficiency.

Secondly, from a qualitative perspective, our system adopts the BP neural network algorithm, which can automatically push personalized teaching content based on the learning effectiveness of students. Compared to ICAI MOOC systems, this may be more precise and efficient in personalized push. In addition, our system also considers the issue of resource sharing, which can better solve the problem of sharing English teaching resources between multiple campuses of the same institution, thereby improving resource utilization. Compared with English teaching systems based on MVC architecture, our system has a deeper application in artificial intelligence technology. Through the introduction of artificial intelligence technology, our system can better adapt to the learning needs of students and provide more intelligent teaching services.

Overall, the artificial intelligence based English teaching resource comprehensive management system designed in this article has shown advantages in resource acquisition speed, personalized push, and resource sharing. These advantages are attributed to the application of artificial intelligence technology, which enables our system to better meet the needs of modern English education. At the same time, it is also recognized that future research can further explore how to apply artificial intelligence technology to the overall construction of English education environment, in order to provide more comprehensive and in-depth teaching support.

Conclusions

According to the analysis of the evaluation data of the proposed model, it can be concluded that the English teaching model is suitable for people whose major language is English. The construction of networked teaching English through a listening and speaking design model is beneficial to change the teacher-centered teaching mode in the past and stimulate students' learning motivation. As the demonstration of this paper, taking the network English teaching model applied to teaching English listening and speaking and taking advantage of modern technology (such as AI), which can guide the students to learn English initiatively. This article also performs simulation test analysis while proposing the hardware and software designs based on the integrated management system for English -teaching resources. The experiment outcomes demonstrate that the exchange of English teaching resource information may be sped up using an artificial intelligence-based integrated management system. The study presented in this paper is intended to offer theoretical justification for creating an integrated management system, English teaching materials and data management system based on artificial intelligence.

Although the application of artificial intelligence technology can greatly improve the efficiency and effectiveness of English teaching, there are still some technical limitations. Although existing natural language processing techniques can handle most text and speech information, there is still room for improvement in handling complex contexts, slang, and accents. In addition, the level of intelligence of the system is limited by the quality and quantity of training data, as well as the design and optimization of algorithms. In the future, further research will be conducted on the learning styles and needs of students, and more personalized learning support and resource recommendations will be achieved by introducing more user feedback and data analysis mechanisms.

Competing of interests

The authors declare no competing of interests.

Authorship contribution statement

Yingjie Cui: Writing-Original draft preparation, Conceptualization, Supervision, Project administration.

Availability of data and materials

On Request

Declarations

Not applicable

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