Design and Application of Computer-Aided College Chinese Interactive Teaching System

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Abstract. In order to improve the atmosphere of different teaching classes, this paper makes an auxiliary analysis of computer teaching interest. Students usually can't grasp the teaching progress in class. In this paper, interest extraction is carried out to improve students' cognitive analysis. especially Chinese, a subject with humanistic and aesthetic values. Computer-assisted teaching can turn abstract concepts into intuitive ones. form to help students understand quickly. However, computer-based tutoring can only be effective if it is used properly. If it is used improperly, it will also affect the communication between teachers and students, stifling students' imagination, and how to use computers correctly and effectively requires Chinese teachers to grasp the scale. This paper makes a detailed design of the college Chinese network-assisted. Based on the system function analysis, the main business process of the system is designed by analyzing the system requirements, and the system structure, function modules and database security are designed according to the principle of system design, so as to ensure the stable operation of the system in practical applications. The fundamental needs of Chinese network-assisted teaching management, and has certain application value.

Keywords: College Chinese; Computer Aided; Interactive Teaching.
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1 INTRODUCTION

With the derivation of the computer-aided teaching model, the educational academia in my country has begun to realize that its role in education is irreplaceable, and its status will become more and more important in the future [1]. At present, the level of computer-aided teaching has become the main evaluation standard for the effectiveness of education and teaching in colleges and universities [2]. Chinese teaching the network-assisted teaching mode, mainly because it can

not only change teaching concepts, innovate teaching modes and teaching methods [3]. Create awareness with innovation. Computer-aided teaching has multiple meanings and important roles in modern teaching [4].

It meets the needs of social development. At present, our society is moving from the industrial age to the information age. The reception, processing and dissemination of information all depend on computer technology [5]. In the new era, those who do not use computers will become illiterate. As the cradle of talent training, Yukselturk et al. [6] should spread advanced science and technology to students while teaching cultural knowledge. Applying computer technology to the classroom is also one of the ways to spread science and technology.

According to the current view of Chinese teaching, Chinese teaching is not a single teaching process, but a teaching system that integrates all levels, elements and stages. Wang et al. [7] guide students' character shaping and personality shaping through Chinese teaching, which not only improves students' Chinese literacy, but also creates a perfect and rich spiritual world for students. "The application of computer-aided software makes the teaching environment interesting, thus becoming a bridge for students to learn more knowledge and broaden their horizons.

Based on the concept of modern education, the production of Chinese courseware has a good discipline support. The ultimate task of its production is to fully integrate modern information technology. Mu'alimin [8] from the above analysis, we can see that if modern information technologies such as computers are reasonably applied in Chinese classes. The corresponding courseware will help students better improve their interest in learning, broaden their horizons, and make the classroom livelier. Become a bridge to broaden horizons, truly improve students' Chinese literacy, and cultivate students' aesthetic awareness and independent creativity.

2 RELATED CONCEPTS AND THEORETICAL BASIS

2.1 Computer-Assisted Teaching

Computer-aided appeared in the 1990s, when it was replaced by another technical term—interactive video. It means that the two branches of video and video technology with the advantages of both sound and image and vivid images and computer technology with interactive functions are infiltrating each other and tending to merge. Literally, computer assistance is compounded from a single medium.

2.2 Chinese Reading Teaching

There are also many debates about the nature of language discipline. From the initial "Instrumentalism" to the current coexistence of "tools and humanities", no unanimous conclusion has been reached. However, Zhu and Li [9] agreed with the statement that "language is the most important communication tool and the most important cultural carrier", as shown in Figure 1. At present, the school Chinese discipline is actually under the careful organization and guidance of teachers, mainly through the analysis, thinking and modeling of a typical language work in various "language works", constantly internalizing all kinds of such knowledge, thoughts and emotional gains, which can be successfully externalized into various written and oral "oral works", and gradually developing "oral ability", such as independent listening, speaking, reading and writing.

Reading is an extremely important learning content in Chinese teaching. Modern Chinese reading view believes that reading is an important link in Chinese learning. The process of interacting with thinking. Noho et al. [10] believed that students can imagine through text symbols with objective significance in reading materials. Understand the meaning of reading materials through feeling, intuition, thinking and other psychological activities, so as to master the content and form of reading materials.

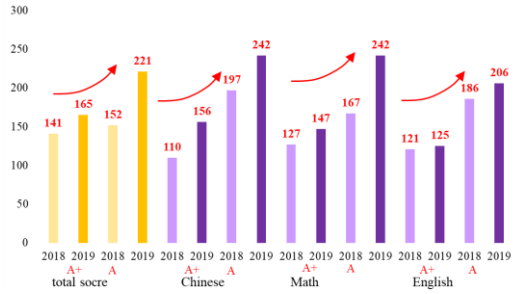

Figure 1: Comparison of online teaching data in 2018-2019.

Reading is not only an activity for students to acquire information and accumulate knowledge from written symbols, but also an activity for students to develop their abilities, cultivate their sentiments and shape their individual characters by receiving emotional education and literary edification through language.

2.3 The Theoretical Basis

The application is based on theories of education, psychology, philosophy, aesthetics and other disciplines. Education is based on the "great education" of Comenius, a Czech educator in the 17th century, and intuition is regarded as the "golden rule" of teaching work. Juraevich [11] believed that when people learn, from direct to indirect, from concrete to abstract, it is easier to acquire knowledge and skills. Computer aided technology is highly intuitive. Psychological Basis For a student with normal physical development, in learning, teaching information is obtained through sight, hearing, smell, touch and taste and transmitted to the brain for processing and storage. Among them, vision and hearing account for the largest proportion of the total amount of information, and also have the characteristics of high reliability and specific image. Practice shows that the combination of image vision and abstract hearing and text will achieve better teaching effect.

The results of psychologists' research on the primary channels through which humans receive information are summarized in Table 1 below:

Feel the difference	*Hearing*	*Visual*	*Audio-visual*
Information recognition rate	0.8 seconds	0.4seconds	Extremely fast
Perceived information ratio	11%	83%	94%
3 hour memory retention rate	60%	70%	90%
3-day memory retention rate	15%	40%	75%

Table 1: The main channels for humans to receive information.

From the table, we can draw the following conclusions: audio-visual composite media has high recognition rate of information, strong stimulation, and is not easy to forget. Computer-aided technology makes use of human learning laws, and through repeated repetitions and reinforcements, it strengthens students' comprehension and memory.

3 RELATED TECHNOLOGIES

Fundamentally, the BP (Error Backpropagation Training Algorithm) neural network itself is a kind of acyclic multi-level Internet, and its adaptability is very wide. After the BP neural network was proposed, it soon became a widely used multi-level network. The training algorithm is of great value to the promotion of artificial neural networks, and its structure includes the following aspects:

In the BP neural network structure, the basic building block is the neuron, and the activation function used by the above neuron is the sigmoid function selected for the design subject that can be guided at any time. For neurons, the internet input formula is:

$$net = x_1 w_1 + x_2 w_2 + \ldots + x_n w_n \tag{1}$$

In the above formula, x1, x2, xn represent neuron inputs, and w1, w2, wn represent their corresponding connection weights, and the initial input value of net must be controlled as much as possible to a range with a faster convergence rate.

According to the factors for improving the accuracy of resource classification analyzed by this research, it includes three major links. The first is the correct rate of secondary vocational students with different styles on the same topic:

$$X_V = \frac{\sum_{i=1}^{n} v_i}{\sum_{v=1}^{m} s_v} \tag{2}$$

In this formula, vs is the number of visual students, iv is the sum of the number of visual students who have done the same question correctly, and the other three situations are as follows:

Auditory

$$X_A = \frac{\sum_{i=1}^{n} a_i}{\sum_{a=1}^{m} s_a} \tag{3}$$

Read and write

$$X_R = \frac{\sum_{i=1}^{n} r_i}{\sum_{r=1}^{m} s_r} \tag{4}$$

Zv , Za , Zr , Zk , respectively, are the sum of a type of resource clicks. And Vi, Ai, Ri, Ki are the total number of clicks of each type of each type, respectively. The third is that students can classify resources within the system. The system uses different students to count the classification of the same resource, and calculates the proportion of various types of statistical results. The above ratios are,

$$T_V = \frac{\sum_{i=1}^{n} V_i}{\sum_{v=1}^{m} C_v} \tag{5}$$

Based on the VARK model design, students' styles are divided into four types of kinesthetic, visual, auditory, and literacy. The resource classification also corresponds to the student classification. Therefore, the number of neurons in the output layer is four

$$Y = \{y_v, y_a, y_r, y_k\} \tag{6}$$

ya is the auditory type accuracy rate, yr is the reading and writing type accuracy rate, yv is the visual type accuracy rate, and yk is the kinesthetic type accuracy rate. At this stage, the number of hidden layers is clear the exact formula is:

$$n_H = \sqrt{n+m} + a \tag{7}$$

In the above formula, m represents the number of output layer units, Hn represents the number of hidden layers, and n represents the number of input layer units. According to the needs of this study, the third formula is selected, and n=12, m=4 are substituted into the formula, and the number of neurons in the hidden layer is obtained as 8.

The confidence level, as the name suggests, is how accurate the rule is. From the formula of conditional probability.

$$\text{Confidence}(A \rightarrow B) = P(B|A) = \frac{P(A \cap B)}{P(A)} \tag{8}$$

A high level of confidence certainly indicates a high degree of accuracy in the rules, but is it worth translating into a sales mix? So also refer to support.

$$Support(A \rightarrow B) = P(A \cap B) \tag{9}$$

Only the association law that satisfies the conditions is meaningful and representative. That is to say, the association law must find all association laws of the form X?Y, which must satisfy the following conditions:

For an effective association law, its support and confidence must be greater than or equal to the minimum limit set by the user. The association law of the two constraints listed above must be satisfied in order to meet the requirements and become a large collection of projects.

We can predict the benefits of using the rules by computing the degree of correlation between item sets. We call such a measure an interest measure, and the correlation between itemset A and item B is calculated as follows:

$$\text{I.M.} = \frac{P(A \cap B)}{P(A)} - P(B) > d \tag{10}$$

1. If -1 ⩽I.M.< 0, this means that a and b show different development trends. The probability of its occurrence has been reduced.

2. If 0 < I.M.⩽ 0, At this time, the probability of a and B appearing at the same time is strengthened.

3. If I.M. = 0, it means that A and B are unrelated, that is, A and B are unrelated.

4. When the correlation degree is greater than 0, it means that the effect of using the rule will be more significant. But when the correlation is less than 0, it means that the law may not work well.

The so-called probability of knowledge point refers to the weight of knowledge point K in teaching planning. The setting and calculation of probability is for the recent model and the overall model, and the model in the emergence period has little influence. The assignment methods of the probability of knowledge point are as follows: There are two kinds of manual assignment and

system assignment. The manual assignment has been explained in the algorithm flow shown in Figure 2.

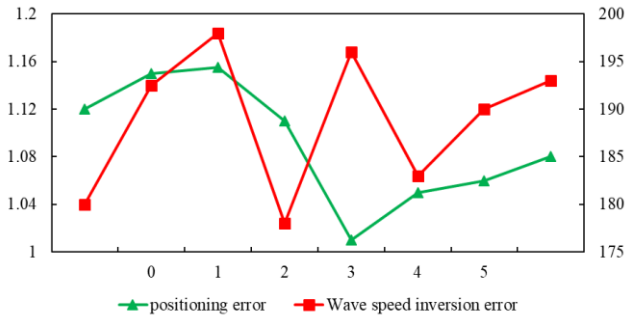

Figure 2: Error statistics of manual assignment and system assignment process.

The calculation method of the system default probability of saving is:

For the knowledge point K, its parent knowledge point (that is, the direct superior knowledge point) is K,, K1, there are n direct child knowledge points, and the direct child knowledge points of K are Kl, K:, ., ., Km, then The probability of knowledge point K is Q(5)=l/n, and the probability of K'(i=l', m) is Q(K,)=1/m. The calculation method of the degree of mastery of knowledge points. Suppose student S, knowledge point K, the probability of K is Q(K), and the sub-knowledge point of K is Ki, (i=1.m), and the probability of Ki is Q(Ki), the student's mastery of knowledge point K The degree is recorded as W(K), then:

$$\sum_{i=1}^{m} Q(Ki) = 1 \tag{11}$$

Kl, KZ, ..., Km can be regarded as the division of knowledge point K, and the calculation method of W(K) is

$$W(K) = \sum_{i=1}^{'''} (Ki) * W(Ki) \tag{12}$$

The contribution of knowledge point K to the teaching task in the student model is W(K)*Q(K).

Corresponding to a certain teaching task R, if it contains A, B, C two!-level knowledge points, the contribution of the teaching task to the student model is:

$$\mathrm{QW(R)} = \mathrm{W(A)} * \mathrm{Q(A)} + \mathrm{W(B)} * \mathrm{Q(B)} + \mathrm{W(C)} * \mathrm{Q(C)} \tag{13}$$

The calculation method of the shielding degree of the target knowledge point is given here. Assume that the current location of the student is knowledge point A0, the content to be queried is knowledge point B, and there are knowledge points Al, A:, ..., E on the path from and to B, corresponding to each knowledge point Ai (i= 0.n), the degree of mastery of students is K, and the importance of knowledge points in teaching planning is Q,, if not specified, then Q, = 1, then the calculation method of the shielding degree p of knowledge point B is: :

$$\rho = \left[\frac{1}{n+1} \sum_{i=0}^{n} Q_{Ai} * K_{Ai} + 0.5 \right] \tag{14}$$

Select the k texts that are most similar to the new text in the training text set. The similarity is measured by the cosine of the vector angle. The calculation formula is:

$$\cos\left(q_1, q_2\right) = \sum_{i=1}^{n} \frac{w_{1i}}{\sqrt{\sum_{k=1}^{n} w_{1k}^2}} \times \frac{w_{2i}}{\sqrt{\sum_{k=1}^{n} w_{2k}^2}} \tag{15}$$

4 EXPERIMENTAL RESULTS AND ANALYSIS

4.1 Database Design of University Computer-Aided Language Teaching System

In terms of system conceptual design, relevant designers model data according to user requirements, thereby forming a conceptual model that exists independently in DBMS and computer hardware. The conceptual model is a first-level abstraction for switching between the information world and the real world. An important tool for communication between users and designers. Therefore, the conceptual model must be easy to understand, clear and simple, and requires strong language expression ability, which can directly express user needs and facilitate the transformation of data models. There are many ways to represent the conceptual model. In this study, the entity connection method is selected to represent the conceptual model in Figure 3.

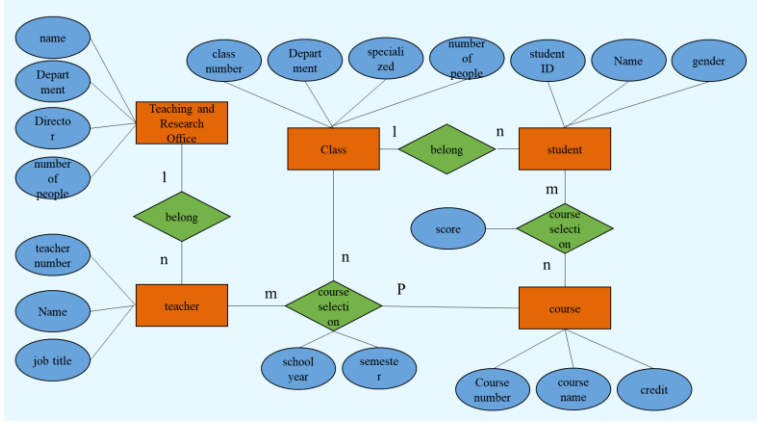

Figure 3: Teacher entity ER diagram.

After entity transformation, relationship transformation, and data constraints, the corresponding basic tables in the database can be obtained. This chapter lists some basic tables as shown in Table 2.

Property ID	*property type*	*constraint*	*illustrate*
SID	Varchar(20)	Primary Key	student number
SName	Varchar(10)	NOT NULL	student name
SCLass	Varchar(20)	NOT NULL	student's class

Table 2: Student table.

4.2 Design and Implementation of Student Learning Evaluation Module

Figure 4 shows the learning behavior evaluation model. Including sample library, parameter preprocessing, BP neural network training and learning, standardized learning evaluation knowledge base. For the evaluation of student users, mainly through learning style tracking, the results are converted with the actual evaluation parameters of the system and the parameter input mode, so as to obtain student learning behavior, compare with the standardized learning evaluation knowledge base, analyze student learning behavior, and generate learning behavior evaluation. Then, through the conversion of the result output mode, the evaluation result is obtained, and the teacher puts forward learning suggestions according to the evaluation result, thus forming a loop.

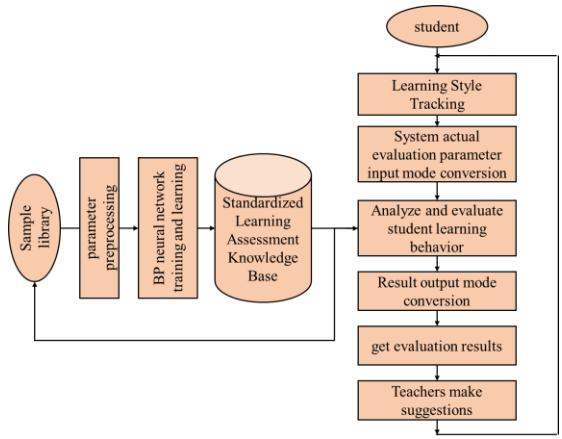

Figure 4: Learning behavior evaluation model.

From the above analysis, it can be seen that the application of neural network in the computer online assisted teaching system is that after the students answer the questions online on the platform, the server will detail the students' mastery of the tested knowledge of the course. The server side mainly records the following information: such as the course of the exam, the chapter of the exam, the style of the question, the type of the question, the duration of the exam, the answering situation, etc. The system automatically aggregates the recorded data of each person into a training set. After many tests, the data will be recorded many times, so that more training sets will be obtained. Through the feedback of repeated test results, The data required for the prediction performance of the neural network is formed, and the neural network model is established based on the data. Thus, a neural network is generated according to the neural network model.

4.3 Implementation of System Online Test Module

In the online examination module of computer-aided teaching, it can be realized by creating a new class that inherits the Action class. First, instantiate the online exam module by constructing the StartTestDAO class. In this example the Action class is implemented through the execute() method. The method itself does not undertake specific affairs and is executed automatically. In the implementation process, we can execute the method by referring to the Action parameter value obtained by the Get Parameter() method.

The uploading learning resource test is designed for three test states: ①Select the upload file and fill in the resource information; ②Do not select the upload content, just fill in the information; ③Only upload the content without filling in the relevant information, Table 3 for the test results.

Test function	*Data*	*Expected outcome*	*Actual results*
Upload learning resources	Select resources and fill in information	Upload is normal	normal upload
Upload learning resources	Select resources, information is not filled	prompt to fill in	prompt to fill in
Upload learning resources	information only	select content	Could not upload

Table 3: Upload resource test.

By testing the functions of the internal administrator module, teacher module and student module of the system, the test results are carefully analyzed, and the conclusion is drawn that the system design function meets the internal user needs of the system analysis.

4.4 Analysis of Results

In this system, students ask different questions through random tests, and the answers are found through a simple question bank and compared with those found through the association algorithm designed by this system. By testing 100 questions to 700 questions for comparative analysis, the specific results are shown in Figure 5 below.

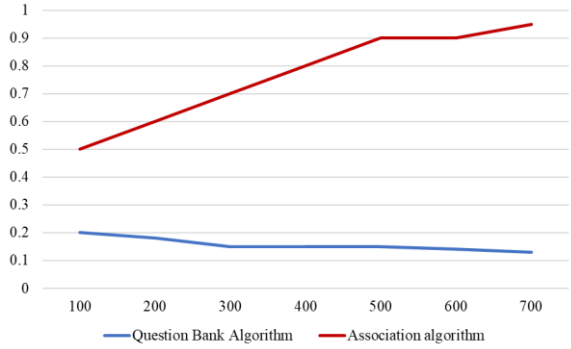

Figure 5: Comparison of Different Algorithms.

As shown in Figure 5 above, the traditional question base algorithm is a simple keyword comparison, and the accuracy rate is not high. The accuracy of the method is gradually improved with the increase of samples, which has a strong feasibility.

This module includes two parts: offering management and course content management. Among them, course offering management is divided into course application and formal offering. If teachers add courses, they can submit course application information. After passing the approval of the administrator, they will approve course offerings, and then publish course resource information based on the background, clarify course codes, and generate information records. , as shown in Figure 6.

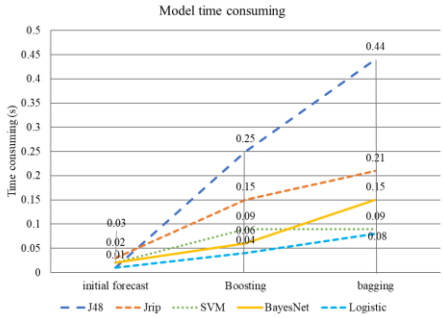

Figure 6: Data analysis of learning performance in computer-assisted teaching.

The computer-based network-assisted teaching system takes the network as the main carrier. Although the process of teachers' explanation will be reduced, the network-based communication and interaction will continue and will not be affected by others. Passive interruption will not disturb the train of thought, and they are not bound by each other, which helps to achieve deep communication. Students use the network platform as the basis to query articles in real time, so as to cultivate students' good data collection and selection ability, as well as information cognition ability. In addition, the Chinese network-assisted teaching system pays attention to the individualized development of students, and creates situations to lead students' thoughts and emotions into situations, which can fully arouse students' enthusiasm and interest in reading. The changes are shown in Figure 7.

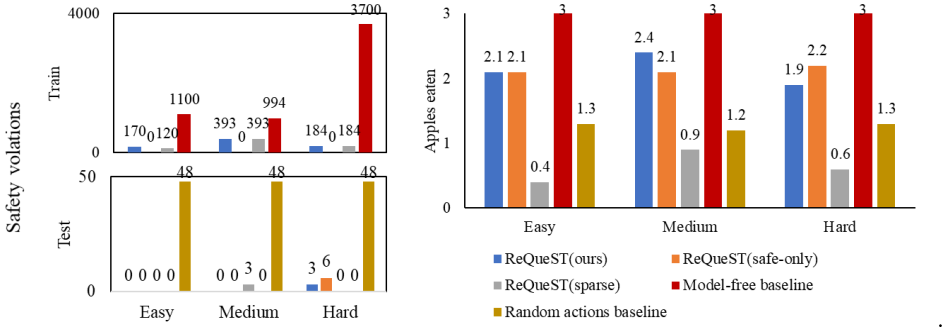

Figure 7: Comparison of Chinese teaching of safety reinforcement learning model.

5 CONCLUSION

This paper analyzes the results of the system development of the evaluation teaching assistant module. Through the computer test program design under different network construction, this paper provides further data design content for the development of a better understanding of the teaching classroom. the process of. System testing is actually a comprehensive process to ensure the quality, correctness, security and integrity of the system, and it is to operate the developed system in a specific environment, so as to check the errors in the system and meet the system and design requirements. The evaluation process for conducting the test.To sum up, Chinese teaching is a process of knowledge accumulation and transformation. In order to ensure the efficiency and quality of Chinese teaching, it is imperative to adopt a diversified teaching mode.

Based on the goal of Chinese teaching in modern education, this paper realizes the organic combination of computer network technology and Chinese teaching, designs a Chinese network-assisted teaching system, and further analyzes its practical effect with practical applications. The practical results show that the functional modules of this system have very high reusability, which cannot only, but also meet the diversified needs of Chinese network-assisted teaching to a large extent.

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