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# Quality Evaluation Methods of College English Teaching Reform Based on Artificial Neural Network



**Abstract:** - This paper aims to enhance the effectiveness of intelligent evaluation in college English teaching and explore the role of artificial neural networks in evaluating college English teaching reform. A research study is conducted to develop an intelligent evaluation model by refining algorithm models and utilizing comparative research methods to address limitations of traditional algorithms. The neural network algorithms are improved through model construction techniques, with practical effectiveness assessed through simulation training methods. The algorithm model is applied to assess teaching quality in universities, with experimental research integrating questionnaire surveys and simulation data processing methods. The feasibility of the approach is verified through data evaluation. Simulation analysis demonstrates that the enhanced neural network algorithm reduces running time and enhances accuracy compared to traditional evaluation algorithms. Experimental studies indicate that employing artificial neural networks for evaluating the quality of college English teaching reform yields positive outcomes, aiding students and teachers in understanding their situations within mobile computing environments. This study confirms that combining a neural network model with data survey methods effectively meets the requirements of contemporary efficient teaching quality evaluation. The innovative integration of intelligent algorithms, factor analysis, surveys, and statistical methods enhances the progressive nature of teaching quality evaluation.

**Keywords:** Artificial Neural Network, English Teaching, Quality Evaluation, Teaching Means.

## I. INTRODUCTION

As artificial intelligence, deep learning, and data mining technologies continue to advance, scholars worldwide have introduced diverse intelligent models for processing and analyzing teaching data. These efforts aim to facilitate objective and efficient research in teaching evaluation. Desire2Learn was an early developer of an intelligent operating system for teaching performance management, which can effectively achieve intelligent management of teaching data and is widely used in research related to teaching evaluation systems. However, due to differences in the nature, content, and form of teaching courses, teaching evaluation systems have different requirements and processing methods for teaching data. Traditional teaching data analysis methods typically involve basic processing, such as simple weighted summation of teaching quality indicators using Excel spreadsheets. These methods often overlook the weighting of each indicator and fail to address subjective uncertainties. As a result, the evaluation outcomes tend to be highly subjective, with low efficiency and inaccurate results in traditional data evaluation approaches.

The assessment of teaching quality presents a complex, non-linear challenge that can significantly influence the accuracy of evaluations. As teaching reform progresses, scholars have continually refined evaluation methods, leading to widespread improvements in accuracy. The BP neural network, capable of simulating the human brain's neural system and approximating non-linear functions with robust self-learning capabilities, has been increasingly utilized for teaching quality assessment. Despite yielding positive outcomes, the BP neural networks are susceptible to slow convergence speeds with the gradient descent learning method, potentially encountering local minima and exhibiting limited generalization abilities. Consequently, the establishment of a scientific teaching quality evaluation index system tailored to diverse courses and student characteristics, along with the use of intelligent control algorithms to construct evaluation models, becomes essential.

With the increasing awareness of English language reform in Chinese colleges, there have been many changes in college English teaching culture, textbook production, teaching, and testing. But there are still some bad situations. The current problems in teaching English in colleges do not meet the requirements of improving communication with English language skills, making good teaching impossible. Considering the consequences of these problems, colleges and universities should establish monitoring and evaluation procedures to ensure effective teaching and take specific measures to follow [1]. Thus, to achieve the goal of increasing the confidence of learning English in colleges and improving English teaching in colleges provide good education. Quality control and evaluation is a research organization, procedure and procedure developed by the Foundation for Quality Control in Education. It only monitors, monitors and evaluates the learning activities of teachers and students and classroom

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learning activities. Its ultimate goal is to ensure effective control of curriculum and research management. See Figure 1 for an idea of instructional quality [2].

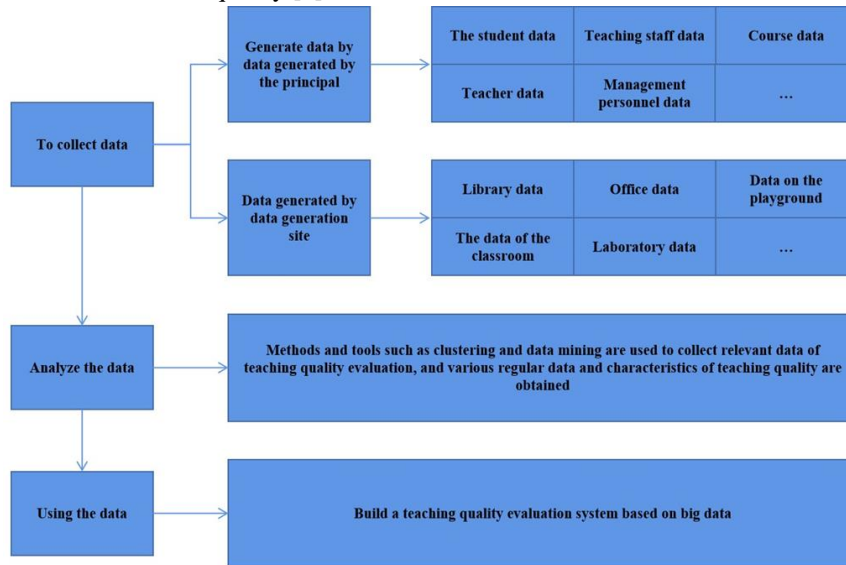


Figure 1: The Idea of Teaching Quality Evaluation

To ensure the attainment of teaching objectives, it is essential to implement objective, scientific, and equitable inspection and evaluation of teaching quality, enhance teachers’ awareness of teaching quality, and uphold stringent quality standards. This comprehensive approach aims to manage the entire process of education, fostering continual improvement in teaching quality. The fundamental structure of the teaching quality monitoring and evaluation system encompasses organization, information collection, evaluation and analysis, as well as information feedback and regulation.

The organizational guarantee system primarily focuses on coordinating teaching quality management activities, with quality monitoring and implementation as its core components, and utilizes the teaching supervision group as the primary channel for quality information feedback. This ensures the seamless progress of various teaching and quality management initiatives as a cohesive whole. The information collection system leverages multiple channels to gather, organize, analyze, and evaluate diverse information within the teaching process. Through information feedback, teaching activities are aligned with teaching quality standards.

Teaching quality evaluation and analysis are chiefly based on the assessment standards for each teaching phase, conducting specialized inspections and evaluations. Information feedback and regulation rely on the collection, analysis, and comparison of teaching quality information with evaluation standards. Any deviations and issues are addressed through the research conducted by the teaching quality office, forming regulatory opinions to resolve them, and inspecting the implementation to achieve quality objectives. The schematic diagram of teaching quality evaluation is depicted in Figure 2.

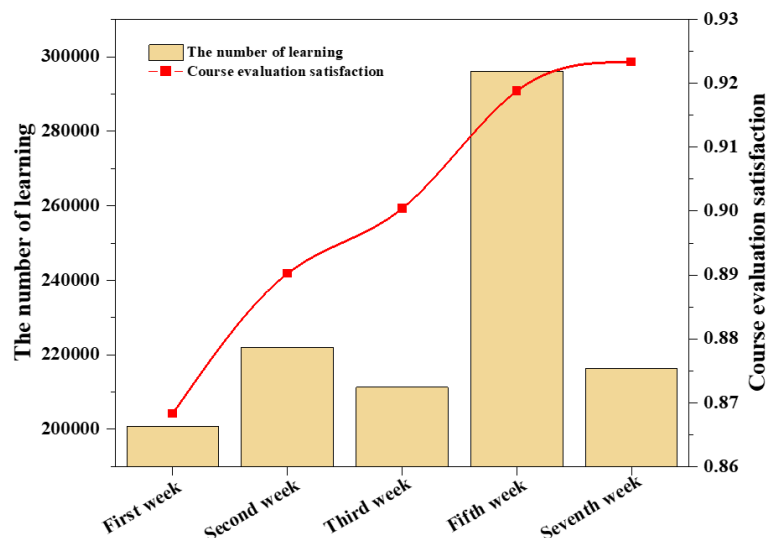


Figure 2: The Schematic Diagram of Teaching Quality Evaluation

Currently, three primary teaching data analysis methods are in use:

- 1) Statistical analysis based on sentiment polarity dictionaries
- 2) Machine learning methods
- 3) Deep learning methods

The first method relies on predefined judgment rules and sentiment polarity dictionaries. However, this approach struggles to overcome fixed emotional word constraints, limiting its data analysis performance.

The second method employs machine learning algorithms like Naive Bayes (NB), Support Vector Machines (SVM), and Random Forests to enhance text analysis flexibility and accuracy. Nonetheless, this method necessitates complex preprocessing steps before inputting text into the algorithm to enhance real-world statistical data integrity and compatibility, relying on text categorization in the training set.

The third method, represented by models like BERT, aims to address the limitations of the previous two approaches. BERT has shown promise in sentiment analysis and found widespread applications in various domains such as movies, social media, e-commerce, online education, and tourism. Despite its success, this method typically focuses on overall sentiment polarity within a sentence, overlooking specific aspects of educational feedback like teaching methods, attitudes, and communication styles.

To address this gap, an educational evaluation analysis method based on an enhanced BP neural network is proposed in this article. This method aims to accurately and efficiently conduct emotional analysis on online education comments in higher vocational education. By identifying specific aspects of educational commentary, this approach enables teachers to make targeted improvements by optimizing teaching plans more effectively through online sentiment analysis and focused viewpoint mining.

## II. LITERATURE REVIEW

Artificial neural networks (abbreviated ANN) (Figure.3) are algorithmic algorithms that control the functions of animal neural networks and create data connections. Depending on the complexity of the system, this type of connection can achieve the purpose of data processing by modifying the relationships on multiple bases, and can achieve self-learning. and self-treatment.

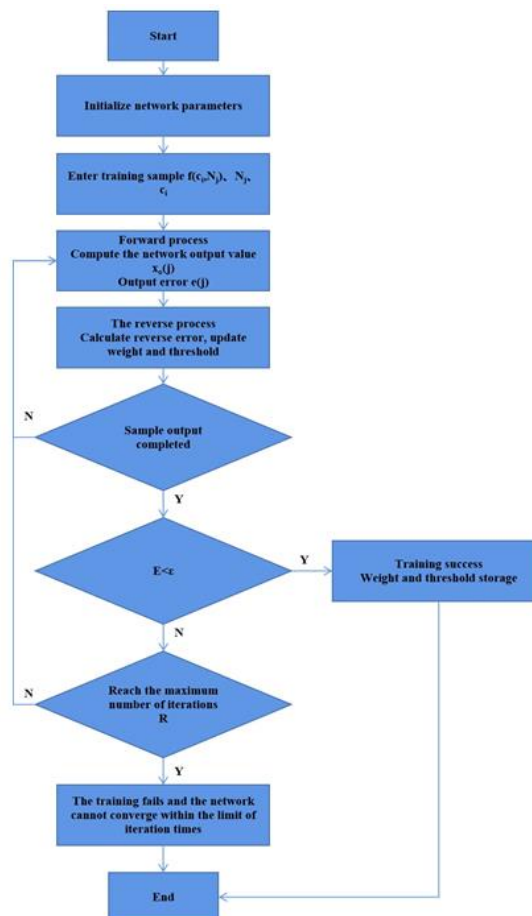


Figure 3: Artificial Neural Network Process

Network output varies depending on network connectivity, load speed and operating pressure [3-5]. The network itself can be either an algorithm or a function included in a given context and can be an indicator of a good idea. The nodes of the neural network equipment are shown in Figure 4.

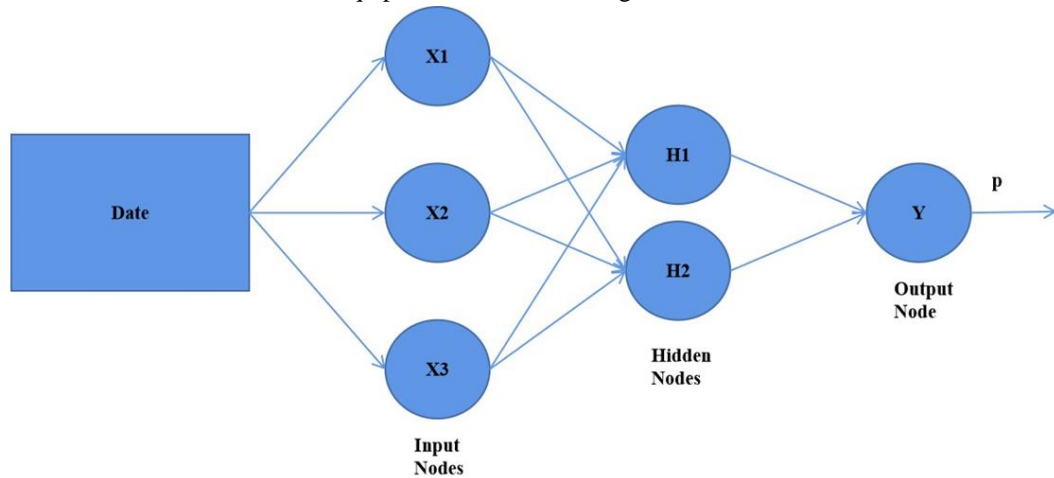


Figure 4: Artificial Neural Network Node

Its developmental strategies are based on the functioning of biological (human or other animal) neural networks. Artificial neural networks are often developed by learning based on mathematical analysis, so neural communication is a great way of calculating arithmetic. Through the mathematical process, many local sites can be put to work. On the other hand, the use of statistics in the field of cognitive intelligence can solve the problem of decision-making in cognitive intelligence (that is, neural connections through statistical processes have the same effect. -abilities and decisions as simple as humans) [6]. This method is more effective than just reasoning. The neural network optimization is shown in Figure 5.

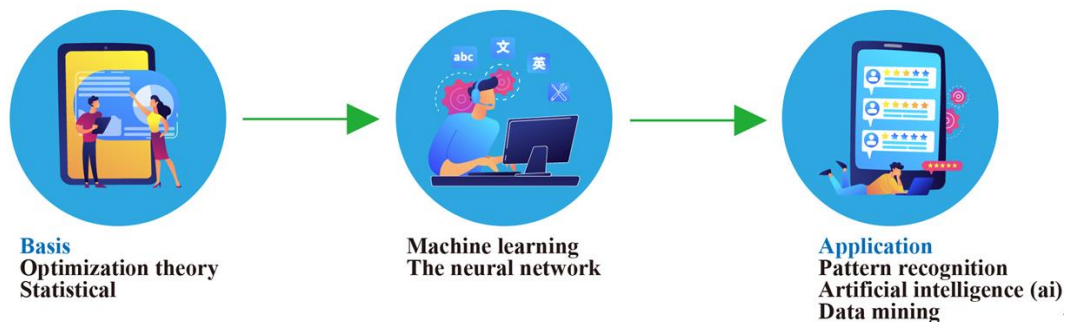


Figure 5: The Optimization of Artificial Neural Network

A neural network device is a non-linear, self-adaptive data processing system that involves a wide range of functional connections. It is intended to be the basis of modern neuroscience research, data processing, and experimental data processing by simulating neural networks with characteristic neural networks. A neural network device has four characteristics. First, folding is non-linear. Nonlinear relationships are universal objects of nature. Neuronal neural networks improve function, hold, and retention. Second, the bend is infinite [7]. A neural network is usually made up of multiple interconnected cells. All bodily functions are not determined by the properties of individual neurons, but are usually determined by the interactions and interactions of units. An infinite cell is simulated by a combination of multiple units. Associative memory is a classic example of infinity. Third, bending is not always possible. Artificial neural networks have the potential for self-modification, disruptive independence, and impaired learning. Not only is the data processed by neural networks highly variable, but the nonlinear dynamic process itself is constantly changing as data is processed. The recovery process is usually used to describe changes in dynamic systems. Fourth, the folds are not convex. The direction of system evolution depends on the state functions in the given context. For example, the energy function, its high value is related to the security of the system. Non-convex means that the workload is more important, so the system has a more stable balance, which leads to more operation. The first diagram is shown in Figure 6.

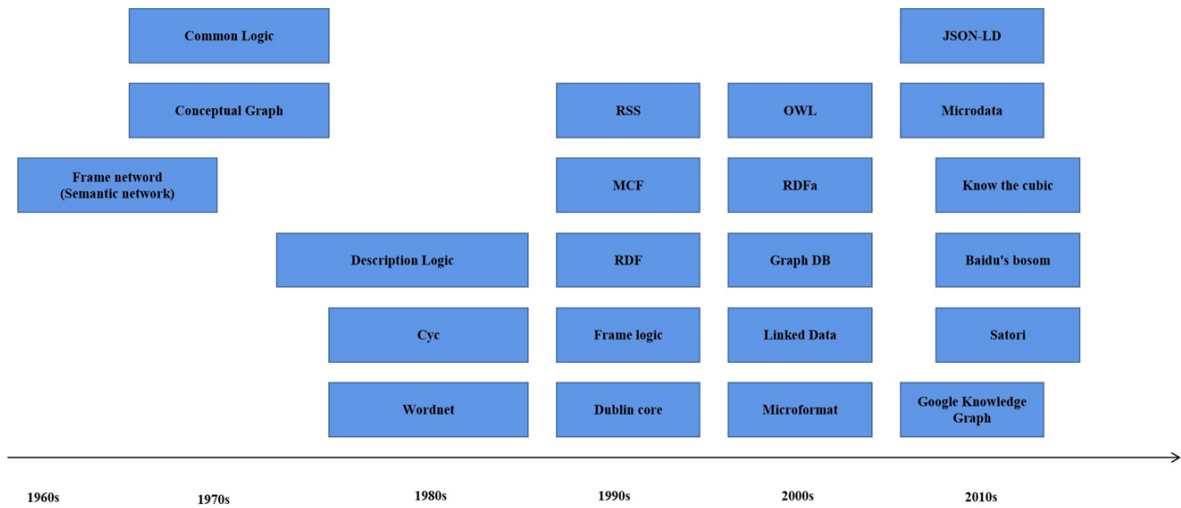


Figure 6: Knowledge Graph Predecessor

In neural devices, neural devices can represent different objects, such as features, text, concepts, or problem-solving techniques. The types of functions available in a network fall into three categories: access hardware, output devices, and encryption devices. The input part receives signals and data from the outside world. As a result, the output unit knows the output of the system. A hidden guest room is a room between the incoming object and the urine, which is not visible from the outside [8]. The heavy charge of the neurons affects the energy transmission of the units. Data representation and processing are interconnected by network processing units. A neural network device is a non-programmable, adaptive, intelligent data processing device. Its purpose is to obtain the same information and share data through network exchange and behavior, and to bring data to meet human interests at different levels and levels.

An artificial neural network is an interconnected network that uses artificial intelligence and various information processes as tools to overcome skill imbalances (Figure 7). It is characterized by self-regulation, independent participation and learning over time [9].

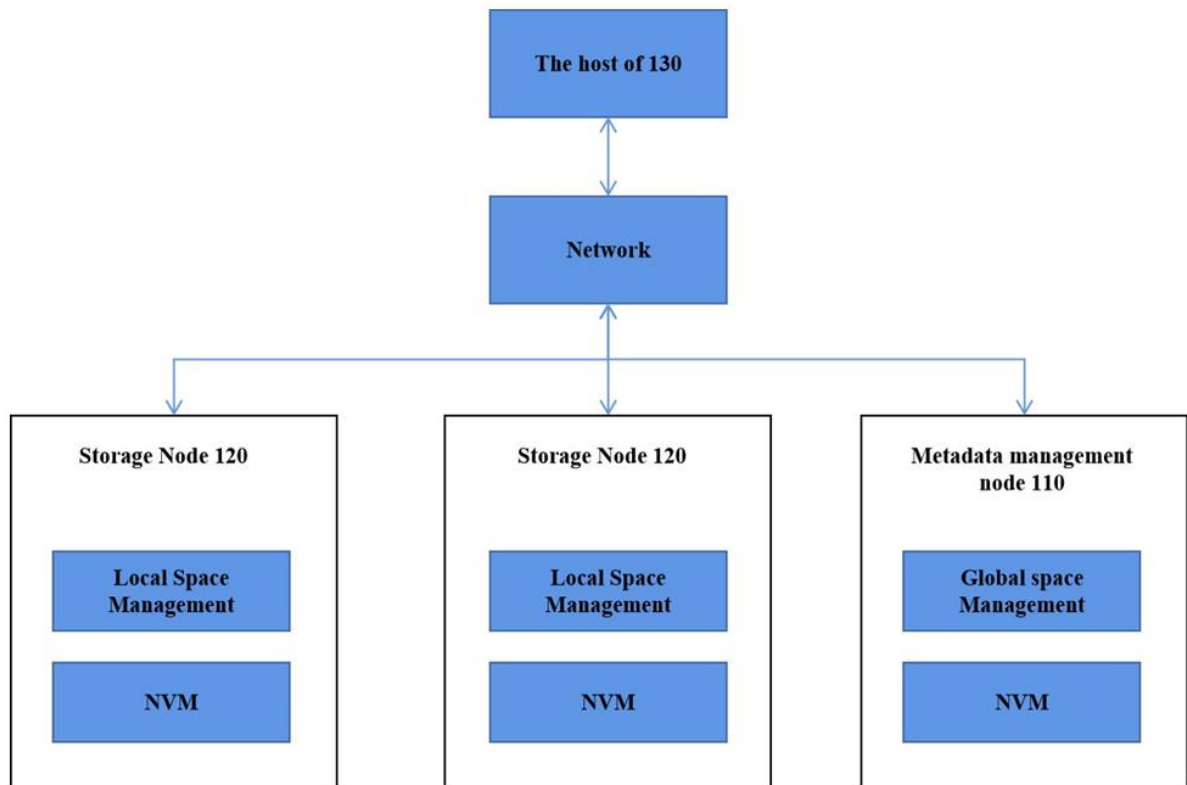


Figure 7: The Distributed System

The properties and advantages of neural network equipment usually occur in our area. First, self-study is possible. For example, in visual imaging, many different images and similar results are visual concepts for neural network devices, and the network will gradually learn to recognize images through self-study. Self-directed

education is particularly important for assessment. I hope that the future of neural network technology will provide the benefits of human financial forecasting, business development and forecasting, and the reliability of its application is very bright. Second, it's working [10]. This integration can be accomplished using symbols in neural networks. Third, the ability to find solutions at high speeds. Finding a good solution to a difficult problem requires a lot of counting. By using high-speed computer technology using neural network intelligence, every problem can be seen quickly.

A multilayer transmission network (MFN) (Figure 8) has three stages. The first is the login process. Many neurons receive multiple nonlinear input data. An input file is called an input vector. The second is the process of urination. The information is transmitted to the neural network, analyzed, measured and outputted. The output file is called an output vector. It is customary to select nodes 1.2-1.5 times larger than the smaller size. There are many different types of neural networks, and this hierarchical model does not apply to all neural networks [11].

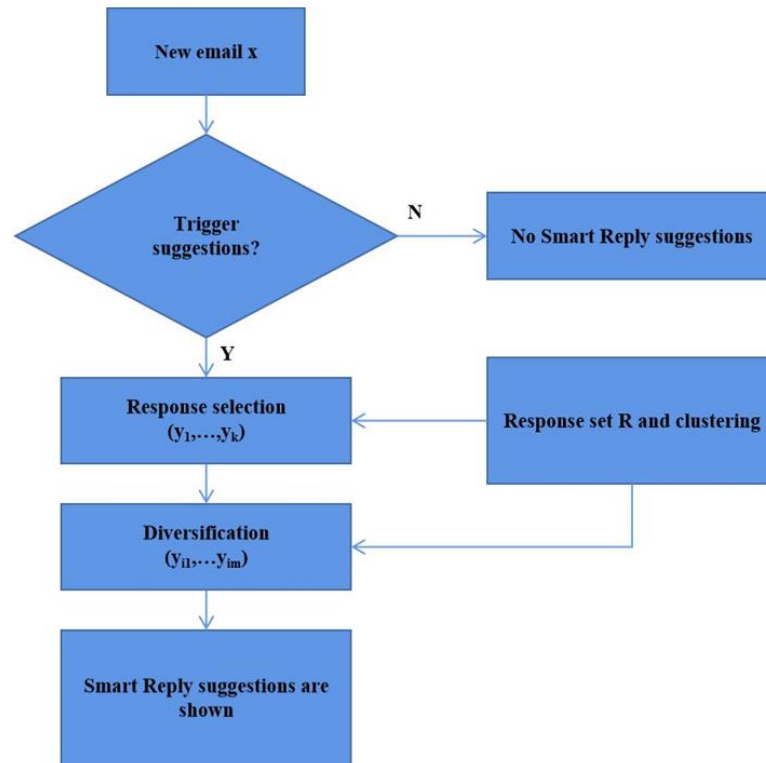


Figure 8: The Feedforward Network

In the study of the nonlinear dynamic power of neural networks, the observation of neural network evolution and universality, the study of neural network integration and convergence, as well as neural network evolution, nonlinear programming theory, and statistical theory are often used. understand the process of generating neural information. Explore the possibilities of neural networks for processing information from the perspective of complexity and uncertainty, and apply the ideas and approaches of chaos theory [12].

Chaos is a difficult mathematical concept to define. In general, “chaos” refers to the non-deterministic behavior that occurs in motor systems that are equivalently, or deterministically, randomly defined. “Determination” refers to internal causes rather than external noise or distraction, while “randomness” refers to erratic behavior that cannot be explained by statistical processes alone. The main characteristic of a chaotic dynamical system is the sensitive dependence of its state in the presence of conditions, and chaos represents its inherent randomness. Chaos theory refers to ideas, concepts, and ways of describing weak systems with negative behavior. It refers to problems with the outside world, negative behavior of electronic devices as their own devices during the exchange of energy and information [13]. The style is alien, the characters are different, and the chaos is stable. Steady states of chaotic dynamical systems include relaxation, relaxation, periodic, nearly identical, and chaotic solutions. The chaotic trajectory stems from a combination of global insecurity and local conflict, which is called fanaticism. The characteristics of a hobby are as follows: (1) A hobby is a hobby, but it is not a fixed point or solution. (2) Hobbies cannot be separated, cannot be shared between two or more lovers. (3) It is very obvious for the initial value that different starting values make a big difference. The teaching quality organization guarantee system is mainly composed of the leaders of the public English department of colleges and universities, the teaching secretary, the director of the teaching and research section and other personnel. They must have rich knowledge of basic



principles of educational science, educational psychology, educational management, etc., have the ability to analyze and solve problems, master the rules of professional construction, curriculum construction, textbook construction, etc., be familiar with modern teaching management methods, and keep up with the latest dynamic teaching. They should carry out “supervising teaching, supervising learning and supervising management” activities through lectures, interviews, inspections and feedback [14].

The main purpose of the collection of the teaching quality information is to comprehensively and timely grasp the information on the basic conditions of each link of the teaching process and the factors of teaching activities in the process of teaching, learning and management. Its main task is to provide all-round information feedback for teaching quality evaluation and regulation to ensure the authenticity and comprehensiveness of the information. Information collection mainly includes:

(1) Students’ discussion and evaluation information. Relevant departments can regularly organize student symposiums every semester to record students’ opinions and suggestions on all aspects of teaching, and listen to students’ evaluation of teachers’ teaching quality [15].

(2) Online teaching evaluation information (Figure 9). Students’ evaluation of teachers’ work is an important task for colleges and universities to implement the teaching quality management. It is an important part of the teaching quality monitoring system. At the end of each semester, students give marks to the teachers in this semester through the campus network. The department should conduct in-depth investigation and research, and take measures to help teachers find problems.

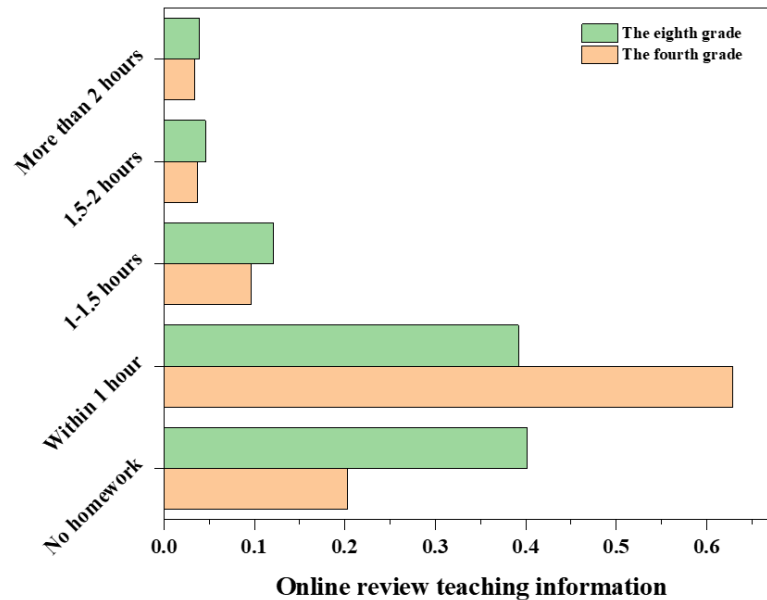


Figure 9: Upward Evaluation of Teaching Information

(3) Teaching supervisor’s lecture information. College English departments should have teaching supervisors who are senior and excellent teachers, and form a teaching supervision group. Supervisors should conduct on-site lectures and evaluations on the teaching situation of English teachers in the department, mainly observe teachers’ teaching ideas, teaching content, teaching art, etc., record the advantages and existing problems in the teaching process in detail, and form written reports and summarize them [16].

(4) Teaching inspection information. The department can carry out various specific evaluation work on a regular basis, which is divided into three stages, the beginning, the middle and the end. At the beginning of the semester, teachers should check the teaching documents before the class starts. The mid-term teaching check is a comprehensive check on the implementation of teaching work and the completion of teaching objectives. The focus of the final teaching check is on the completion and effect of teaching tasks. After each teaching inspection, the teaching secretary should summarize the teaching inspection situation.

(5) Teachers’ mutual evaluation information. According to the specific situation, by adopting various forms, the leaders of the department and the director of the teaching and research section are organized to conduct regular lecture inspection and evaluation of the teachers, and the teachers are organized to carry out mutual listening and mutual evaluation. The leaders of the department and the director of the teaching and research section also organize regular discussions with teachers to discover and solve problems in a timely manner, and promote mutual observation and learning among teachers, so as to enhance their strengths and avoid weaknesses.

(6) Students' learning quality evaluation information (Figure 10). Grading examinations can fairly and objectively reflect the actual level of teaching. The marking work should be managed in a fully closed manner, and supervision should be strengthened to ensure impartiality and confidentiality. The filing work is the summary link of the assessment process. In this link, the work of the department should be carried out in a fair, meticulous and standardized manner in accordance with the prescribed procedures [17].

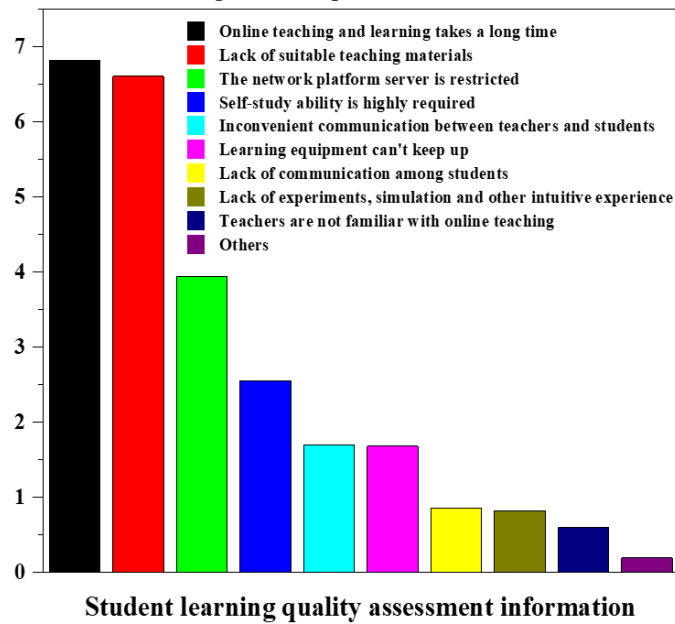


Figure 10: Students Learning Quality Assessment Information

### III. METHODS

#### A. Teaching Quality Evaluation Indicators and Evaluation Grades

1) *Determination of the teaching quality evaluation indicators:* (1) Teaching attitude: The view on teaching and the behavior taken are called teaching attitude. Teachers' teaching attitude directly affects the teaching content, methods and quality. Tutoring and Q&A. Tutoring and homework correction is an important part of a teacher's work, but it is not the most critical part of the teaching process. Through the score of this index, the teacher's attention to teaching work and students can be known. (2) Content of the training: Key concepts and issues are defined appropriately [18]. Curriculum should be well understood and applied according to the actual development and characteristics of the students, and the "curriculum" should be changed to "instruction with the curriculum report". An important instruction is to teach students to the best of their ability. Attention must be paid to the accuracy of the training points. The content of the lecture should be in relation to the reality and real life of the students. Only when it is connected to real life can it attract students' attention, and at the same time, it also strengthens students' grasp of knowledge. (3) Teaching strategies and methods: active learning, standardized language, clear speaking, and appropriate writing on the blackboard. Clear lectures and appropriate blackboard writing can help students to understand the teacher's lectures more quickly and clearly [19]. Appropriate blackboard writing can also help students consolidate what they have learned after class. The advanced teaching instruments are used. The need to use college-level technology in the classroom will enhance the classroom content and improve student listening skills. Students participate in the lesson and the content should be encouraging. Generally, students are required to attend more than half of the classes. Focus on students' independent learning and improving personal diversity. (4) Teaching effect: Teaching effect is the purpose of teaching quality evaluation. It reflects the degree to which students have acquired basic theories, methods and basic knowledge in the courses they have studied, according to teachers' experience. The secondary indicators that reflect the teaching effect are as follows. The first is whether students master the key points and difficulties of the teaching materials after listening to the class. Although students know how to apply basic theoretical knowledge and skills. The second is whether the students are familiar with the structure of the key words and the complex syllabus of the class. Although students are improving their problem-solving and problem-solving skills [20]. The third is how does the attention of the students in the listening lesson? In teaching, teachers control students' attention, encourage and guide students to think positively, and help students understand their feelings, Simple processes, and the ability of important and difficult points, which is a sign of success. Student test scores



are an important measure of long-term learning. Using test scores to determine a teacher’s academic achievement is the most accurate and objective.

2) *Comprehensive score and weight:* According to the comprehensive principle of the teaching quality evaluation, it is necessary to assign different weights to the evaluation results of different evaluators, and then calculate the comprehensive evaluation score. The comprehensive score takes ten as the full score. The general teacher’s comprehensive score weight can be specified. 60% students, 20% director of teaching and research, 10% peer review, and 10% self-assessment. The overall score weight is adjusted by the director of the teaching and research section. 70% for students, 20% for peer review, and 10% for self-assessment (The scoring for each metric in this system has already been processed.) [21].

3) *The survey method of students’ evaluation of teaching:* If the number of students evaluating a professor’s course is less than 50, a comprehensive survey can be used, and a sampling survey can be used for more than 50 students. The sampling method can be simple random sampling, stratified random sampling (stratified by class) or systematic sampling method (such as 305 people in the whole department, suppose the sample size n=50, the cumulative number is 305/50, and the sampling starts from the student number 4, the student numbers of the selected students are 4, 10, 16, ..., 298, 304) [22].

4) *Comprehensive evaluation results:* The comprehensive evaluation results are divided into four grades: excellent, good, general and poor. The grading standards are shown in Table 1.

Table 1: Grading Criteria

Overall rating	Grating
$Y \geq 8.5$	Excellent
$7.0 \leq Y < 8.5$	Good
$6.0 \leq Y < 7.0$	General
$Y < 6.0$	Poor

For teachers who undertake teaching tasks in two semesters in the same academic year, the annual evaluation result is the average score of the comprehensive evaluation scores of the two semesters.

*B. Determination of Teaching Quality Evaluation Prediction Model of BP Neural Network*

1) *BP network model structure:* (1) Determination of input strategies and procedures: Because there are 7 factors that affect performance, the number of neurons in the input process is set to  $n = 7$ . These count with: X1 means to teach, answer questions, edit homework, X2 means to identify key points and necessary problems, X3 means to give importance to taken from the content, X4 means language, clear description, and written correctly on board. Using college-level tools, X6 is student engagement, content is encouraging, X7 is student test scores, network results are the result of measurement show good. Therefore, the number of neurons in the output layer is defined as  $m = 1$ . Y represents the estimated result of the training test.

(2) Determining the encryption process: A three-layer BP network with a simple structure is chosen, that is, there is a primary layer, and the encryption process receives a Sigmoid transform function. Currently, there is no best diagnostic model to represent the number of neurons in the hidden process, but the following diagrams can be provided for use in making an optimal choice. Hidden object ranking. Since the input node is 7 according to the model:

$$n = \log_2^2 n \tag{1}$$

In formula (1), n is the number of input cells, and formula (2) is obtained.

$$n1 = \sqrt{n + m} + a \tag{2}$$

In formula (2), m is the number of output neurons, n is the number of input units, and a is the constant of [1, 10]. The number of neurons in the occult process can be set to 19 or 10 initially. The model BP neural network prediction is shown in Figure 11.

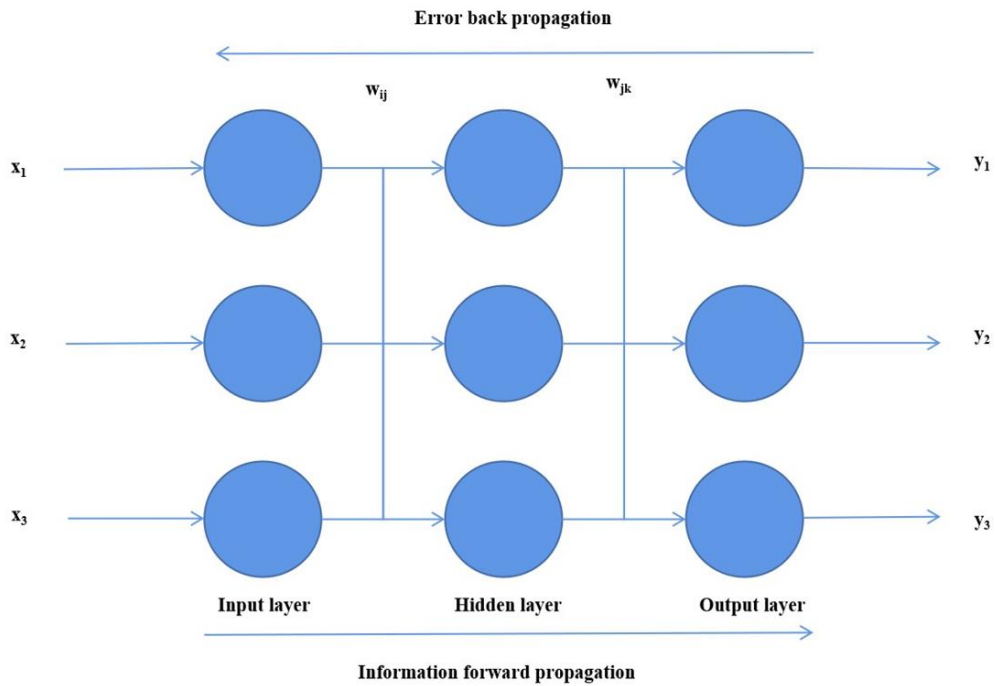


Figure 11: BP Neural Network Prediction Model

2) *Teaching data processing in BP network design:* (1) Since the filtering process of the BP neural network to preprocess data inputs generally uses the Sigmoid transform function, it works to improve the training speed and sensitivity and reduce the saturation of the Sigmoid function, so the value of the file format should usually be between 0 and 1. So it needs to be done. age  $[0,1]$  to normalize data input to data at that time. There are several types of normalization, and the following formula is used here [23]:

$$X = \frac{X - X_{\min}}{X_{\max} - X_{\min}} \tag{3}$$

(2) Inverse transform processing of output data. If the output layer node also uses the sigmoid transformation function, the output variables must also be preprocessed accordingly. There are various methods of preprocessing, and the formulas used in different literature are also different. However, it must be noted that after the preprocessed data training is completed, the result output by the network needs to be inversely transformed to obtain the actual value.

3) *MATLAB simulation implementation of neural network model for teaching quality evaluation:* (1) The BP network is based on the design of the BP network, where the displacement of neurons in the middle layer is a sigmoid tangent function. As urination occurred in a specific time interval  $[0,1]$ , the change in neuronal activity in the urinary layer was defined as a sigmoidal logarithmic function. MATLAB is used to create a BP network that meets the above requirements according to the following rules.

$$\text{threshold} = [01;01;01;01;01;01;01] \tag{4}$$

$$\text{net} = \text{newf}(\text{threshold}, [19,1])(\text{'tansig', logsig}, \text{'traingdx'}) \tag{5}$$

In Formula (4) and Formula (5), the initial set value of the input vector of the network is  $[0,1]$  and the training function used by the network is `traingdx`, which is learned by gradient lip. The course fees are flexible and this is an improvement of the BP algorithm.

(2) BP network training and testing. Determination of hidden layer nodes: The formula is determined based on the number of hidden layers. Initially, the number of neurons in the hidden layer can be set to 10 and 19, and training and simulation are conducted separately for each case. By comparing the errors in these two scenarios, it was observed that the network's prediction performance is optimal when there are 19 neurons in the hidden layer. Therefore, 19 hidden nodes are selected for the neural network's hidden layer to evaluate and predict teaching quality. The maximum number of training iterations for the network is set at 1000 times. If the network fails to converge after this number of training iterations, it is considered as non-convergent and the training process is terminated. The training target is set at 0.001, which represents the target error value for the network. Training concludes once the training error reaches the target value.

Network testing: Following the completion of network training, it is essential to conduct testing using a separate dataset. The test data is sourced from the actual evaluations of various teachers within our school. Furthermore, the

network’s prediction error is relatively minor, and its performance generally meets the practical application requirements.

IV. RESULTS & ANALYSIS AND DISCUSSION

A. Results

1) *Teaching attitude*: In teacher evaluations, the distribution for teaching attitude ratings is as follows: 90% rated as excellent, 10% as good, 0% as average, and 0% as poor. In student evaluations, the breakdown for teaching attitude ratings is as follows: 80% rated as excellent, 14% as good, 6% as average, and 0% as poor. Please refer to Table 2 for a detailed overview.

Table 2: Teaching Attitude

Teaching situation	Excellent (n/%)	Good (n/%)	General (n/%)	Poor (n/%)
Teacher evaluation	45 (90)	5 (10)	0 (0)	0 (0)
Student evaluation	40 (80)	7 (14)	3 (6)	0 (0)

2) *Teaching content*: In teacher evaluations, the distribution of ratings for teaching content is as follows: 82% rated as excellent, 12% as good, 6% as average, and 0% as poor. In student evaluations, the breakdown for teaching content ratings is as follows: 82% rated as excellent, 16% as good, 0% as average, and 0% as poor. Please refer to Table 3 for more detailed information.

Table 3: Teaching Content

Teaching situation	Excellent (n/%)	Good (n/%)	General (n/%)	Poor (n/%)
Teacher evaluation	41 (82)	6 (12)	3 (6)	0 (0)
Student evaluation	42 (82)	8 (16)	0 (0)	0 (0)

3) *Teaching strategies and methods*: In the teacher evaluation, the evaluation of teaching strategies and methods as excellent, good, general and poor are 96%, 4%, 0% and 0% respectively. In the student evaluation, the evaluation of teaching strategies and methods as excellent, good, general and poor are 94%, 6%, 0% and 0% respectively. See Table 4 for details.

Table 4: Teaching Strategies and Methods

Teaching situation	Excellent (n/%)	Good (n/%)	General (n/%)	Poor (n/%)
Teacher evaluation	48 (96)	2 (4)	0 (0)	0 (0)
Student evaluation	47 (94)	3 (6)	0 (0)	0 (0)

4) *Teaching effect*: In the teacher evaluation, the evaluation of teaching effect as excellent, good, general and poor are 96%, 2%, 2%, and 0% respectively. In the student evaluation, the evaluation of the teaching effect as excellent, good, general and poor are 98%, 2%, 0% and 0% respectively. See Table 5 for details.

Table 5: Teaching Effect

Teaching situation	Excellent (n/%)	Good (n/%)	General (n/%)	Poor (n/%)
Teacher evaluation	48 (96)	1 (2)	1 (2)	0 (0)
Student evaluation	49 (98)	1 (2)	0 (0)	0 (0)

B. Analysis and Discussion

This study utilizes artificial neural networks to assess the quality of college English teaching. The research focuses on optimizing the weights and thresholds of neural networks to establish a model suitable for teaching evaluation, enhancing the performance of the BP algorithm, reducing running time, and improving prediction efficiency and accuracy. The trained network model will be applied to evaluate teaching quality in universities to validate the reliability and effectiveness of the model.

The results revealed that in teacher evaluations, the breakdown of ratings for teaching attitude was 90% excellent, 10% good, 0% average, and 0% poor. In student evaluations, the distribution for teaching attitude ratings was 80% excellent, 14% good, 6% average, and 0% poor. For teaching content, in teacher evaluations, the ratings were 82% excellent, 12% good, 6% average, and 0% poor, while in student evaluations, the ratings were 82% excellent, 16% good, 0% average, and 0% poor.

Regarding teaching strategies and methods, in teacher evaluations, the ratings were 96% excellent, 4% good, 0% average, and 0% poor, and in student evaluations, the ratings were 94% excellent, 6% good, 0% average, and 0% poor. Evaluating teaching effectiveness, in teacher assessments, the breakdown was 96% excellent, 2% good, 2% average, and 0% poor, and in student evaluations, it was 98% excellent, 2% good, 0% average, and 0% poor.

The experimental findings demonstrate that using artificial neural networks for evaluating the quality of college English teaching reform yields positive outcomes, aiding students and teachers in understanding their performance in mobile computing environments. This research contributes by integrating neural network models with data

survey methods to explore teaching reform quality for college students and utilizing factor analysis for experimental studies. The innovative fusion of intelligent algorithms, factor analysis, surveys, and statistical methods enhances the progression of teaching quality assessment.

The analysis of promoting intelligent classroom teaching in the future can be focused on the following aspects. Firstly, develop collaborative annotation and analysis methods that focus on classroom dialogue and multimodal data fusion. Dialogue is the most important channel for information sharing, knowledge construction, and inspiring thinking in classroom teaching. Discourse analysis has become more mature and can be effectively applied in classroom teaching evaluation. Based on this, future research can further integrate multimodal data such as behavior data, facial expression data, and image scene data for collaborative annotation and analysis. "Collaboration" is not only limited to narrow physical properties, but also serves as the interconnection of media. It is also the interconnection of connotation and function, in order to achieve a state of normalized collaborative analysis. In this process, the key is to explore the cognitive and cognitive development connotations reflected behind multimodal data, integrate the information sources of multimodal data, and achieve collaborative analysis from the perspective of educational and teaching functions. The improved neural network proposed in this article not only combines traditional data processing methods for teaching evaluation, but also has learning ability and can handle various teaching evaluation data processing needs in various situations, meeting various future teaching evaluation needs

Secondly, research on classroom teaching analysis models that cover multiple scenarios and diverse forms. With the development of classroom teaching reform, the structure and form of the classroom have also undergone corresponding changes. In addition to the new teaching type, it will also involve various types of classrooms such as research-oriented, group learning, and practical learning. In addition, with the rapid development of the Internet of Things and virtual reality technology, teaching scenarios and organizational forms have also undergone profound changes. This requires the development of analytical methods suitable for different types of courses based on curriculum teaching theory, and based on this, the exploration of high-quality teaching modes suitable for diverse classrooms. The neural network algorithm proposed in this article can not only be combined with digital evaluation data, but also with the Internet of Things and communication technology, which can effectively cope with various teaching modes. It also uses online and offline teaching, with good application prospects

Thirdly, the analysis of intelligent classroom teaching should be aligned with the training objectives of education and teaching, such as thinking development, comprehensive literacy, cognitive ability, etc., to avoid machine over learning and ineffective learning. It is necessary to introduce human intelligent decision-making through theoretical model construction and path selection, and focus on leveraging the powerful role of neural networks in causal inference, behavioral motivation, cognitive decision-making, and other aspects. The selection of intelligent technology should ultimately be transformed into practical and applicable strategies to serve classroom teaching evaluation and improvement more scientifically and accurately, promote systematic reshaping of classroom teaching, and improve the quality of teaching and education. Neural network algorithms have good data mining and intelligent learning effects, and can form reliable decision-making ability through multiple learning. It can be inferred that the improved neural network algorithm proposed in this article can play a certain decision-making role in subsequent intelligent teaching

Based on the experimental analysis provided, this article presents the following key findings:

(1) To address issues in traditional teaching evaluation, an enhanced neural network model is developed. The improved algorithm optimizes the weights and thresholds of the neural network to enhance the performance of the BP algorithm. Simulation results demonstrate that the model excels in rapid computation and high accuracy.

(2) A teaching quality evaluation index system is established. The intelligent BP neural network algorithm is applied for evaluation, integrating questionnaire survey scoring results to create a sample set. Neural network models are then used for sample training and testing to conduct teaching quality assessments.

(3) The research outcomes highlight that neural network models exhibit rapid convergence, robustness, high predictive accuracy, and strong generalization capabilities compared to other models. Furthermore, these results validate the effectiveness of the established evaluation index system, presenting a novel approach for assessing teaching quality.

## V. CONCLUSIONS

This article focuses on optimizing the weights and thresholds of neural networks to establish a model suitable for evaluating teaching quality. The aim is to enhance the performance of the BP algorithm, reduce running time,

and improve prediction efficiency and accuracy. The trained network model will be utilized to assess teaching quality in universities, validating the reliability and effectiveness of the model.

The results indicate that in teacher evaluations, the breakdown of teaching attitude ratings is 90% excellent, 10% good, 0% average, and 0% poor. For student evaluations, the distribution of teaching attitude ratings is 80% excellent, 14% good, 6% average, and 0% poor. Similarly, in teacher evaluations, the breakdown of teaching content ratings is 82% excellent, 12% good, 6% average, and 0% poor, while for student evaluations, it is 82% excellent, 16% good, 0% average, and 0% poor. In terms of teaching strategies and methods, teacher evaluations show 96% excellent, 4% good, 0% average, and 0% poor ratings, whereas student evaluations demonstrate 94% excellent, 6% good, 0% average, and 0% poor. Evaluation of teaching effectiveness reveals 96% excellent, 2% good, 2% average, and 0% poor ratings in teacher assessments, and 98% excellent, 2% good, 0% average, and 0% poor ratings in student evaluations.

These assessment results enable teachers to understand students' situations, identify curriculum challenges, and enhance instructional planning. They also aid schools in measuring teacher performance for appropriate recognition and rewards, serving as a foundation for decision-making. Utilizing neural networks in academic well-being assessment mitigates subjective expert biases, offering broad application prospects.

The model's accuracy is contingent on the number of training samples, with increasing accuracy as the model is applied and more training samples are added. Future work entails enhancing model accuracy through increased training data sample sizes. Further improvements can be made by incorporating big data and deep learning into the evaluation model, alongside validating the indicator system and model with additional cases.

#### REFERENCES

- [1] Wu, X. . (2022). Research on the reform of ideological and political teaching evaluation method of college english course based on "online and offline" teaching. *Journal of Higher Education Research*, 3(1), 87-90.
- [2] Pandiyan, M. K. , Idhayaselvi, V. A. , Danalakshmi, D. , & Sheela, A. . (2021). Online estimation of control parameters of facts devices for atc enhancement using artificial neural network. *IOP Conference Series: Materials Science and Engineering*, 1055(1), 012146 (13pp).
- [3] Nandakumar, S. D. , Valarmathi, R. , Juliet, P. S. , & Brindha, G. . (2021). Artificial neural network for rainfall analysis using deep learning techniques. *Journal of Physics: Conference Series*, 1964(4), 042022 (6pp).
- [4] Vogiatzi, P. , Pouliakis, A. , & Siristatidis, C. . (2019). An artificial neural network for the prediction of assisted reproduction outcome. *Journal of Assisted Reproduction & Genetics*, 36(7), 1441-1448.
- [5] Zhu, L. , & Feng, C. . (2021). Study on anti-fighting activity of mice by artificial neural network. *Journal of Shenzhen University Science and Engineering*, 38(03), 295-300.
- [6] Abishekraj, N. , Prashanna, G. , Suriyaa, M. S. , Barathraj, T. , & Mohanraj, D. . (2020). Condition based monitoring for fault detection in windmill gear box using artificial neural network. *IOP Conference Series: Materials Science and Engineering*, 912(3), 032061 (6pp).
- [7] Zhou, J. , Yang, M. , Wang, F. , & Wang, C. . (2020). Research on financial aid model of colleges and universities based on artificial neural network. *Journal of Physics: Conference Series*, 1575(1), 012100 (4pp).
- [8] Zhao, B. , Wang, R. , Cai, Y. , & Zhao, E. . (2020). Block chain financial transaction using artificial neural network deep learning. *IOP Conference Series: Materials Science and Engineering*, 740(1), 012161 (7pp).
- [9] Wang, Z. , Ma, L. , Zhan, Q. , Li, Q. , & Li, F. . (2020). An acoustic discrimination method for impact load based on artificial neural network. *IOP Conference Series: Earth and Environmental Science*, 455(1), 012032 (6pp).
- [10] Manan, W. , & Abdullah, N. R. . (2021). An artificial neural network model for forecasting air pollution. *IOP Conference Series: Materials Science and Engineering*, 1176(1), 012032-.
- [11] Wang, J. , Kim, Y. H. , Ryu, J. , Jeong, C. , & Kim, D. . (2021). Artificial neural network-based compact modeling methodology for advanced transistors. *IEEE Transactions on Electron Devices*, PP(99), 1-8.
- [12] Davis, T. A. , Samson, D. J. , Inchiosa, M. A. , & Prabhakaran, K. . (2019). Prediction of in-hospital outcomes after traumatic brain injury using artificial neural network algorithms. *Journal of the American College of Surgeons*, 229(4), e238-.
- [13] Chung, T. , Xu, B. , Liu, Y. , Ouyang, C. , Li, S. , & Luo, L. . (2019). Empirical study on character level neural network classifier for chinese text. *Engineering Applications of Artificial Intelligence*, 80(APR.), 1-7.
- [14] Gao, H. . (2021). Reform of college english teaching model under the background of artificial intelligence. *Journal of Physics: Conference Series*, 1744(4), 042161 (6pp).
- [15] Zheng, H. , & Miao, J. . (2021). Construction of college english teaching model in the era of artificial intelligence. *Journal of Physics: Conference Series*, 1852(3), 032017-.
- [16] Liu, Y. , & Liu, M. . (2019). Research on college english teaching under the background of artificial intelligence. *Journal of Physics: Conference Series*, 1345(4), 042064 (6pp).
- [17] An, B. , & Zhao, H. . (2021). Research on the satisfaction of hybrid college english teaching based on artificial intelligence rain classroom. *Journal of Physics: Conference Series*, 1992(2), 022078-.

- [18] Yang, T. , Wang, Z. , Ma, L. , & Li, Y. . (2020). Research into college english teaching under artificial intelligence in china. IOP Conference Series: Materials Science and Engineering, 782(5), 052023 (4pp).
- [19] Chilamkurti, N., (2019). A secure, energy- and sla-efficient (sese) e-healthcare framework for quickest data transmission using cyber-physical system. Sensors, 19.
- [20] Bradha M., Balakrishnan N., Suvitha A., Arumanayagam T., Rekha M, et al. (2021). Experimental, computational analysis of Butein and Lanceoletin for natural dye-sensitized solar cells and stabilizing efficiency by IoT. Environment, Development and Sustainability, 1-16.
- [21] Hu, J. , Kang, Y. M. , Chen, Y. H. , Liu, X. , & Liu, Q. . (2018). Analysis of aerosol optical depth variation characteristics for 10 years in urumqi based on modis\_c006. Huan jing ke xue= Huanjing kexue / [bian ji, Zhongguo ke xue yuan huan jing ke xue wei yuan hui “Huan jing ke xue” bian ji wei yuan hui.], 39(8), 3563-3570.
- [22] Huang, R., (2015). Framework for a smart adult education environment. World Transactions on Engineering and Technology Education, 13(4), 637–641.
- [23] Zhang, Q. (2021). Relay vibration protection simulation experimental platform based on signal reconstruction of MATLAB software. Nonlinear Engineering, 10(1), 461-468.