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*Research Article*

# Analysis of Key Indicators in English Teaching Evaluation Based on Big Data Model

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With the advent of the era of big data, the traditional English teaching methods in the past can no longer accurately assess the comprehensive level of English teachers and classrooms because of various factors. In order to reexamine and plan English teaching content, based on the big data model, we will carefully analyze the key indicators in English teaching evaluation using computer technologies such as particle swarm optimization and support vector machine, hoping to dig out the characteristics of English education in a deeper way, so as to make a series of index adjustments to English classroom and improve English teaching level. The results of this study show the following: (1) The average accuracy of the evaluation index of the model designed in this study is as high as 96.56%; after 20 tests, the test time of this model method is the least, and the test time can be as low as 13.32 ms. (2) For eight first-class indexes of A, B, C, D, E, F, G, and H and 29 second-class indexes, the expert scores are all greater than 3.66, and the standard deviation is all less than 1, which accords with the standard of reaching common opinions. The key index test system is reasonable. (3) We find that the weights of A2, D1, H1, and H2 are all higher than 0.5, the weights of A1, B3, C5, E5, F4, and G4 are all higher than 0.3, and the weights of other indexes are all less than 0.3. This shows that each index has a different weight and emphasis on English teaching evaluation. (4) Taking a certain teacher as an example to assess English proficiency can effectively analyze the key indicators of English teachers and enable the teacher to make corresponding improvements and formulate strategies. On the whole, the teacher has strong writing ability and listening ability; the ability of speaking and translating is slightly weak, both of which are about 0.8; for listening analysis, idiom and sentence ability are generally to be enhanced, about 0.8. (5) The comprehensive scoring of English teaching is carried out, large difference in scoring values is avoided, and fairer test results are given. It is found that after big data analysis, the key indicators of English are analyzed accurately, the classroom teaching is diversified, and the students' final classroom evaluation reflects well, so this method has obvious advantages.

## 1. Introduction

With the increasing affluence of people's lives, both material and spiritual conditions have been greatly increased, and the demand for education and related standards has also been improved. How to use the key indicators of teaching to evaluate the quality of higher education is very important, which can help educators understand the needs of students and teachers and make a series of adjustments. Taking English teaching evaluation as an example, English teaching evaluation represents English teachers' ability and teaching quality, which can evaluate whether students' education meets the standards from various key indicators and accurately reflect the characteristics of English as a subject and students' educational needs. With the wide application of big data boom at home and abroad, it is an inevitable trend to use big data model to mine demand characteristics when evaluating teaching analysis indicators. To better measure and evaluate English teaching content, this study makes a comprehensive analysis and comparison of English teaching characteristics based on big data model, assisted by support vector machine, particle swarm optimization, and other contents, from teaching theory to actual teaching feedback. This study provides a lot of theoretical support according to the achievements and documents made by predecessors. Literature [1] analyzes the best teaching mode in big data environment and applies it to college English teaching. Literature [2] analyzes the current situation and hot spots of college English textbook compilation with the help of big data and CiteSpace software. Literature [3] analyzes the influence of big data on college English education. Literature [4] examines "general chemical effects" and analyzes the class size and teaching evaluation. Literature [5] evaluates the overall teaching effect of higher education institutions. Literature [6] constructs a teaching quality data monitoring platform to improve the supervision level of teaching data literacy. Literature [7] integrates big data information fusion and K-finger clustering algorithm to realize clustering and integration of English teaching ability index parameters. Literature [8] analyzes the characteristics of English teachers' educational ability in a massive open online course (MOOC) environment with a fuzzy C method algorithm. Based on big data analysis, literature [9] discusses the selection and acquisition of teaching resources, the trajectory analysis of teaching and learning behaviors, teaching monitoring and evaluation, etc. Literature [10] establishes an "online + offline" hybrid learning model based on a large amount of data and analyzes the feasibility of combining online and offline English classes in colleges and universities. Literature [11] realizes feature clustering and multiple regression analysis and realizes quantitative evaluation of the correlation between college English teaching mode reform and performance. Literature [12] uses big data analysis to study the evaluation methods of students' English classroom performance. Literature [13] uses big data analysis technology to construct a college English TQA model and obtains high-precision English teaching quality evaluation results. Literature [14] combines subjectivity and objectivity and applies data mining technology to the evaluation of English teaching quality. Literature [15] reconstructs the monitoring mode of autonomous English learning under the background of big data and establishes an effective comprehensive evaluation system. The method proposed in the above literature discusses English teaching in combination with other issues in depth and gains advantages in the process of English teaching through evaluation. However, the accuracy and efficiency of the evaluation are low in the research process of the above methods. This study proposes a literature review on big data model and English teaching evaluation and refers to the experience of predecessors in many aspects, such as integrating big data information fusion and establishing blended learning model based on large amounts of data, to help us select research methods and applications appropriate to this topic from practice. The method proposed in this study uses big data to analyze and make decisions, and the analysis results are studied and analyzed. The model can effectively extract the characteristics and needs of English teaching. It can help to improve the efficiency of modeling and reduce the workload of researchers. The hybrid model includes particle swarm optimization and support vector machine, which effectively improves the accuracy and efficiency of teaching index evaluation and can give fairer test results based on data.

## 2. Theoretical Basis

*2.1. Big Data Model.* Big data first appeared in the information technology (IT) industry. With the in-depth study of it by researchers, the world is quietly setting off a wave of big data. After deep mining of data information, big data interpret the elegant demeanour of the world from a new angle. People are surprised to find that what lurks under ordinary data information is not an iceberg, but a whole brand-new world. Various optimized application technologies based on big data are constantly emerging. It is common to make analysis decisions and research and analysis with big data, which further illustrates versatility and availability.

Big data application [16] describes business requirements and patterns, uses big data to build models [17], mines data features from huge data [18], and proposes problem solutions. These workflows can be carried out using professional data modeling tools: PowerDesigner, Sparx Enterprise Architect, CA Erwin, ER/Studio, etc. Making good use of the above tools can help improve modeling efficiency and reduce the workload of modelers. Figure 1 shows several common big data analysis models.

In the fields of big data, artificial intelligence, biomedicine, etc., the Bayesian formula, a very important mathematical formula given by Laplace [19], is used. $A$ denotes event $A$, $B$ denotes event $B$, and $P$ denotes probability [20]:

$$P\left(\frac{A}{B}\right) = P\left(\frac{B}{A}\right) * \frac{P(A)}{P(B)}. \tag{1}$$

*2.2. English Teaching.* English is a common language in the world. Since the 1990s, the teaching methods and means of English in colleges and universities have gradually become rich and varied, and teachers are no longer instilling the content of this language as before. The quality of English teaching in colleges and universities is improved, the fairness and rationality of English teaching indicators are ensured, and an excellent English teaching system is established [21]; these are the enduring hot topics and key tasks of the education department.

Traditional English teaching mainly depends on the teaching methods and contents of teachers, which has strong and distinct personal characteristics and styles of teachers. The teaching quality is uneven, and the teaching evaluation is difficult to evaluate. The key teaching indicators are mainly teachers' methods, contents, effects, etc., which have great autonomy and are difficult to judge accurately. Teaching results often vary from person to person, which leads to the uncertainty of students' English literacy and level. To cultivate students' English ability and use language tools flexibly, we need the help of science and technology. Big data mining technology is used to mine the indicators that are easily overlooked in English teaching, and the evaluation indicators that were originally roughly divided from all aspects and angles are refined comprehensively; only by

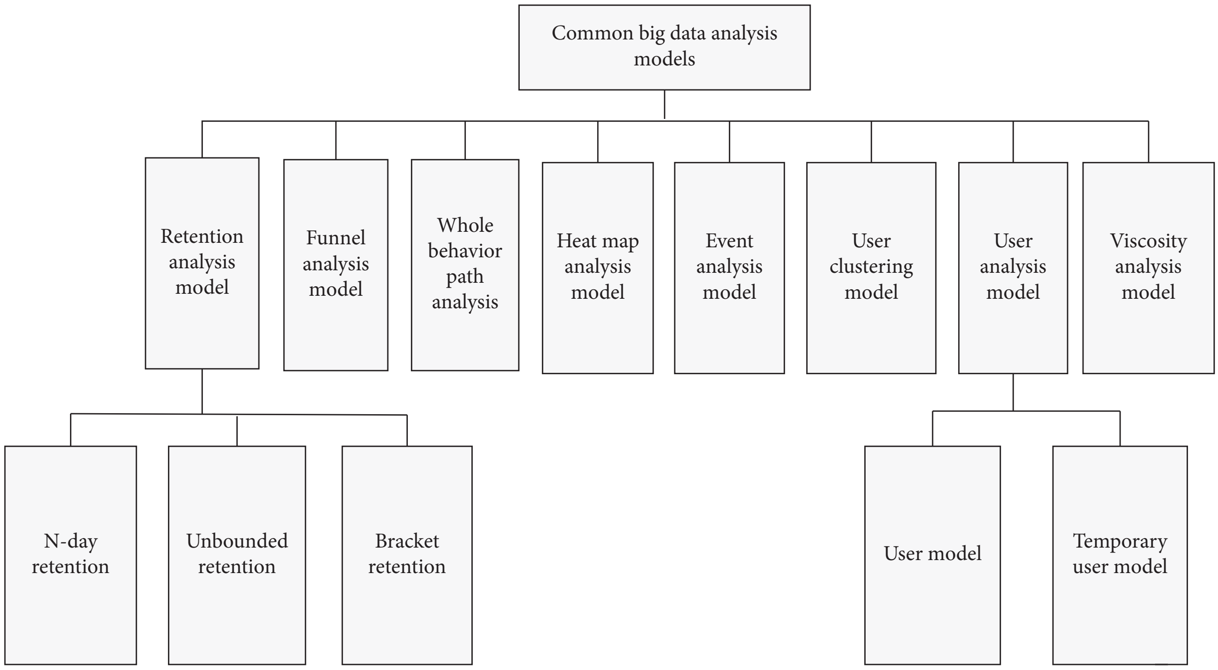


Figure 1: Big data analysis model.

adding objective evaluation factors as much as possible can educators design a scientific evaluation system for English teaching and teachers to find and solve practical problems in students' learning process.

*2.3. Support Vector Machines.* Support vector machine (SVM) is a binary classification model, which belongs to one of the machine learning algorithms, and is mainly used for classification and regression analysis. Least-squares support vector machines [22] are used. $\omega$ represents the weight vector, $b$ represents the deviation, and the linear regression function is as follows:

$$y = \omega^T x + b. \tag{2}$$

In high-dimensional eigenspace, $\varphi\ (x)$ is a nonlinear mapping:

$$f(x) = \omega^T \varphi(x) + b. \tag{3}$$

The optimization objective function and constraints are as follows:

$$\begin{gathered} \min = \frac{1}{2}\|\omega\|^2 + \frac{1}{2} c \sum_{i=1}^{l} e_i^2, \\ \text{s.t. } \omega^T \varphi(x_i) + b + e_i = y_i, \quad i = 1, 2, \ldots, l. \end{gathered} \tag{4}$$

The Lagrange multiplier (denoted by $\lambda$) [23] is introduced to solve unconstrained optimization problems:

$$\min J = \frac{1}{2}\|\omega\|^2 + \frac{1}{2} c \sum_{i=1}^{l} e_i^2 - \sum_{i=1}^{l} \lambda_i \left(\omega^T \varphi(x_i) + b + e_i - y_i\right). \tag{5}$$

According to the Karush–Kuhn–Tucker (KKT) optimization conditions:

$$\begin{aligned} \frac{\partial L}{\partial w} &= 0 \Rightarrow w = \sum_{l=1}^{L} a_l \varphi(x_l), \\ \frac{\partial L}{\partial b} &= 0 \Rightarrow \sum_{l=1}^{L} a_l = 0, \\ \frac{\partial L}{\partial e_l} &= 0 \Rightarrow a_l = \gamma e_l, \\ \frac{\partial L}{\partial a_l} &= 0 \Rightarrow y_l - w^T \varphi(x_l) - b - e_l = 0. \end{aligned} \tag{6}$$

The Gaussian kernel function is chosen:

$$K(x_i, x_j) = \text{cxp}\left(-\frac{\|x_i - x_j\|^2}{(2\sigma^2)}\right). \tag{7}$$

Regression estimation is as follows:

$$h(x_*) = \sum_{l=1}^{L} a_l K(x_*, x_l) + b. \tag{8}$$

The Gaussian kernel function chosen in this study is the most widely used one. In most cases, if you do not know what kernel function to use, the Gaussian kernel function is preferred. Both large and small samples have better performance. In addition, it has fewer parameters than the polynomial kernel function, so it is more convenient to use.

*2.4. Particle Swarm Optimization.* Particle swarm optimization (PSO) is a kind of swarm intelligence optimization algorithm. The core formula of particle swarm optimization algorithm is as follows:

$$\begin{aligned} v_i^d &= wv_i^{d-1} + c_1 r_1 \left( p\,\text{best}_i^d - x_i^d \right) + c_2 r_2 \left( g\,\text{best}^d - x_i^d \right), \\ x_i^{d+1} &= x_i^d + v_i^d. \end{aligned} \tag{9}$$

The calculation process is as follows:

$$f = \sum_{i=1}^{N} \left| y_i - y_1' \right|. \tag{10}$$

*2.5. Decision Tree Algorithm.* The decision tree algorithm [24] uses branch nodes to represent classification problems, predicts each path from root node to leaf node of decision tree corresponding to categories, and classifies information through a series of rules [25]; with the help of decision tree algorithm, we can find out the important factors behind teaching achievements.

Decision tree is a prediction model. The common decision tree algorithms include ID3 algorithm, C4.5 algorithm, CART algorithm, and random forest algorithm. The C4.5 algorithm is chosen, which is easy to understand classification rules and has high accuracy:

(1) Information entropy

$$H(D) = -\sum_{k=1}^{K} \frac{|c_k|}{|D|} \log_2 \frac{|c_k|}{|D|}. \tag{11}$$

(2) Conditional entropy

$$H(D|A) = -\sum_{k=1}^{n} \frac{|D_i|}{|D|} \left( \sum_{k=1}^{K} \frac{|D_{\text{ik}}|}{|D_i|} \log_2 \frac{|D_{\text{ik}}|}{|D_i|} \right). \tag{12}$$

(3) Information gain

$$\text{Gain}(D, A) = H(D) - H(D|A). \tag{13}$$

(4) Calculated gain ratio

$$\begin{aligned} \text{Gain}_{\text{ratio}}(D, A) &= \frac{\text{Gain}(D, A)}{H_A(D)}, \\ H_A(D) &= -\sum_{k=1}^{n} \frac{|D_i|}{|D|} \log_2 \frac{|D_i|}{|D|}. \end{aligned} \tag{14}$$

(5) Predicting random forest

$$H(x) = \arg\max \sum_{t=1}^{T} \left( h_t(x) = y \right) \cdot \left( x \notin D_t \right). \tag{15}$$

(6) No pruning needs to meet conditions

$$\begin{aligned} &E\,(\text{Misjudgment times of subtree}) \\ &\quad + \text{std}\,(\text{Misjudgment times of subtree}) \\ &< E\,(\text{Misjudgment times of leaf nodes}). \end{aligned} \tag{16}$$

(7) Pruning condition

$$\begin{aligned} &E\,(\text{Misjudgment times of subtree}) \\ &\quad + \text{std}\,(\text{Misjudgment times of subtree}) \\ &\geq E\,(\text{Misjudgment times of leaf nodes}). \end{aligned} \tag{17}$$

## 3. Model Design and Method

*3.1. Research, Analysis, and Design.* Using scientific tools to analyze the key indicators of English teaching is focused, and the improved method with the original one after feedback is compared. By referring to various related literature studies at home and abroad, using theoretical basis and analysis of the current situation of English teaching, this study constructs a complete system for analyzing English teaching evaluation indicators, as shown in Figure 2.

In order to ensure sufficient theoretical support for the study, this study uses a variety of research methods, such as literature review, questionnaire survey, Delphi method, and data analysis, and invites relevant English education experts to give their opinions and guidance. After determining the research content and theme, the rational use of contemporary scientific and technological strength, a big data analysis model, and a hybrid model of support vector machine and particle swarm optimization, which can assist the big data model to process data samples, are preliminarily constructed. Let the two models as the carrier of the analysis work improve the test index system to establish a new test index system for English teaching. Finally, according to the experimental data, the advantages and disadvantages of this method are summarized and analyzed.

*3.2. Big Data Analysis Model.* Huge data information needs to be mined, managed, and traced. We build an analysis data model of big data, choose the core idea of Ralph Kimball's dimension model to model, and refer to the implementation method of OneData model. As shown in Figure 3, we introduce the core functions of OneData tools.

As shown in Figure 3, the OneData tool has three core functions: specification definition, detailed model design, and summary model design. Under these three core functions, there are different specific functions.

The model follows the principles of consistency, clarity and efficiency, high cohesion, and low coupling. Data research: the business system is understood and the needs are analyzed; the business process or dimension is abstractly collected, the data domain is divided, the bus rectangle is constructed, and the statistical index is defined; code development: ETL tasks for deployment and operation and

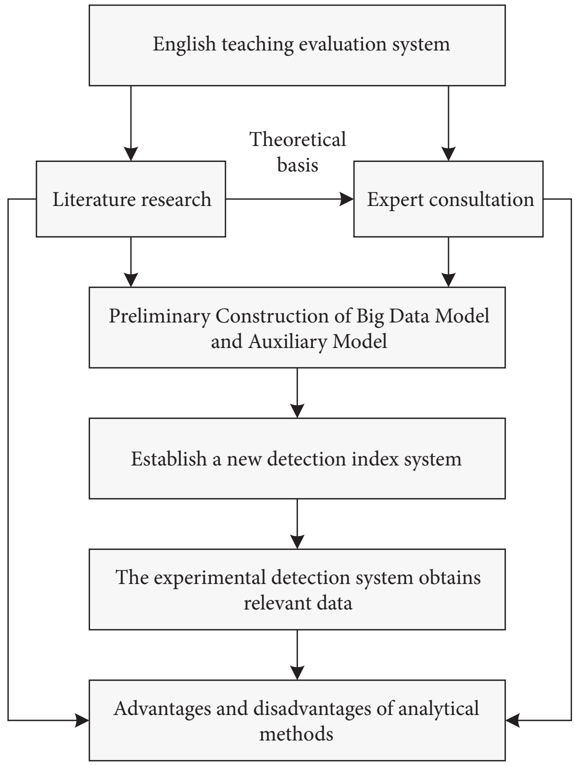


Figure 2: English teaching evaluation system.

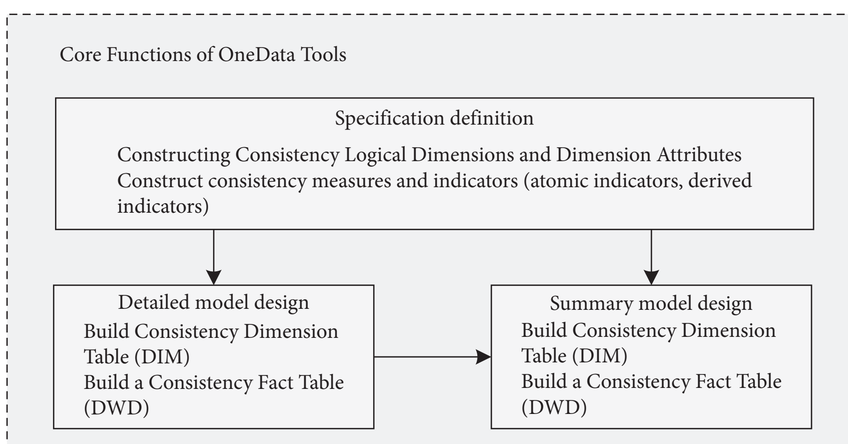


Figure 3: Core functionality of the OneData tool.

maintenance are generated. Figure 4 shows the architecture of the model.

As shown in Figure 4, the data import layer (ODS) is mainly responsible for importing basic data into MaxCompute and recording the historical changes in basic data. The common data layer (CDM) mainly completes data processing and integration, establishes consistent dimensions, constructs reusable detailed fact tables for analysis and statistics, and summarizes indicators of common granularity. After ODS and CDM processing, it is processed by personalized analysis, data retrieval, and data application layer.

*3.3. Hybrid Model of Support Vector Machine and Particle Swarm Optimization.* The purpose of this model is to assist the big data analysis model to analyze English teaching evaluation indicators. To improve the accuracy and efficiency of teaching index evaluation, the particle swarm optimization algorithm searches the parameters of least-squares support vector machine, and the particle swarm optimization algorithm solves the optimal solution of the parameters of least-squares support vector machine, optimizing the evaluation process and making a mixed model. Figure 5 illustrates a flow chart of processing data samples by particle swarm optimization algorithm and support vector machine.

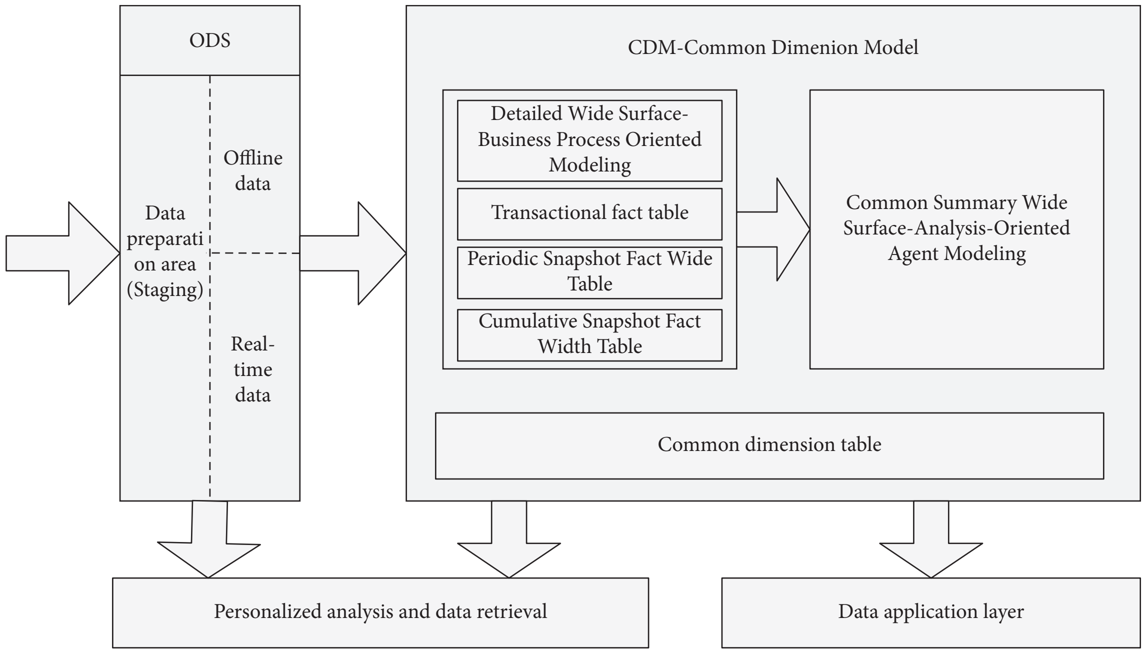


Figure 4: Big data model architecture.

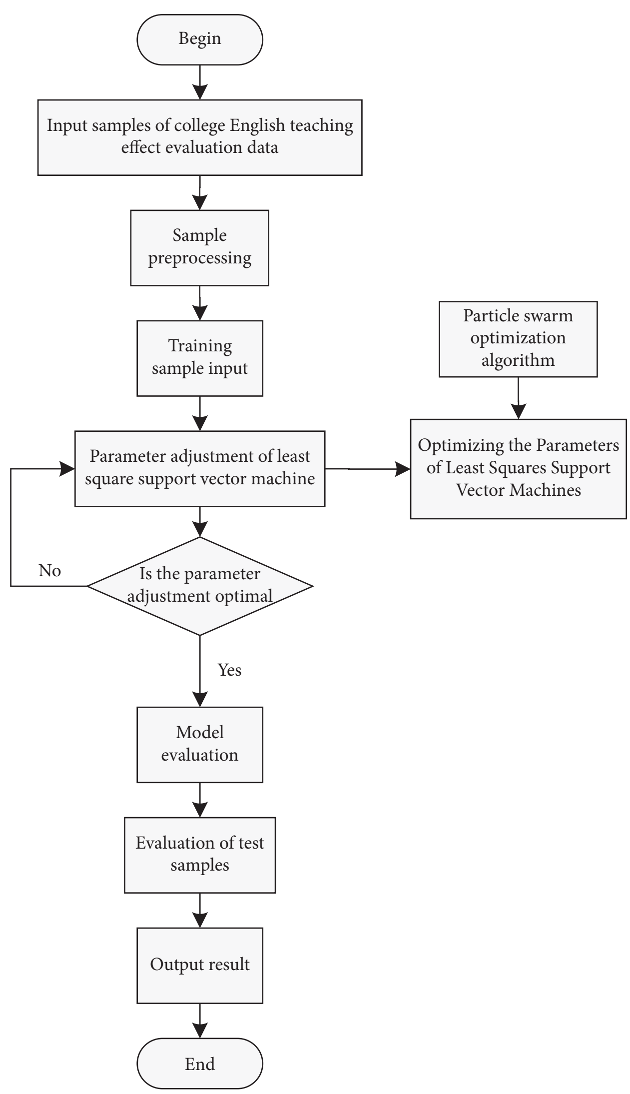


Figure 5: Flow chart of data sample processing by particle swarm optimization algorithm and support vector machine.

*3.4. Index System Analysis.* The evaluation index follows the principles of scientificity, universality, comparability, systematicness, and conciseness. The content of the original index system is simple, the evaluation of human factors is large, and there is no specific standard. To improve the evaluation index system of English teaching, we consulted 10 well-known college English education experts from different levels, and the specific proportion is shown in Figure 6.

We are generally divided into two parts—the student part and the teacher part. Compared with before, we add more feedback evaluation indicators from the student part, to evaluate the teacher's English teaching more comprehensively from the perspective and experience of students. We set up three first-level indicators in the student part and five first-level indicators in the teacher part and design two-level indicators with different numbers under each first-level indicator. As shown in Table 1, the evaluation index system of college English teaching is listed, which lists all the evaluation criteria of secondary indexes.

In particular, it is stated here:

(1) Determining the weight of each index reflects the importance level of an index, $X$ represents the ranking corresponding score, $Y$ represents the weight coefficient, $n$ represents the total number of experts, and $N$ represents the ranking number. The calculation formula of index weight coefficient is as follows:

$$Y = \frac{\sum X \cdot n}{N \cdot \sum X}. \quad (18)$$

(2) The evaluation part of students' English ability can include five parts: listening, speaking, reading, writing, and translation, which are represented, respectively. The calculation formula of their overall scores can be expressed as follows:

$$\begin{aligned}\text{Score}_{\text{English}} = {} & \text{Score}_{\text{Listening}} \times W_L + \text{Score}_{\text{Oral}} \times W_O \\ & + \text{Score}_{\text{Reading}} \times W_R + \text{Score}_{\text{Writing}} \times W_W \\ & + \text{Score}_{\text{Translation}} \times W_T.\end{aligned} \quad (19)$$

## 4. Experimental Analysis

*4.1. Model Testing.* This part mainly tests the model constructed in this study and selects the English classroom teaching evaluation of the same major in a certain university as the test sample (a total of 200 data samples), which is divided into 10 groups with 20 data samples in each group. To see the test results of this model method more intuitively, the traditional evaluation model, the optimized BP neural network model, and the category weighted grey target decision model are selected for comparative analysis, as shown in Figure 7.

From Figure 7, we can find that the accuracy of English teaching evaluation index of this model method is the highest, and the average evaluation accuracy is as high as 96.56%; compared with the other three methods, this method is 7% higher than the optimized BP neural network method, 18.68% higher than the class-weighted grey target decision method, and 29.49% higher than the traditional method. Therefore, this method has the highest accuracy and the best effect, and its superiority can be seen.

Using these four model methods to test 20 times, respectively, comparing their test time, we can find that the test time of this model method is the least, and the test time can be as low as 13.32 ms. The specific data comparison is shown in Figure 8.

*4.2. Index Scoring Results.* Although the evaluation index system of English teaching created by us has been agreed upon, it still needs to be evaluated by experts in the field of English education for each first-level index and second-level index. It is necessary to ensure the rationality of each index, define the score with 1 to 5 points, and collect the average value, mode, and standard deviation of the score; according to Osbome, if more than two-thirds of the experts' score is above 4 (i.e., the average score of experts is above 3.66), it can be considered that all ten experts have reached a common opinion on this index. Excel is used to count the data of experts on the first-level index and the second-level index, as shown in Figures 9 and 10.

As shown in Figure 9, we can find that the expert scores of eight first-class indicators of A, B, C, D, E, F, G, and H are all greater than 3.66, and the standard deviation is all less than 1. Moreover, only one expert gives 4 points, and the other indicators are all 5 points, which meets the standard of reaching common opinions. Therefore, we can judge that ten experts have reached a consensus on the first-class index. When we observe the data shown in Figure 10, we can find that the average scores of 29 secondary indicators are all greater than 3.66 points, which meets our evaluation criteria, and the standard deviation is all less than 1. All 29 secondary indicators have reached the standard. According to the evaluation results of all indicators, the test system of key indicators in English teaching evaluation in this study is reasonable and meets the requirements of this study.

*4.3. Comparison of Indicator Weights.* After scoring the key test indicators of English teaching in this study reasonably, it is necessary to determine the weight of each indicator, as shown in Figures 11 and 12.

According to Figure 11, we can find that the weight of $C$ index is the least, the weight of $D$ index is as high as 0.205, and the weight of each first-level index is different, which means that each index has a different weight and emphasis for English teaching evaluation, and some indexes are the most important, while others are relatively less important, just a simple reference factor. According to Figure 12, we find that the four secondary indexes of A2, D1, H1, and H2 are all higher than 0.5, the six secondary indexes of A1, B3, C5, E5, F4, and G4 are all higher than 0.3, and the rest indexes are all less than 0.3.

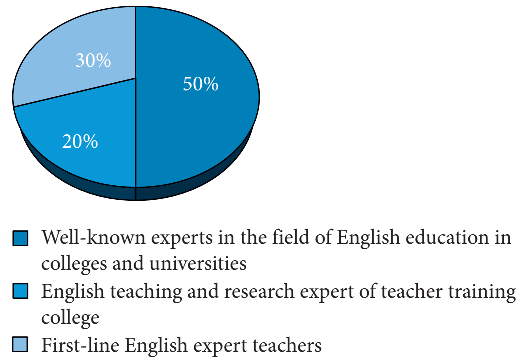


Figure 6: Proportion of expert types.

Table 1: Evaluation index system of college English teaching.

| Classification | First-class index | Secondary index |
|---|---|---|
| Students | A English proficiency | A1 Listen, speak, read, write, and translate |
| | | A2 Words, sentences, text, logical relations, idioms |
| | B Teacher evaluation | B1 Teachers' sense of responsibility |
| | | B2 Teacher's seriousness in correcting homework |
| | | B3 Teacher's attitude |
| | | B4 Teachers' approval of ability |
| | C Teaching evaluation | Reasonable degree of C1 course content |
| | | The quality of C2 classroom atmosphere |
| | | Does C3 course have practical significance? |
| | | The organization and hierarchy of C4 lectures |
| | | C5 Vividness of teaching skills |
| Teachers | D Teaching Plan | D1 formulates a comprehensive curriculum ideological and political teaching plan and selects teaching contents rich in ideological and political elements |
| | | D2 adjusts the teaching plan in time to ensure that it is completed on time |
| | E Teaching methods | E1 is full of teaching content and large amount of information |
| | | E2 teaching content can reflect or connect with the development frontier of the subject |
| | | E3 organizes diversified ideological and political teaching forms, which can effectively use multimedia teaching |
| | | E4 open classes or elective courses |
| | | E5 participates in the construction of online teaching resources |
| | | E6 undertakes teaching reform projects or publishes teaching-related papers and monographs, etc. |
| | F Teaching process | F1 teaching content conforms to the syllabus, and the amount of lecture information is reasonable and rich |
| | | F2 English phonetic standard, language flow 1 smooth; explains the problem with clear thinking and clear rules |
| | | Chu; can highlight key points, disperse difficulties, and grasp key points |
| | | F3 caring for students, teaching and educating people, enhancing the sense of contrast between China and the West, enhancing the ability of value speculation, improving cultural self-confidence, enhancing cultural comparison ability, and cultivating philosophical consciousness |
| | | F4 class is full of energy, infectious, and can attract students' attention |
| | G Teaching attitude | G1 is serious about teaching work and strictly manages classroom discipline |
| | | G2 answers students' questions seriously, and both teaching and learning learn from each other |
| | | G3 attaches importance to homework information feedback, makes timely comments, and completes performance registration |
| | | G4 class time arrangement is reasonable, not late, not delayed |
| | H Teaching effect | The H1 course has a high degree of ideological and political participation, and the effectiveness of educating people is in line with the society |

*4.4. Teacher Ability Assessment.* The evaluation system of key indicators of English teaching based on big data model established in this study can be formally tested after evaluation. This test is mainly aimed at English proficiency, and the evaluation criteria for English proficiency data analysis are shown in Table 2.

The decimals in Table 2 represent the weight ratio of the index for the English proficiency level. For example, the

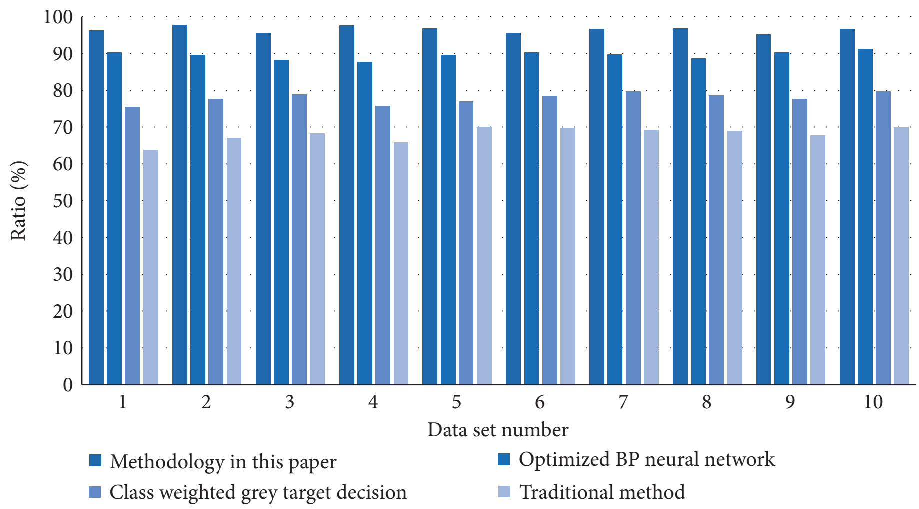


FIGURE 7: Comparison results of evaluation accuracy.

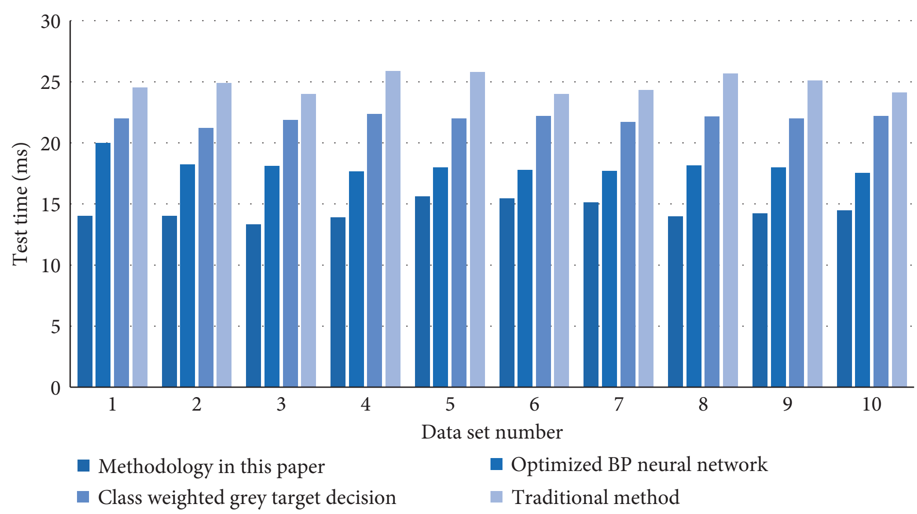


FIGURE 8: Comparison of test time data.

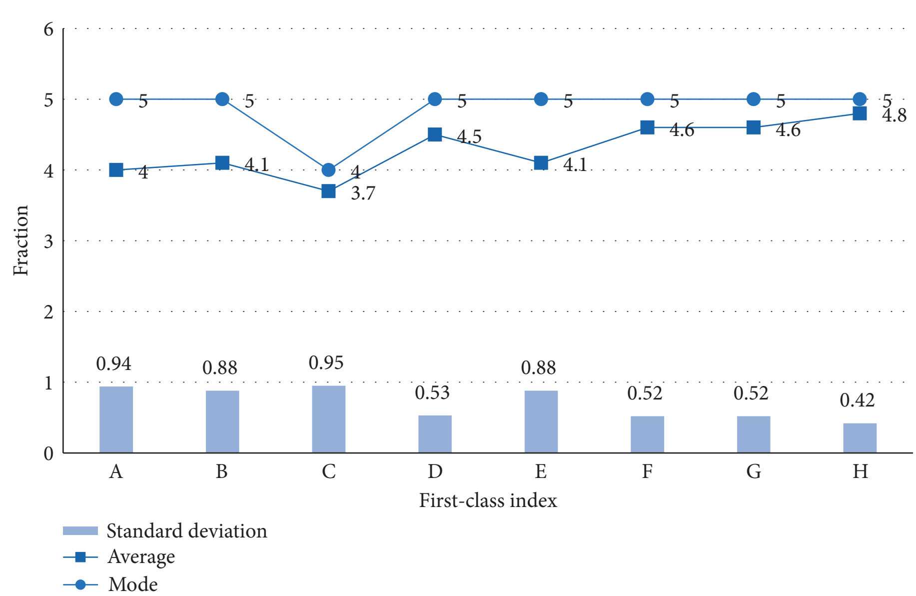


FIGURE 9: Scoring statistics of first-class indicators.

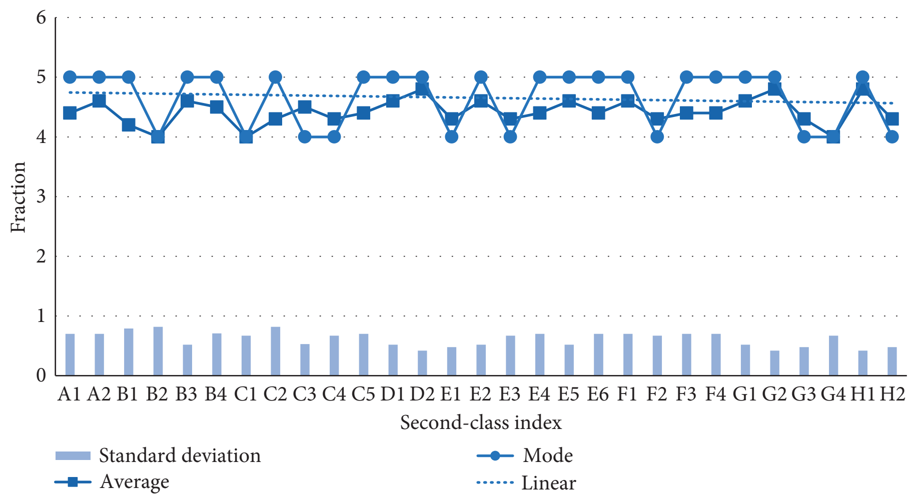


Figure 10: Scoring statistics of secondary indicators.

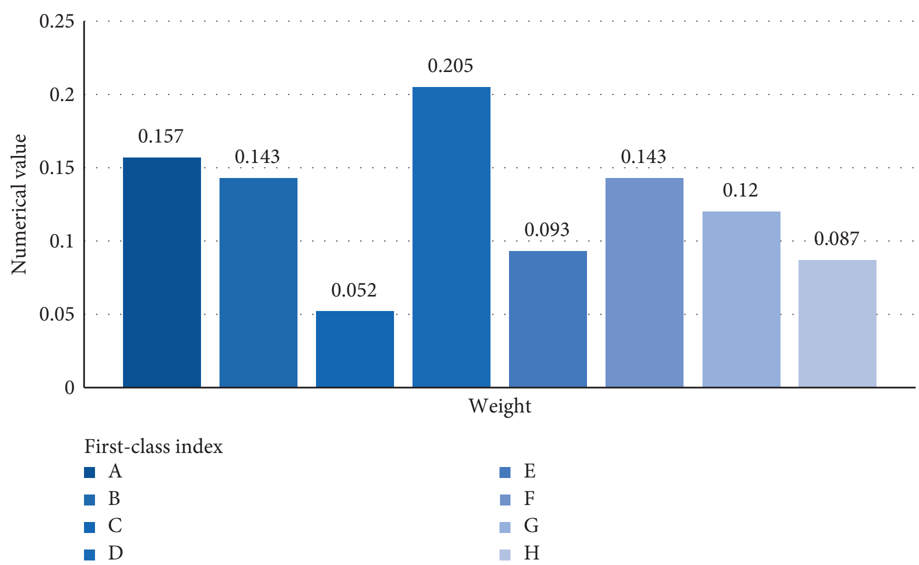


Figure 11: Weight of first-level indicators.

weights of the five subordinate indicators of listening are 0.2 for words, 0.2 for sentences, 0.2 for texts, 0.3 for logical relations, and 0.1 for idioms. The weights of the five indicators add up to exactly 1. The remaining indicators are the same.

As shown in Figure 13, we first invited a teacher to test and analyze his English proficiency. The scores measured by this model and index system are compared with those obtained by the original evaluation system, and we can find that there is little difference in the evaluation of his listening, speaking, and translation abilities, while the results of reading and writing abilities are relatively deviated due to different evaluation standards due to subjective factors. The method in this study can effectively correct the errors and make an accurate judgment of the teacher's ability. On the whole, the teacher's writing ability is extremely strong and his listening ability is strong; however, the ability of speaking and translating is about 0.8, which needs further training and strengthening.

As shown in Figure 14, we further take the teacher's listening ability as an analysis case for detailed test, and we can find that the evaluation and correction effect of text and logic relationship are the greatest, and both abilities are closest to the perfect score standard. However, the ability of idioms and sentences is relatively average, about 0.8, so the teacher needs to analyze and formulate strategies to improve his level according to these two points. Thus, the model test in this study can effectively analyze the key indicators of English teachers, and then, teachers can improve their abilities and correct their mistakes according to the relevant data.

Finally, we select 10 teachers of the same major to score English teaching comprehensively, of which students account for 0.5 and teachers account for 0.5. We can find that when there is a big difference between students' scores and teachers' scores, we can effectively integrate the two and give a fairer test result, as shown in Figure 15.

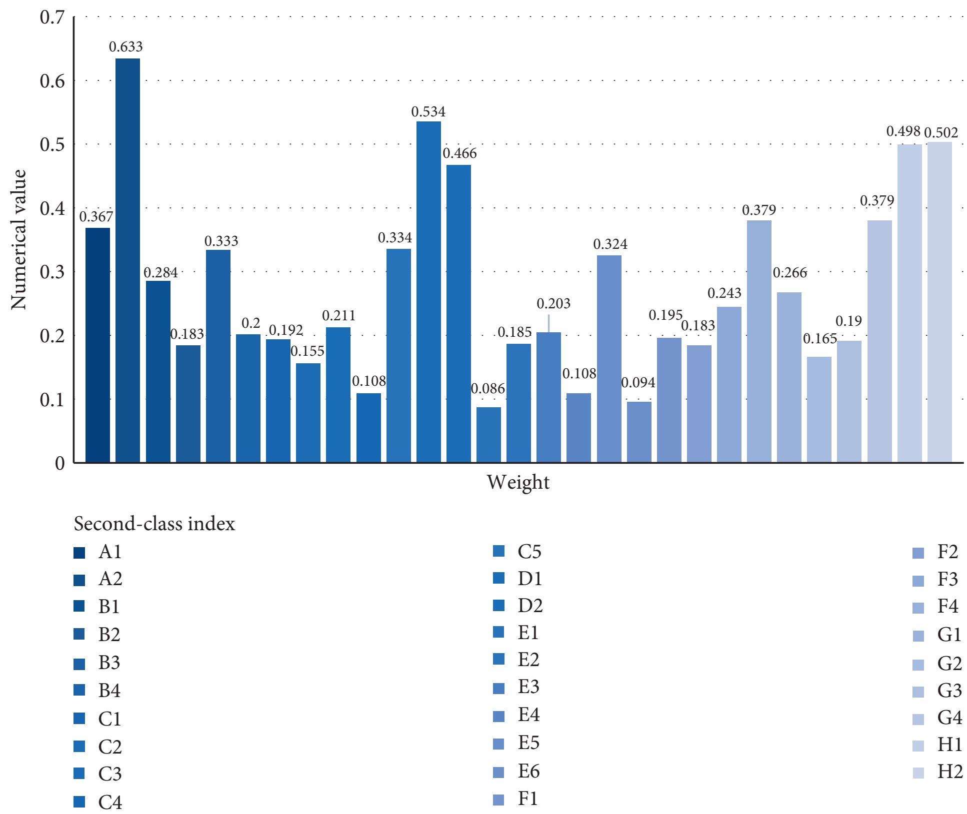


Figure 12: Weight of secondary indicators.

Table 2: Evaluation of English proficiency.

| Name | Specific classification | | | | |
|---|---|---|---|---|---|
| Listen | Word 0.2 | Sentence 0.2 | Text 0.2 | Logical relation 0.3 | Idiom 0.1 |
| Say | Pronunciation 0.5 | Broken sentence 0.3 | Tone and intonation 0.2 | — | — |
| Read | Vocabulary 0.3 | Sentence pattern 0.3 | Syntax 0.4 | — | — |
| Write | Vocabulary 0.5 | Format 0.2 | Organizational structure 0.3 | — | — |
| Translated | Interpretation 0.4 | Translation 0.4 | Shorthand 0.2 | — | — |

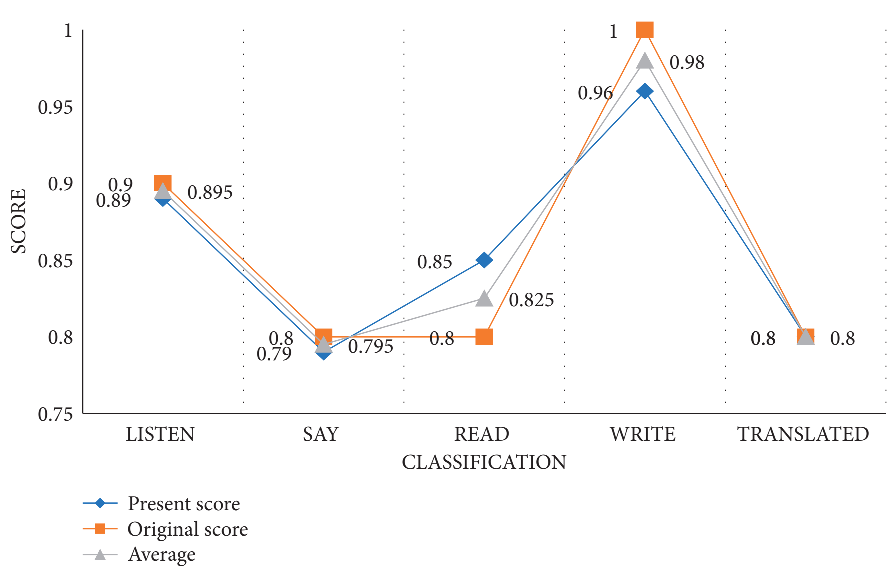


Figure 13: A teacher's English level.

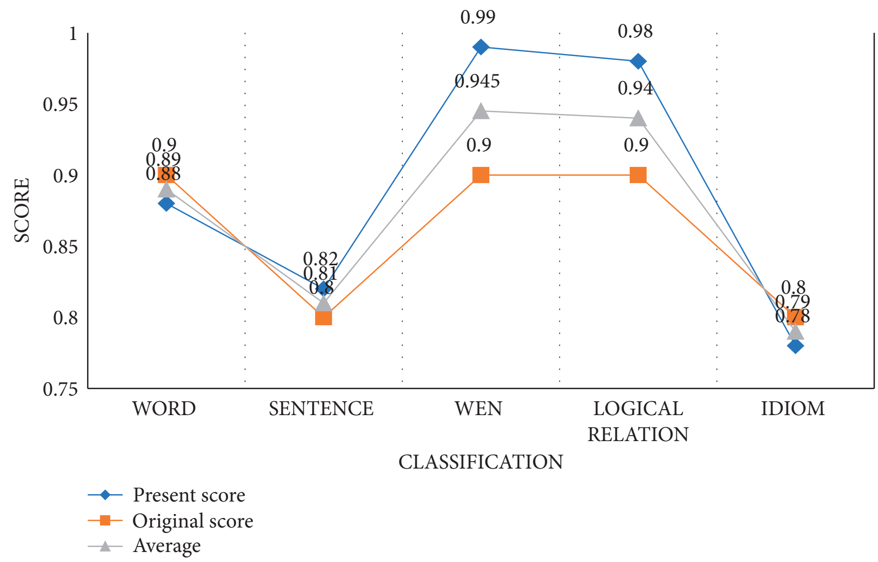


Figure 14: Analysis of a teacher's listening ability.

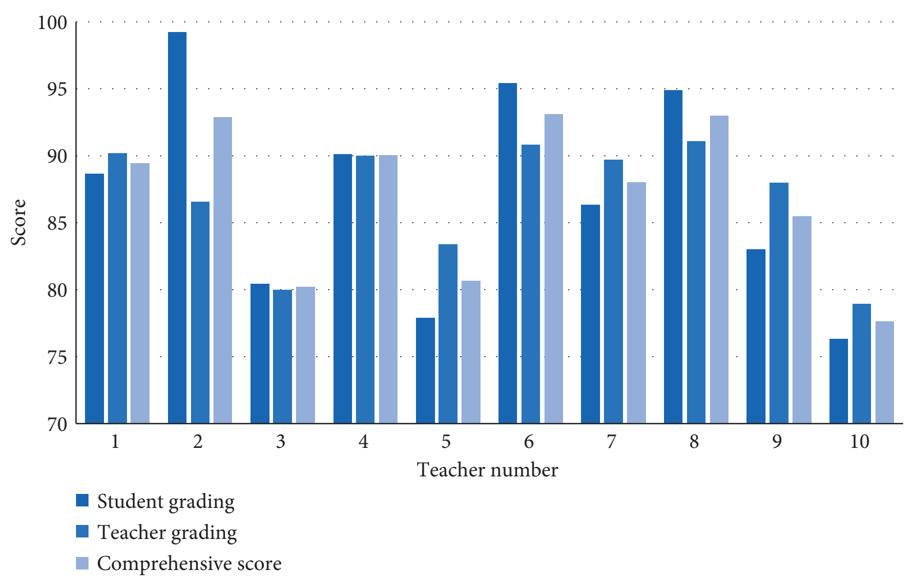


Figure 15: Comprehensive score.

The sample size of the evaluation was corrected by referring to the method of similar evaluation and repeating the experiment, so as to minimize random errors. The number of students participating in the scoring was determined to be 30 students of different majors, with a ratio of 3 : 1 to the number of teachers. Comprehensive scoring is to score each evaluation index according to the evaluation criteria of different indicators, and then, weighted addition is used to obtain the total score.

## 5. Conclusion

In the new era, teachers are given heavier responsibilities and obligations. How to be closer to the needs of society and students and how to accurately evaluate the overall level of teaching quality, so as to better teach students to learn English content, are urgent tasks. The method proposed in this study to analyze English teaching evaluation indicators using big data model has the advantages of short evaluation time, high operation efficiency, clear key indicators, and best effect. It effectively extracts the characteristics of English teaching and students' needs, helps English teachers to improve the evaluation system of teaching effect and improve the comprehensive quality of classroom education, and has extremely important practical research significance.

The research results of this study show the following:

(1) The average evaluation accuracy of the model designed in this study is as high as 96.56%; after 20 tests, the test time of this model method is the least, and the test time can be as low as 13.32 ms.

(2) For eight first-class indexes of A, B, C, D, E, F, G, and H and 29 second-class indexes, the expert scores are all greater than 3.66, and the standard deviation is all less than 1, which accords with the standard of reaching common opinions. The key index test system is reasonable.

(3) We find that the weights of A2, D1, H1, and H2 are all higher than 0.5, the weights of A1, B3, C5, E5, F4, and G4 are all higher than 0.3, and the weights of other indexes are all less than 0.3. This shows that each index has a different weight and emphasis on English teaching evaluation.

(4) Taking a certain teacher as an example to assess English proficiency can effectively analyze the key indicators of English teachers and enable the teacher to make corresponding improvements and formulate strategies. On the whole, the teacher has strong writing ability and listening ability; the ability of speaking and translating is slightly weak, both of which are about 0.8; for listening analysis, idiom and sentence ability are generally to be enhanced, about 0.8.

(5) The comprehensive scoring of English teaching is carried out, large difference in scoring values is avoided, and fairer test results are given.

Although the results of this method have obvious advantages, however, the test samples of this study only focus on the evaluation of English teaching-related indicators. The sample size is low and the test scope is not large, so the research conclusion of this study still has certain limitations and inaccuracy, which needs further research to verify its universality, make the whole English teaching evaluation system more complete and scientific, and strive to make big data-related technologies create more practical value.

## Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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