

Research Article

Evaluation Model of Teachers' Teaching Ability Based on Improved Random Forest with Grey Relation Projection

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The development and improvement of teachers' teaching ability is the guarantee to continuously improve the overall teaching ability and school running level of universities. Therefore, it is of great significance to scientifically evaluate teachers' teaching ability. Aiming at the problems of traditional algorithms, such as weak generalization performance and difficult determination of parameters and model structure, a random forest algorithm is introduced into the field of teaching ability prediction. At an equal time, the ordinary grey correlation algorithm is accelerated through the usage of the projection principle, and instructor instructing capacity assessment mannequin based totally on grey projection expanded random woodland algorithm is proposed. The grey correlation degree judgment matrix is used to represent the correlation between historical samples and influencing factors, and the weight of influencing factors is established by the direct weight method to weight the judgment matrix. The random woodland algorithm is used to set up the prediction model, the grey projection is used to display screen the pattern set education model, and ultimately, the characteristic vector is entered to whole the prediction. The experimental results show that the new method has high prediction accuracy, robustness, and effectiveness. It not only enriches the evaluation methods of teachers' teaching ability but also provides a quantitative evaluation model reference for teachers' teaching ability evaluation.

1. Introduction

With the deepening of the popularization of education, the structure of school teachers has also changed greatly. Teachers' teaching ability not only affects the teaching ability and effect but also the key factor to improve the overall teaching ability and talent training quality of the school [1]. It is of great significance to strengthen the construction of teachers and maintain the sustainable development of colleges and universities. In order to scientifically manage and guide teachers' teaching level, it is very important to objectively evaluate their teaching ability level. With the deepening of the new curriculum reform, the role of teachers needs to be changed urgently. Education puts forward higher requirements for teachers' teaching ability [2]. Teaching ability is the core content of teachers' ability. How

to improve teachers' teaching ability has become the focus of research. As an important part of teaching work, teaching ability evaluation is an important means to judge teaching level and improve teaching ability; it plays a vital role in strengthening modern teaching management. The evaluation of teachers' teaching ability is a multi-index comprehensive evaluation problem [3]. At present, the evaluation methods of teachers' teaching ability mainly include the fuzzy comprehensive evaluation method, analytic hierarchy process, neural network method, and diversified teaching evaluation methods combining the two. These methods provide scientific means and theoretical basis for the research of teachers' teaching ability evaluation and greatly enrich the evaluation content of teachers' teaching ability [4]. However, there are too many artificial factors in the model construction of these methods, which is not

conducive to the further improvement of prediction accuracy and speed. Therefore, in today's diversified trend of teachers' teaching ability evaluation, it is very important to choose scientific and effective teaching evaluation methods. However, in teaching evaluation, due to the influence of various human factors, its evaluation system presents a certain grey characteristic, which cannot be well handled by the traditional evaluation methods. The grey correlation analysis law is just suitable for the objective needs of this grey factor analysis, and it can better analyse the grey system with incomplete information.

Using the theoretical method of educational evaluation to judge whether the educational ability and its process meet certain quality requirements is the evaluation of teaching ability. In education and teaching activities, teaching design, classroom teaching, and teaching evaluation are essential [5]. Evaluation is an objective and comprehensive evaluation of teachers' teaching ability under the guidance of correct values. The evaluation of teachers' teaching ability is a comprehensive work and a purposeful and planned teaching activity. It needs to systematically use various evaluation technical means to analyse various factors affecting teaching ability, continuously improve teachers' teaching ability, and then improve the level of education and teaching. In order to effectively evaluate the teaching ability, we propose a teacher's teaching ability evaluation model based on the improved random forest algorithm of grey projection [6]. On the basis of mastering the specific implementation process, content, methods, and methods of education and teaching, we use the grey system theory and method to take the teacher's teaching ability as the system output and the teaching ability evaluation index as the system input and establish the corresponding evaluation model.

Taking teachers' curriculum ability as the research object, this paper explores the application of the correlation analysis method of grey system theory in the field of educational research and makes a simple improvement. While trying to find out the relevant advantageous factors affecting teachers' curriculum design ability and provide a basis for the improvement of teachers' curriculum design ability, we should find the methods, advantages, and defects of the application of grey system theory in educational research so as to prepare for more in-depth research in the future. The sections of this paper are arranged as follows: Section 1 introduces the background and significance of this subject. Section 2 introduces the relevant research work at home and abroad. Section 3 analyses the improved random forest prediction model based on grey projection. Section 4 introduces the evaluation and analysis of teachers' teaching ability. Section 5 analyses the evaluation results. Section 6 summarizes the full text and prospects the future research direction.

2. Related Work

The set of elements of teaching ability is expressed as the teaching ability model. Explaining the constituent elements of teaching ability is a common research topic of educational researchers, policy makers, and teachers all over the world.

However, due to the different researchers' backgrounds, theoretical perspectives, and focus, the research results of the constituent elements of teaching ability show some differences, and the levels and shapes of the teaching ability model are also different.

In the early stage, foreign countries mainly explained the structure of teaching ability by studying teachers' personality characteristics. Later, they mainly studied teachers' effective behaviour in teaching activities from the perspective of teachers' teaching effectiveness and teachers' teaching result evaluation, and further constructed the teaching ability model [7]. For example, Simpson used the rating method to self-evaluate teachers; the teaching abilities involved in the research include knowledge transfer ability, teaching organization ability, and interpersonal relationship processing ability [8]. After in-depth investigation and research, the Florida committee on teacher education in the United States proposed five categories, a total of 23 teachers' general teaching abilities. The five categories are as follows: communication skills, basic knowledge, technical skills, classroom management skills, and interpersonal skills. Through research, a streamer located that the instructing capability mannequin of university instructors consists of two majors and three skills. Some scholars believe that the model is too rigid and cannot be well applied to modern teaching; we should pay attention to the role of teachers' personality in teaching [9]. Therefore, Korthagen pointed out that a teacher's personality is very important; Lodwick also stressed that the most important thing is not the teaching behaviour itself but the teacher's personality.

In terms of research content, Chinese scholars pay more attention to teachers' behaviour ability and less study whether teachers' teaching behaviour effectively promotes students' development from the perspective of students who are in the main position of learning, while foreign researchers pay more attention to the effectiveness of teachers' teaching ability in promoting students' development [10]. At the identical time, the significance of teachers' private qualities or persona qualities in teachers' instructing potential mannequins is turning into greater and extra prominent. In terms of research methods, inductive and deductive method, Delphi method, and behaviour event interview method are the common research methods for constructing the teaching ability model. In recent years, more research methods of questionnaire survey and statistical analysis have been used [11]. Some scholars have tried to use a variety of methods to construct and verify the teaching ability model and enhance the scientific of the model. In addition, in recent years, some scholars began to explore the use of qualitative research methodology and data coding based on grounded theory to construct a teaching ability model so as to enrich the research paradigm in this field [12]. The interview information processing approach used in this study to assemble the theoretical framework of neighborhood schooling teachers' instructing capacity mannequin is the grounded principle coding approach [13].

There are mainly two ways to construct the teaching ability model: one is to deduce from top to bottom based on psychology and other related theories, and the other is to

summarize from bottom to top based on teaching practice and teacher cognitive survey [14]. Most of the teaching abilities mined by these two methods are general teaching ability elements at the macrolevel. Only some researchers pay attention to the teachers' teaching ability of specific disciplines and topics. In the applicability test of the teaching ability model, a few studies have tested the proposed teaching ability model at the practical application level [15]. Most researchers stay at the theoretical output level, and the guiding significance for practice needs to be verified. Only a few researchers have applied the proposed teaching ability structure model to the field of practice.

3. Improved Random Forest Prediction Model Based on Grey Projection

3.1. Random Forest Algorithm. Random forest method is an integrated learning algorithm proposed by Bierman et al. Random forest is a classifier composed of multiple cart decision trees according to certain rules. The classification results are obtained by voting all decision trees [16]. Because the classification accuracy of a single decision tree (CART) is not high, Bierman et al. proposed the bagging algorithm; this method uses the bootstrap repeatable sampling method to extract the same number of training sample subsets for each decision tree from the original training set samples so as to effectively improve the generalization ability of random forest [17]. Flowchart of the random forest algorithm is shown in Figure 1. The training process is as follows:

- (1) Set parameters. Set the feature dimension F , the number of decision trees T , the depth D , the number of features m used by each node, the minimum number of samples s on the node, and the minimum information gain on the node.
- (2) Sample selection. Select the training subset X_i from the sample set X as the sample of the root node.
- (3) Feature division. If the current node has reached the termination condition, set the current node as the leaf node, and the predicted output of the leaf node is c_i with the largest number in the current node sample set. The probability p_i represents the proportion of c_i in the current sample set. If the current node does not meet the termination condition, there is no randomly selected feature f put back from the F -dimensional feature. Using this F -dimensional feature, the one-dimensional feature k and its threshold t_h with the best classification effect are found. The samples whose k -dimensional feature is less than t_h on the current node are divided into the left node, and the rest are divided into the right node; then continue to train other nodes.
- (4) Continuous division. Repeat Steps 2 and 3 until all nodes have been trained or labelled as leaf nodes.
- (5) Output forecast. For each left and right leaf node of t trees, the predicted value is the cumulative probability of c_i class with the largest sum of predicted probabilities in all trees.

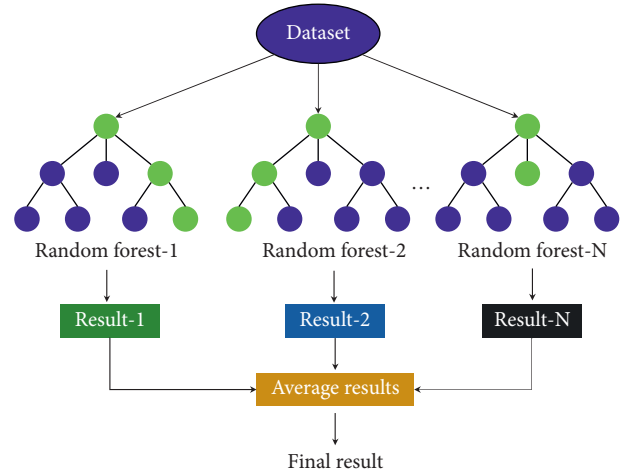


FIGURE 1: Flowchart of random forest algorithm.

3.2. Grey Relational Projection Model. Grey correlation analysis mainly judges the correlation degree by the similarity between the geometry of the sequence curve and that of the ideal optimal sequence. According to the ranking of correlation degree, the advantages and disadvantages of the scheme are judged. The greater the degree of similarity, the greater the correlation degree between sequences, and vice versa. Main calculation procedures are as follows:

Step 1. Calculate the grey correlation coefficient. There are n objects; each object has m indicators, and the evaluation index data are standardized to form the evaluation matrix. Let x_0 be the reference factor and compare the factor series x_i , $i \in m$. Because the dimensions of each series are inconsistent, the average image method is used to normalize the original index series, and the correlation coefficient between x_0 and the k -th element is

$$\gamma_{i0} = \frac{\min |x_{0j} - x_{ij}| + \rho(j) \max |x_{0j} - x_{ij}|}{|x_{0j} - x_{ij}| + \rho(j) \max |x_{0j} - x_{ij}|} \quad (1)$$

Step 2. Determine the index weight. When determining the weight of evaluation indicators, subjective methods that are prone to bias are often used. In information theory, the direct value reflects the degree of information disorder. The utility of the obtained system information can be evaluated by the direct value of information, and the index weight can be determined by the judgment matrix composed of the evaluation index value so as to make the evaluation result more in line with reality.

Step 3. Calculate the grey correlation projection value. Let the weighting vector between the evaluation indexes be $w' = (w'_1, w'_2, w'_3, \dots, w'_n)$, and the calculation formula is

$$w'_j = \frac{\sum_{k=1}^M w_{ik} \times w_{jk}}{\sqrt{\sum_{k=1}^M w_{ik}^2} \cdot \sqrt{\sum_{k=1}^M w_{jk}^2}} \quad (2)$$

Let Z^* be the weighted grey correlation coefficient matrix, where

$$Z^* = \frac{(w_j' r_{ij})_{(m+1) \times n}}{m+n}. \quad (3)$$

The included angle θ between Y_0 and Y_i is the projection angle.

$$\cos \theta_i = \frac{\sqrt{Y_i^*} \times \sqrt{Y_0}}{\sqrt{\|Y_i\|} \times \sqrt{\|Y_0\|}} \quad (4)$$

where d_i is the module of Y_i ; then, the grey correlation projection value of Y_i on Y_0 is

$$P_i = \frac{\sum_j w_j' r_{ij} w_j'}{(w_j')^2} * d_i, \quad (5)$$

where $\bar{w}' = (\bar{w}'_1, \bar{w}'_2, \dots, \bar{w}'_n)$ is the grey relational projection weight vector of the index. The larger the projection value, the closer the evaluation sample is to the reference sample.

3.3. Grey Projection Improved Random Forest Algorithm Flow. The steps of the improved random forest algorithm based on weighted grey relational projection proposed in this paper are as follows:

- (1) Similar selection of historical sample sets. The weighted grey relational projection method is used to form a similar sample set with high similarity.
- (2) Bootstrap resampling is performed on similar sample sets to generate k training sets
- (3) The corresponding k cart decision trees are generated according to the algorithm. In this process, the number of randomly selected features is $M_{try} = \log_2(M+1)$ (M is the dimension of sample input features), and the size of N_{tree} needs to be adjusted according to the prediction results.
- (4) Input the feature vector $Y_0 = [y_{01}, y_{02}, \dots, y_{0m}]$ to be predicted into the above random forest model, calculate the average output of each tree, and obtain the load forecasting results. The overall algorithm flow is shown in Figure 2.

4. Evaluation and Analysis of Teachers' Teaching Ability

4.1. Comprehensive Evaluation Index System of Teaching Ability. Determining a scientific and reasonable evaluation index system of teaching ability is the primary task of teaching ability evaluation. Many scholars at home and abroad have conducted in-depth research on the evaluation index system of teachers' teaching ability [18]. Some scholars mainly focus on the evaluation of teachers' teaching ability, which generally includes the first level indicators such as teachers' working attitude, teaching and scientific research ability, and specific knowledge literacy, and then the next level indicators are set [19]. Some scholars focus on the

evaluation of classroom teaching, generally including teachers' moral education, teaching attitude, classroom teaching ability, teaching methods, teaching valley, and other primary indicators, and then secondary indicators are set. However, the teaching process is a complex system composed of many factors affecting the teaching ability, such as school, teachers, teaching environment, students, and teaching resources. Each movie bar branch has interacted and affected the instructing capacity together. From the point of view of instructors themselves, teachers' quality, instructing attitude, educating content material, and educating strategies have an effect on instructing ability. Teachers' quality is an important indicator of the good link of teaching ability, which can be considered from the two main dimensions of teaching and scientific research.

Teaching attitude directly affects the effect of classroom teaching, which can be evaluated from two aspects: the attitude towards teaching and education. The teaching content mainly considers the problem of "what to teach" to students, which should be evaluated in combination with the specific subject content. Finally, the teaching method is the problem of "how to teach." It is not only a measure for teachers to implement teaching activities but also an important means to improve teaching ability. The emergence of different teaching effects must be related to specific teaching methods [20]. Generally speaking, educational strategies broadly include three aspects: unique instructing methods, the use of educating media, and the structure of educating organization. By summarizing the research results of the existing teaching ability evaluation index system, combined with the results and data of in-depth interviews and questionnaires with some teachers and students of the Southwest University of science and technology, we use the analytic hierarchy process to obtain the teaching ability evaluation index. These indicators mainly include teaching methods, teaching content, teaching attitude, teaching effect, teachers' basic quality, and basic skills, which basically cover the content of teachers' teaching ability evaluation. On this basis, a comprehensive evaluation index system of teaching ability is constructed.

4.2. Application of Teaching Ability Evaluation Model.

From the comprehensive evaluation index system of teaching ability constructed in this paper, it can be seen that there are many factors affecting teaching ability, and the relationship between the influencing factors is complex. Therefore, the evaluation process of teaching ability can be simulated as a complex system; that is, the system can be studied with teaching ability as the system output and teaching ability evaluation index as the system input [21]. Based on the grey system theory and method, the system establishes the dynamic equation of system simulation, fits the system dynamic equation with the historical data of teaching ability evaluation so that the system has the function of teaching ability evaluation, tests and determines the effectiveness and reliability of the model with empirical data, and finally extrapolates to the future so that the established system has an independent function of

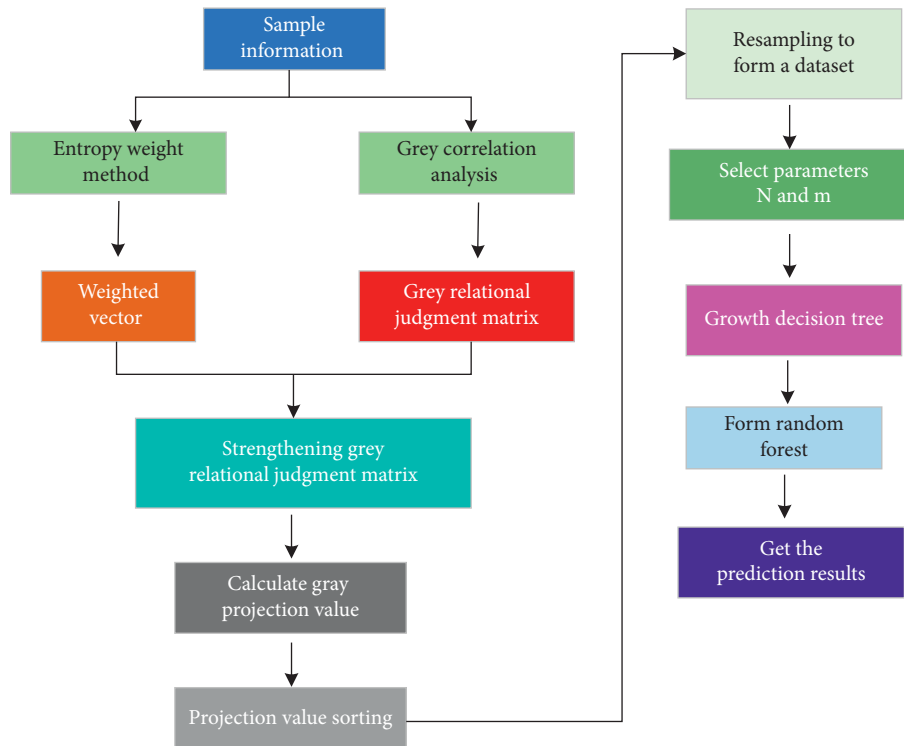


FIGURE 2: Process of grey projection improved random forest algorithm.

prediction, evaluation, and analysis. The established system with an input-output relationship can clarify the reasons affecting teaching ability through the analysis of the value of each evaluation index and the evaluation results of teaching ability, and make targeted improvements to improve teaching ability.

Based on the characteristics of the teaching ability evaluation system, we choose grey system theory to simulate it. Grey system theory points out that through the generation process of discrete random numbers, it can become a more regular generation sequence with significantly weakened randomness, provide intermediate information for grey data modelling, and weaken the randomness of original data [22]. On the basis of obtaining the regular generated sequence, we can make a long description of the data generation process and even determine the coefficients of the differential equation so as to establish a differential equation model reflecting the correlation between the input and output of the system, simulate and predict the system according to the differential equation model, and then restore the results obtained from the simulation prediction to the initial discrete random number [23].

In order to evaluate teaching accurately and effectively, an evaluation model is established, as shown in Figure 3. The main functions of the model are as follows: it can calculate the comprehensive evaluation value of the evaluation object and sort it accurately, including the student score of self-evaluation, which can fully reflect the teaching ability; timely and effective teaching evaluation feedback has the effect of internal regulator, which can stimulate the common development of both sides of teaching and promote the comprehensive improvement of teaching ability [24].

The core of the model is the evaluation method in this paper; the fuzzy comprehensive evaluation method is improved by using the theory of correlation degree in grey system theory fuzzy comprehensive evaluation method and is a method to comprehensively evaluate the evaluation object based on the fuzzy set theory of fuzzy mathematics. It conforms to the fuzziness of educational phenomena and can be summarized comprehensively to gather the opinions of various appraisers [25]. The analytic hierarchy process is used to determine the weight, which solves the problem that it is difficult to make accurate analysis only by qualitative analysis and logical judgment without quantitative analysis. The grey correlation degree in the grey system theory is a method to analyse the correlation degree of various factors in the system [26]. The fuzzy comprehensive evaluation method is improved by using the correlation degree; it overcomes the disadvantage of only considering the maximum membership when using the maximum membership principle, losing more information, and even drawing abnormal conclusions.

5. Results and Analysis

5.1. Analysis of Recognition Degree of Teaching Ability Index. According to the model of teachers' teaching ability, 20 secondary indexes of teachers' comprehensive teaching ability evaluation system are given. Practical teaching and classroom teaching belong to the dimension of teaching work and intersect with the dimension of teaching activities such as teaching cognitive ability, teaching design ability, teaching implementation ability, teaching evaluation ability, teaching research ability, and teaching innovation ability.

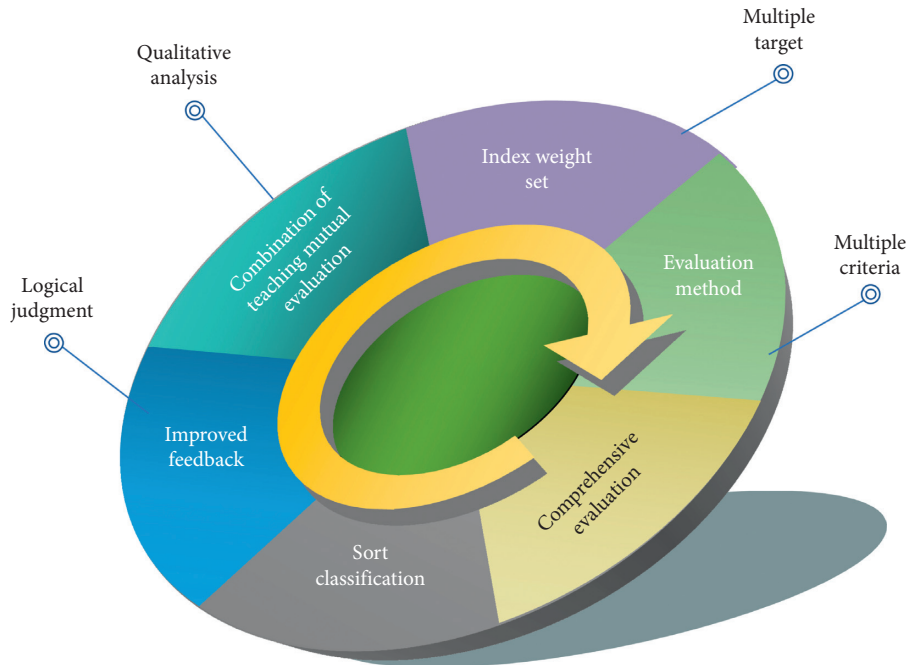


FIGURE 3: Process of teaching ability evaluation.

However, in order to highlight the practical characteristics of teachers' comprehensive teaching ability, in the evaluation index system of teachers' comprehensive teaching ability, we should highlight the practical teaching ability and evaluate the practical teaching ability under the primary index of teaching skills. Teachers' professional efficacy is an important factor affecting the sustainable development of teachers' teaching ability, which should be evaluated in the secondary indicators of personality traits. Discipline construction and specialty construction are the basis of curriculum construction. Teachers' participation in specialty construction and discipline construction is conducive to the improvement of teachers' teaching ability. The specialty construction ability and discipline construction ability are evaluated in the indicators of teaching technology.

It can be seen from Figure 4 that except for the four secondary indicators of career planning, career efficacy, professional construction ability, and discipline construction ability, the teacher-student recognition scores of the other 20 secondary indicators are above 3.50. The teacher-student recognition scores of professional efficacies are lower than 3.50, and one of the teacher recognitions scores and student recognition scores of professional construction ability and discipline construction ability is lower than 3.50.

The primary indicators in the preliminarily constructed evaluation index system of teachers' comprehensive teaching ability are screened twice. The scores of each primary indicator in the secondary screening are shown in Figure 5.

It can be seen from Figure 5 that the evaluation scores of the subjects' teachers and students on the importance of the three first-class indicators of personality, knowledge structure, and teaching skills in teachers' teaching ability are greater than or equal to 4, indicating that the above three first-class indicators have high recognition between teachers

and students. Therefore, these three first-class indicators are determined as the first-class indicators of teachers' comprehensive teaching ability evaluation index system.

5.2. Screening and Evaluation of Comprehensive Teaching Ability. The secondary indicators in the previously preliminarily constructed evaluation index system of teachers' comprehensive teaching ability are screened again, and the secondary screening scores of each secondary indicator are as follows.

It can be seen from Figure 6 that the evaluation results of the tested teachers on the secondary indicators of the preliminarily constructed evaluation index system of teachers' comprehensive teaching ability are as follows: among the 23 secondary indicators, the evaluation score of 19 secondary indicators is greater than or equal to 4, indicating that the teachers have a high degree of recognition for these 19 secondary indicators. The evaluation scores of the other four secondary indicators are between 3 and 4, indicating that teachers' recognition of these four secondary indicators is general.

It can be seen from Figure 7 that the evaluation results of the secondary indicators of the preliminarily constructed evaluation index system of teachers' comprehensive teaching ability are as follows: among the 23 secondary indicators, the evaluation score of 11 secondary indicators is greater than or equal to 4, indicating that the students have a high degree of recognition of these 11 secondary indicators. The scores of other 12 secondary indicators, such as career orientation, career planning, evaluation knowledge, scientific research knowledge, technical knowledge, student knowledge, teacher knowledge, teaching evaluation ability, teaching innovation ability, teaching research ability, professional

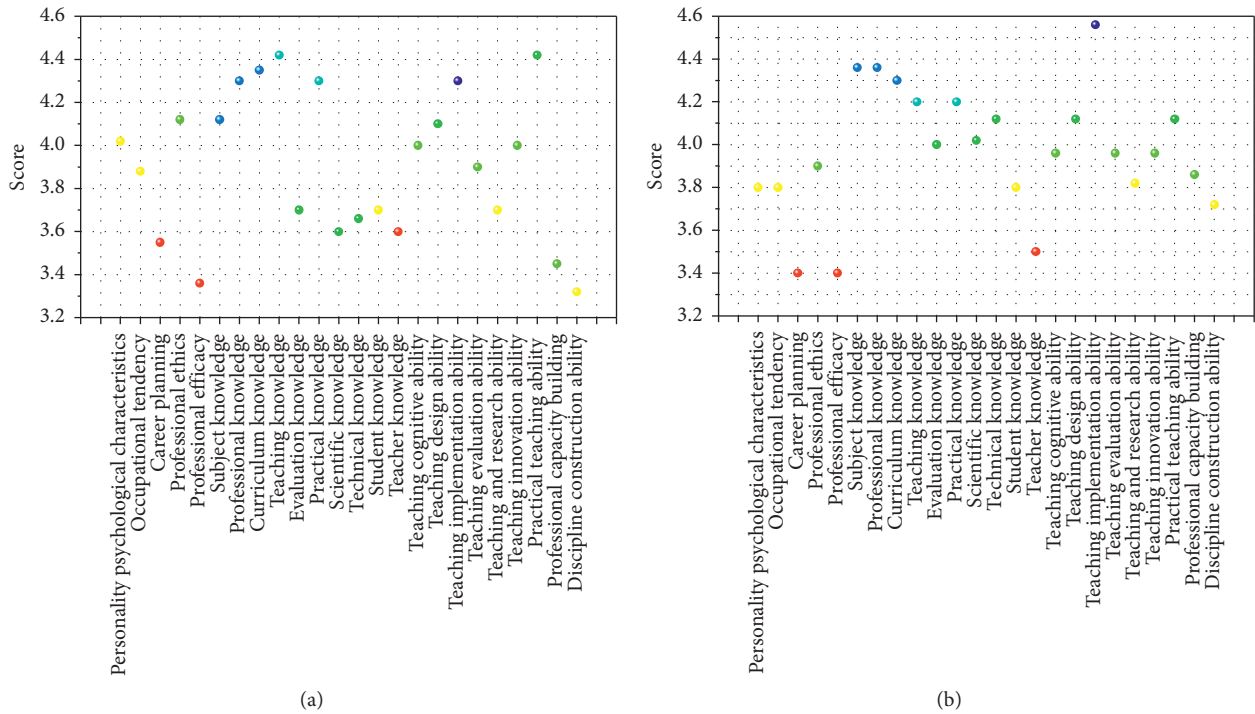


FIGURE 4: Score comparison of index recognition. (a) Student recognition score. (b) Teacher recognition score.

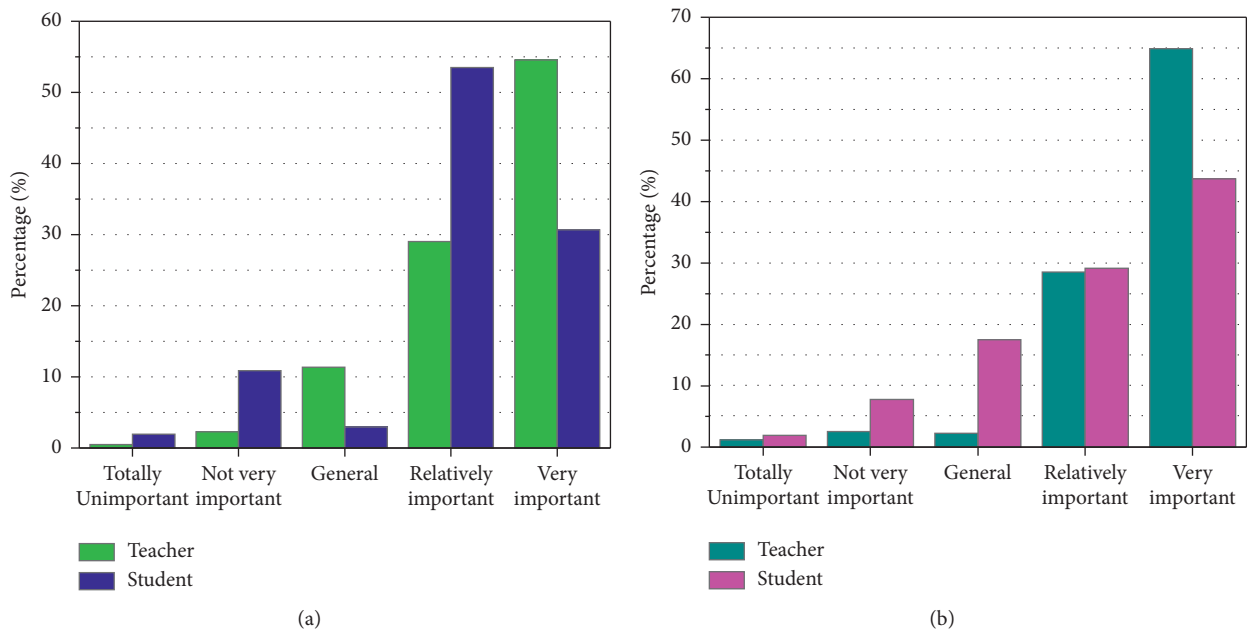


FIGURE 5: Screening results of indicators. (a) Index screening of personality trait. (b) Index screening of knowledge structure.

construction ability, and discipline construction ability, are between 3 and 4, indicating that students' recognition of these 12 secondary indicators is general.

5.3. Reliability Analysis of Evaluation Results. In order to test the reliability of the evaluation scale, the author uses the

evaluation scale to evaluate the teaching ability of 20 teachers selected by convenient sampling. After the evaluation scale is recovered, the evaluation results of different subjects are statistically analysed according to the calculation method of the above comprehensive teaching ability evaluation results. The evaluation scores of different subjects on the comprehensive teaching ability of 20 tested teachers and the TAE

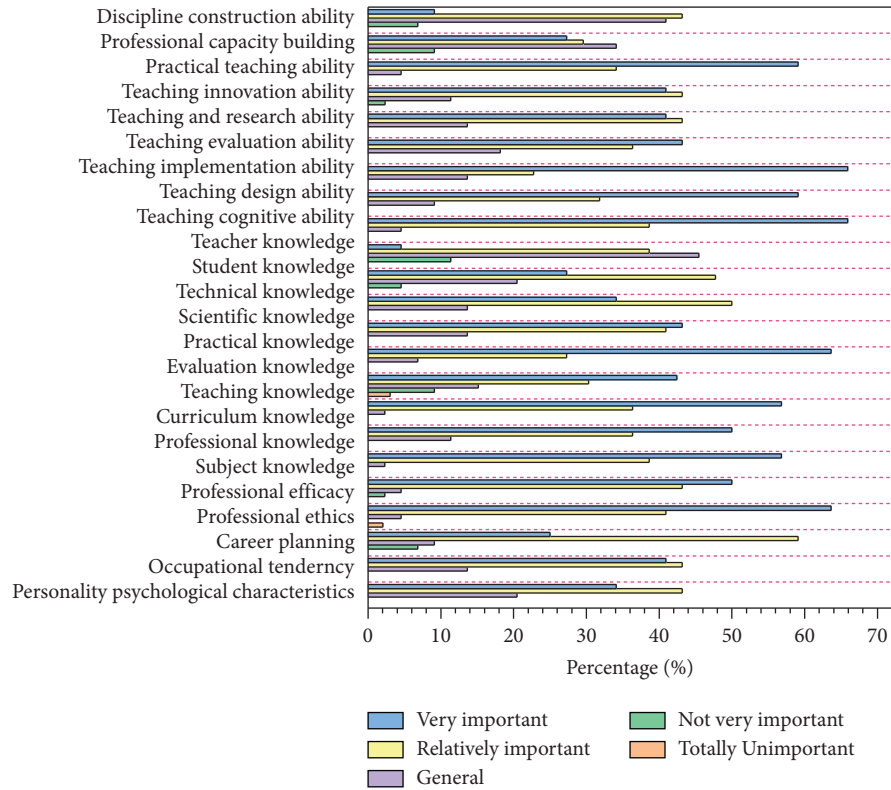


FIGURE 6: Teacher's screening result score.

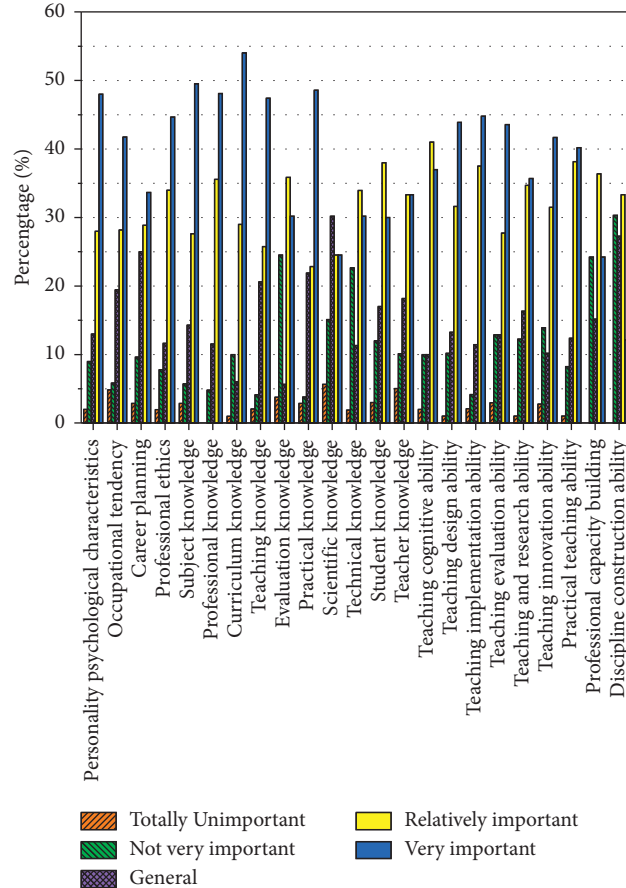


FIGURE 7: Student's screening result score.

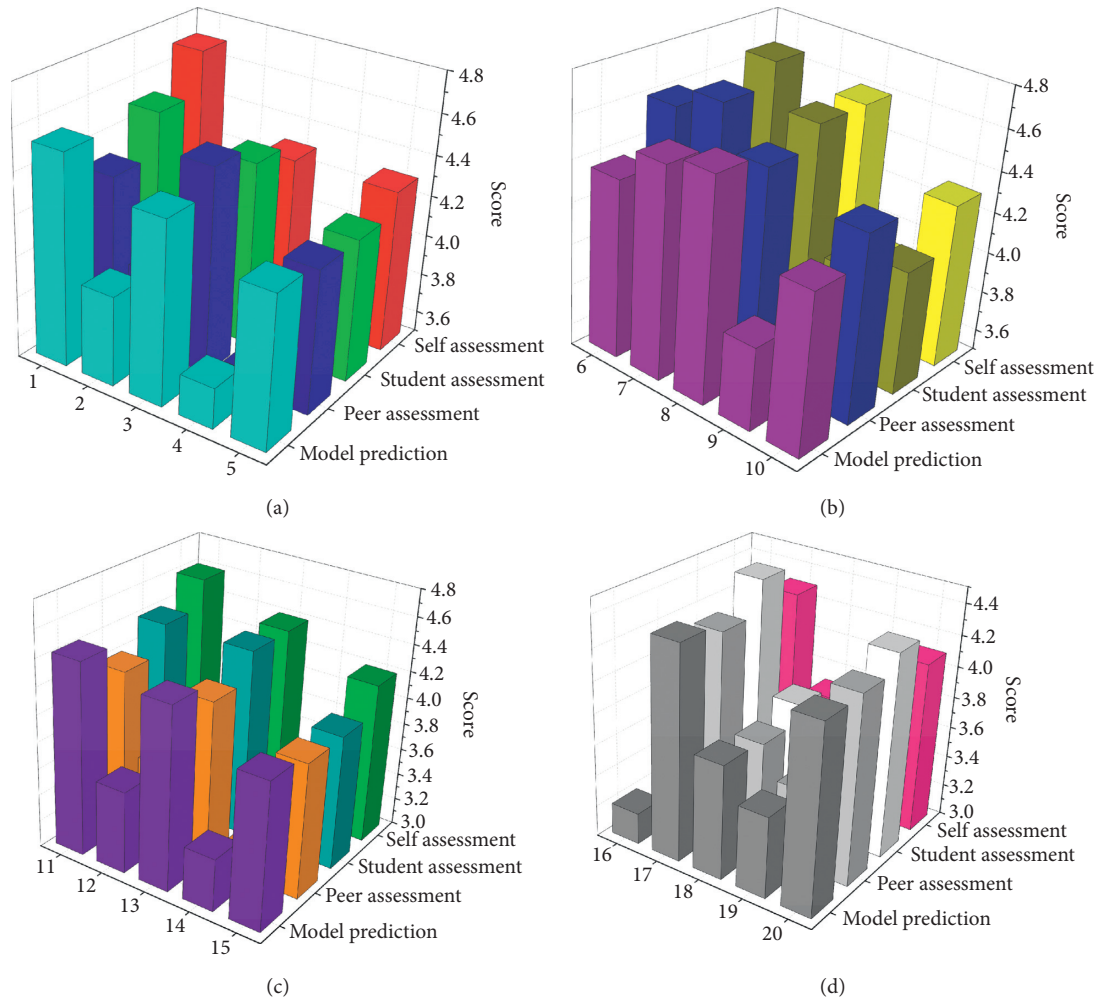


FIGURE 8: Comparison between model prediction and different subjects' evaluation of teaching ability.

evaluation scores and grade distribution of tested teachers are shown in Figure 8.

It can be seen from Figure 8 that the mean values of self-evaluation scores, student evaluation scores, and peer evaluation scores of the tested teachers are 4.07, 4.09, and 4.03, respectively, and the mean value of TAE scores of the tested teachers is 4.06, indicating that the comprehensive teaching ability of the 20 tested teachers is generally at a good level, which is more consistent with the actual situation of the tested teachers. By SPSS 26 by the chi-square test, the difference of TAE scores of 20 tested teachers in different subjects' evaluation is not statistically significant, indicating that unique topics use the complete instructing capacity comparison scale to consider the educating potential of the equal teacher, which proves that the above complete instructing capacity comparison scale has appropriate operability and reliability.

It can be seen from Figure 9 that students' recognition scores for the eight secondary indicators are higher than 3.80 points. Among them, the three indicators with the highest recognition scores are skill training ability, professional practice guidance ability, and knowledge training ability, and the three indicators with the lowest recognition scores

are ability to guide extracurricular activities, ability to organize extracurricular activities, and ability to demonstrate experimental teaching. The recognition scores of ordinary teachers for the eight secondary indicators are higher than 3.91, of which the three indicators with the highest recognition scores are skill training ability, professional practice guidance ability, and knowledge training ability, and the three indicators with relatively low recognition scores are ability to guide extracurricular activities, ability to arrange and raise out extracurricular things to do, and ability to display experimental teaching. Expert teachers' attention rankings of the eight secondary warning signs are greater than 3.95, of which the three indications with the absolute best cognizance ratings are talent coaching ability, double trainer qualification, and know-how education ability. The three indicators with relatively low recognition scores are ability to organize and carry out extracurricular activities, ability to guide and carry out extracurricular activities, and ability to demonstrate experimental teaching.

It can be seen from Figure 10 that students' recognition scores for the two indicators of questioning and monitoring are lower than 4, and the recognition scores for the other seven indicators are higher than 4. The index with the highest score is humour, followed by motivating students,

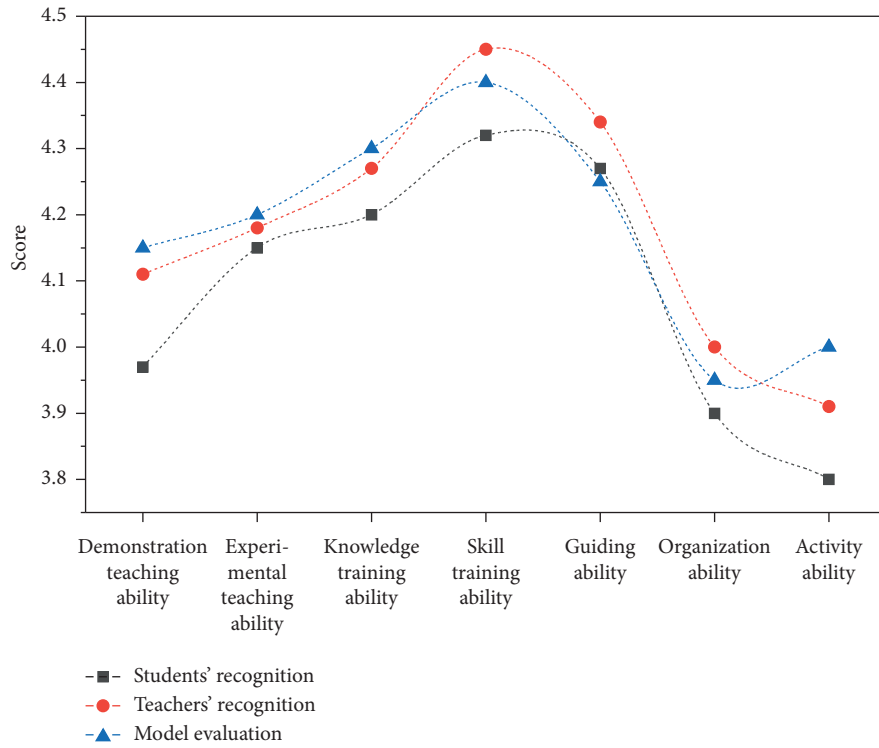


FIGURE 9: Comparative analysis of index screening results.

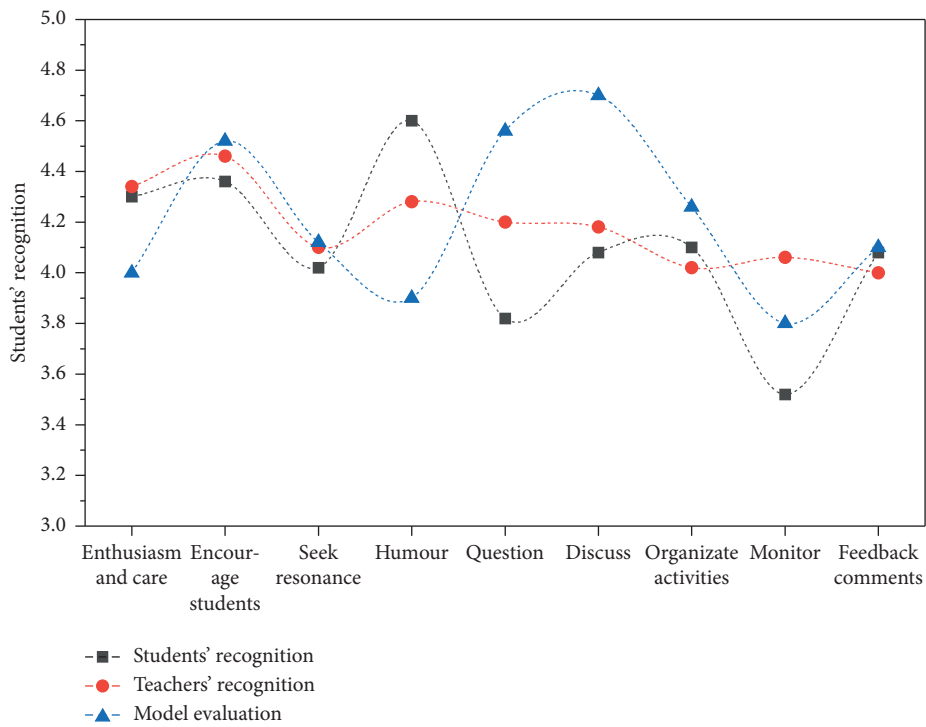


FIGURE 10: Screening and evaluation results of interaction ability.

and the index with the lowest score is monitoring. Ordinary teachers' recognition scores of all nine three-level indicators are higher than 4, of which the index with the highest score is motivating students, followed by expressing enthusiasm and care, and the index with the lowest score is a feedback comment. The recognition scores of expert teachers for the two indicators of humour and monitoring are lower than 4, and the recognition scores for the other seven indicators are higher than 4. The index with the highest score is discussion, followed by questioning, the third is motivating students, and the lowest score is monitoring. In conclusion, teachers and students generally recognize the above nine three-level indicators of interactive ability, indicating that teachers and students generally agree with the above nine three-level indicator settings.

6. Conclusion

Aiming at the evaluation of teachers' teaching ability, this paper establishes an evaluation index system for evaluating teachers' teaching ability based on the existing research methods, determines the weight of the established evaluation index by using the grey correlation analysis method, and improves the traditional grey correlation algorithm by using the projection principle. A teacher teaching ability evaluation model based on the grey projection improved random forest algorithm is proposed to simplify model training and improve prediction accuracy. The effectiveness of this method is verified by an example, which not only enriches the evaluation method of teachers' teaching ability but also provides a quantitative evaluation model reference for teachers' teaching ability evaluation.

Data Availability

The 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.

Acknowledgments

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