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PAPER

A Novel Method of Teaching Quality Monitoring and Evaluation from the Perspective of Educational Balance

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ABSTRACT

Exploring the problem of teaching quality monitoring and evaluation from the perspective of educational balance can help educators and policy makers discover educational inequality problems, thereby promoting fair allocation of educational resources and opportunities. In light of this, this study attempts to research teaching quality monitoring and evaluation from the perspective of educational balance. At first, the mechanism of promoting educational balance by information technology was expounded, and the principle and necessity of a comprehensive assessment based on the evaluation results of different evaluators were explained. Then, this study innovatively introduced the whitening weight function (WWF)-grey evaluation model into the conventional grey clustering evaluation, calculated the unit comprehensive clustering coefficients of the indexes of teaching quality evaluation from the perspective of educational balance, and gave fair, accurate, and effective evaluations. After that, the grey GM (1,1) model was applied to the prediction of teaching quality improvement effect, the future trend of teaching quality changes was predicted based on history data, and the results provided references for teaching reform and educational decision-making. At last, experimental results verified the validity of the proposed method.

KEYWORDS

education balance, teaching quality monitoring, evaluation of teaching quality

1 INTRODUCTION

Globalization and economic disequilibrium have resulted in unbalanced allocation of educational resources, so the educational quality varies significantly from region to region not only within the country but also around the globe [1–3]. In such circumstances, researching the problem of teaching quality monitoring and

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evaluation from the perspective of educational balance has become particularly important [4–11]. As society is posing increasingly higher requirements on education equity and quality, educators are facing greater challenges, and how to improve educational quality on the premise of ensuring education equity has been regarded as a very important issue in education research [12–17]. Exploring the problem of teaching quality monitoring and evaluation from the perspective of educational balance can help educators and policy makers discover educational inequality problems, thereby promoting fair allocation of educational resources and opportunities [18–23]. Through effective teaching quality monitoring and evaluation, the teaching process and results can be evaluated scientifically and effectively, which can urge teachers to optimize their teaching methods, and thereby improve the teaching quality.

Wu and Liu [24] found a problem with the current teaching quality evaluation methods of adolescent health physical education as they are slow in given evaluations when encountering large-scale data, so they proposed a new method for the said problem based on mobile education technology, which can realize evaluations and estimations of potential user's demand and student's physical activity quality. Liang [25] combined analytic hierarchy process with the improved open grade method, proposed a comprehensive integrated assignment method to solve difficulty in accurate weight determination, and applied it to the evaluation of physical education teaching quality combined with SVM. Liu and Yang [26] pointed out that the evaluation of PE quality in higher education is often considered as a multi-attribute group decision-making (MAGDM) problem. The authors extended the EDAS model to the single-valued neutrosophic sets (SVNSs) setting to deal with the MAGDM problem, and listed all designed calculation steps. The SVNN-EDAS model was proved via PE quality evaluation, a comparative analysis was given to prove the advantages of SVNS-EDAS, and the results show that the SVNS-EDAS method emphasizes the expectation value of SVNS average alternative, and it is more practical and efficient than other methods as its calculation steps are simpler and it is easier to apply in real word cases.

Conventional methods for teaching quality monitoring and evaluation include: rating system, questionnaire survey, in-depth interview, and observation, etc. These methods generally require a series of quantitative indexes, such as the students' exam scores, and graduation and enrollment rates, which are then used to assess the teaching quality of teachers or schools. Through designing questionnaires and collecting perceptions and evaluations of students, teachers, parents and other relevant personnel on teaching quality, data could be collected but the attained evaluation results of teaching quality are often questioned for their credibility and validity. Therefore, to solve this matter, this paper studied teaching quality monitoring and evaluation from the perspective of educational balance. In the second chapter, the mechanism of promoting educational balance by information technology was expounded, the necessity of building distance cooperative learning communities based on Internet technology was explained, and the principle and necessity of a comprehensive evaluation based on the evaluation results of different evaluators were introduced. The third chapter innovatively introduced the WWF-grey evaluation model into conventional grey clustering evaluation, calculated the unit comprehensive clustering coefficients of the indexes of teaching quality evaluation from the perspective of educational balance, and gave fair, accurate, and effective evaluations. In the fourth chapter, the grey GM(1,1) model was applied to the prediction

of teaching quality improvement effect, the future trend of teaching quality changes was predicted based on historical data, and the results provided references for teaching reform and educational decision-making. At last, experimental results verified the validity of the proposed method.

2 DEFINITION OF COMPREHENSIVE TEACHING QUALITY ASSESSMENT

In the wake of technical advancement, IT-supported learning models and methods are altering the form of education dramatically. Figure 1 gives a diagram showing the IT-based learning model. IT effectively promotes educational balance through many ways, including providing personalized learning, expanding the coverage of educational resources, enhancing students' learning initiative, increasing teaching efficiency, and giving educational evaluation. However, it should also be noted that IT isn't omnipotent for all educational problems, but needs to be combined with other factors such as educational policies and teachers' professional development to jointly promote the development of educational balance. Figure 2 gives a typical application form of IT and the source of teaching quality monitoring data.

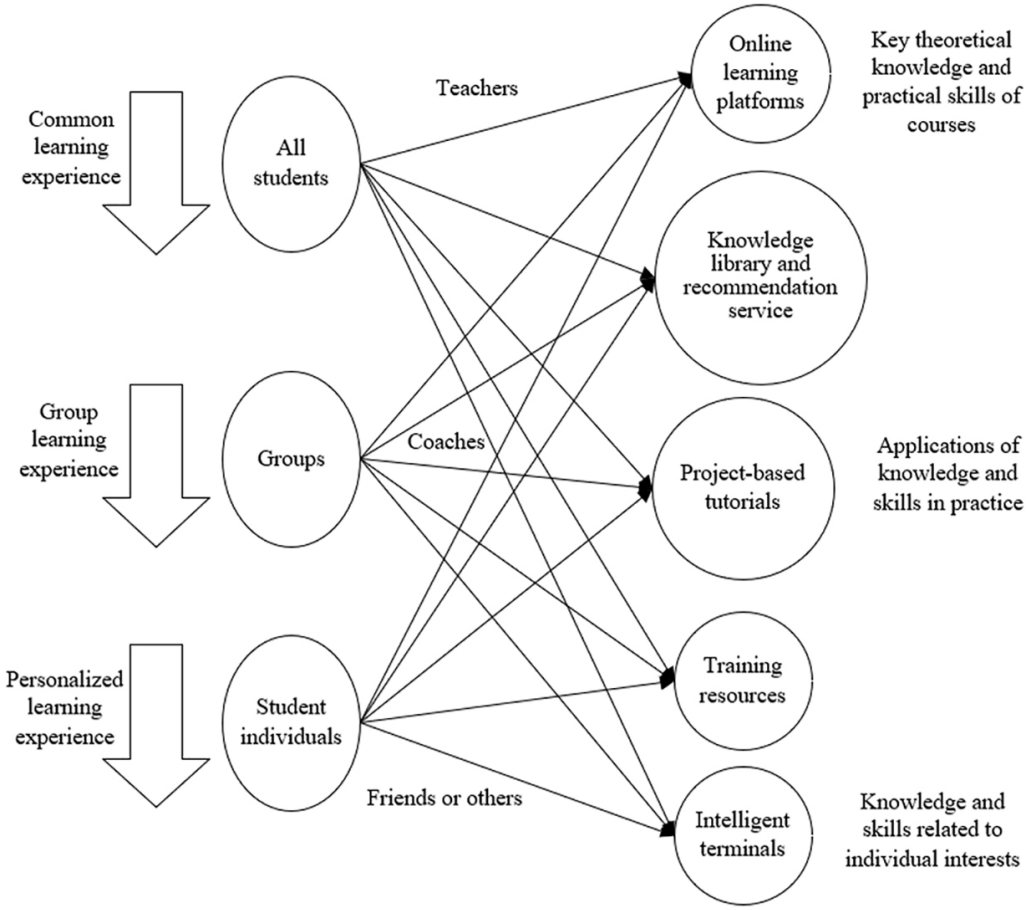

Fig. 1. The information technology (IT)-based learning model

Building distance cooperative learning communities based on Internet technology is of utter importance for promoting educational balance. Figure 3 shows the structure of an Internet-based distance cooperative learning community. Internet can break geographical and temporal constraints, enabling students from different regions and backgrounds to access high-quality educational resources, especially for students in remote regions or resource-insufficient regions. Through Internet, students can conduct cross-regional and cross-cultural exchanges, broaden their vision, and enhance cross-cultural communication skills. In the meantime, cooperative learning can cultivate students' teamwork ability and problem-solving ability. Internet provides a wealth of learning resources and tools to support students to learn autonomously according to their own interests and needs, and this helps to stimulate students' interest in learning and improve learning effect. Via Internet, teachers can share teaching resources and experiences, conduct professional exchanges, and strengthen their teaching ability. With the help of data analysis, they can also master students' learning progress and adjust teaching strategies in a timely manner. Internet offers fair learning opportunities, enables all students to participate in learning, and creates an educational environment that is fairer.

From the perspective of educational balance, participants of teaching quality evaluation (evaluators) can be divided into these categories:

1. Students: As the direct beneficiaries of education, students are highly sensitive to the evaluation of teaching quality. They can evaluate it from aspects of classroom teaching, teacher's teaching style, and course content, etc.
2. Teachers: Teachers are subjects of education, and have an inherent understanding of teaching quality. They can evaluate teaching quality from aspects of teaching objectives, teaching methods and students' performance.
3. Parents: Parents are the guardians of students and have an important influence on students' learning process and growth. They can evaluate teaching quality from aspects of students' learning results, learning attitude, and school education environment, etc.
4. Education administrators: This includes school leaders and educational administrative departments. They can evaluate the quality of teaching from the aspects of policy implementation, resource allocation, and school management, etc.
5. Society and industry experts: Society and industry experts can evaluate the quality of teaching from the macro aspects such as education policies, education systems, and education resources.

When evaluations are given by multiple evaluators, the evaluation results need to be assessed comprehensively according to different types of evaluators. Because evaluators give evaluations of teaching quality from different angles and levels, comprehensive assessment enables the evaluation results to reflect the real teaching quality situation more comprehensively. Since evaluators have different standpoints and interests, their evaluation results are subjective more or less, and the comprehensive assessment can help eliminate subjective bias and make it more objective. Such comprehensive assessment provides objective and all-sided references for education policy makers, school administrators and teachers, and helps to improve education policies, teaching methods, and education quality. Moreover, viewing from the perspective of educational balance, equity is an important goal of these evaluations, and the comprehensive assessment of the evaluation results of multiple evaluators is conducive to ensuring the fairness of evaluations, thereby promoting the equity of education and the fair allocation of educational resources.

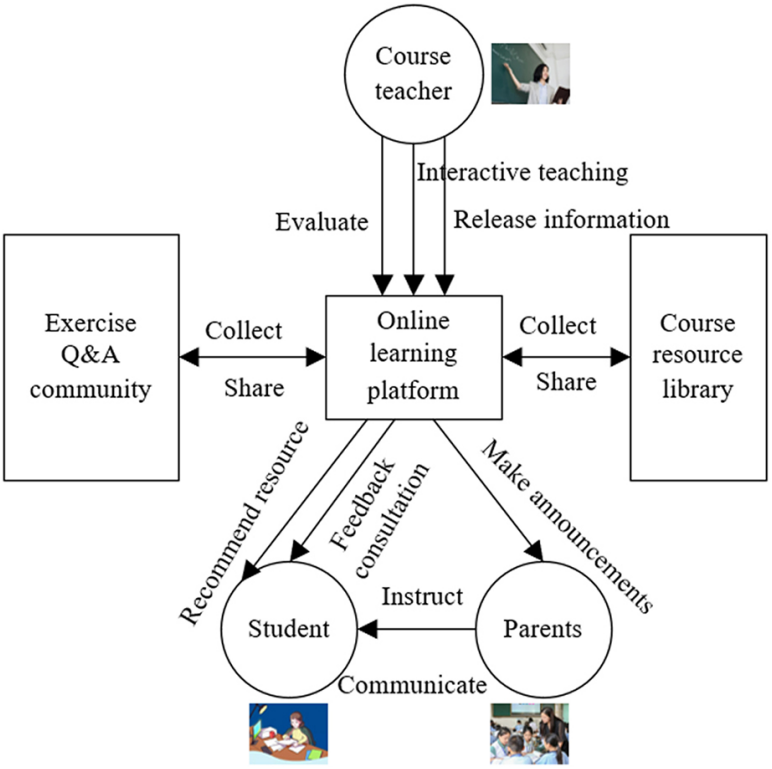

Fig. 2. A typical application of IT

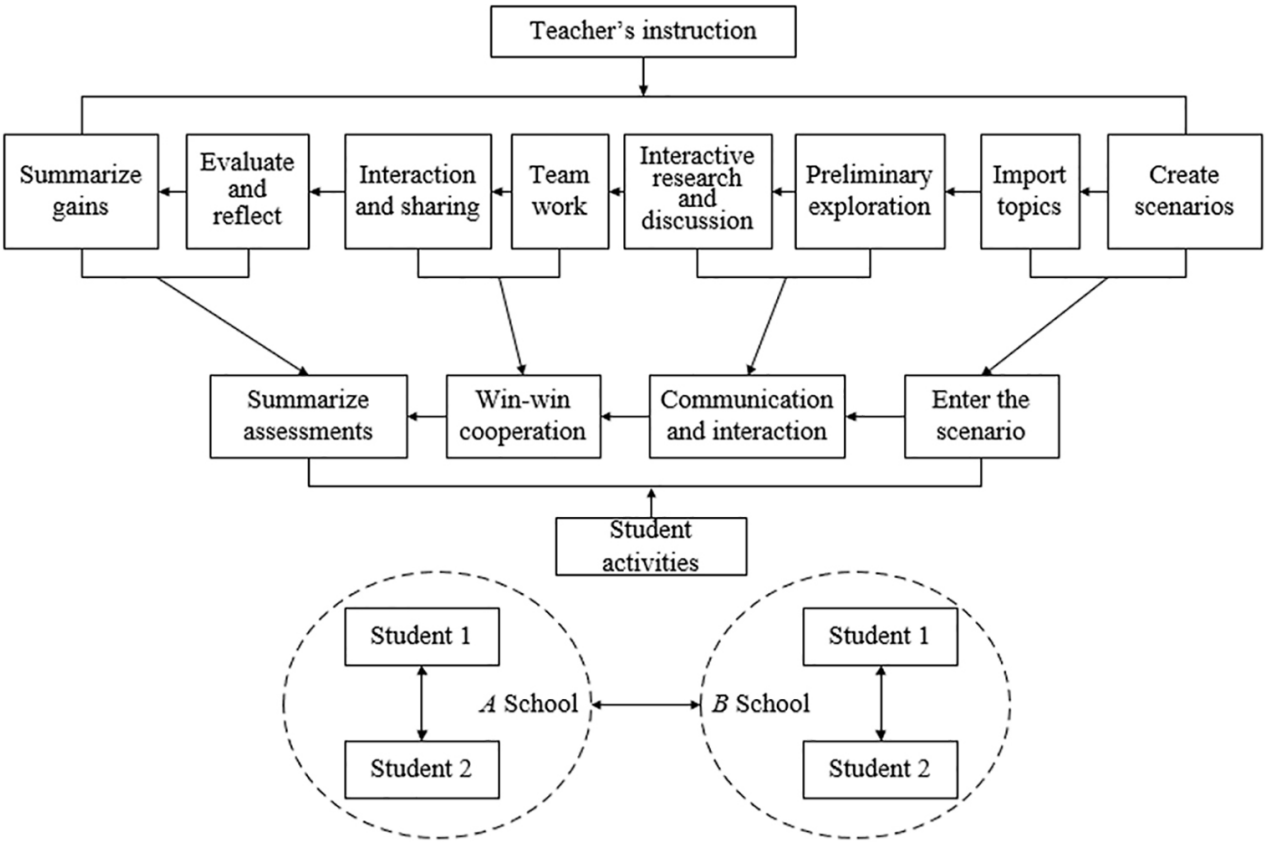

Fig. 3. Structure of a distance cooperative learning community based on internet technology

Assuming: $B=\{n_1, n_2, ..., n_p\}$(p is the total number of indexes) represents all indexes in the teaching quality evaluation system from the perspective of educational balance, y_m represents the weight of any attribute $d_m \in B(1 \le m \le p)$ in index system B, then there is:

$$y_m = p / 100 \tag{1}$$

Assuming g_m represents the total score of index d_m, then:

$$g_m = 100 / p \tag{2}$$

Assuming: R represents the number of evaluators, $R/d_i=\{T_1, T_2, ..., T_p\}$ is the division of R with respect to d_m, then the corrected weight y'_m of index d_m in index system B is:

$$y'_m = \sum_{m=1}^{N} \left|T_m\right|^2 / \left|R\right|^2 \tag{3}$$

The corrected total score g_m of index d_m is:

$$g'_m = y'_m * 100 \tag{4}$$

Assuming: R_l represents the total number of evaluators of the l-th sub index system, B_l represents the l-th type of index set of teaching quality evaluation system from the perspective of educational balance, $R_l/B_l=\{T_{l1}, T_{l2}, ..., T_{lin}\}$ is the division of R_l with respect to B_l, Y'_l represents the weight of evaluation results of the l-th type of evaluators, the there is:

$$Y'_l = \sum_{n=1}^{N} \left|T_{ln}\right|^2 / \left|R_l\right|^2 \tag{5}$$

Assuming: LI_l represents the evaluation score of the i-th type of evaluators, then the final evaluation result is:

$$result = \sum_{i=1}^{M} Y'_i LI_i \tag{6}$$

3 TEACHING QUALITY EVALUATION MODEL FROM THE PERSPECTIVE OF EDUCATIONAL BALANCE

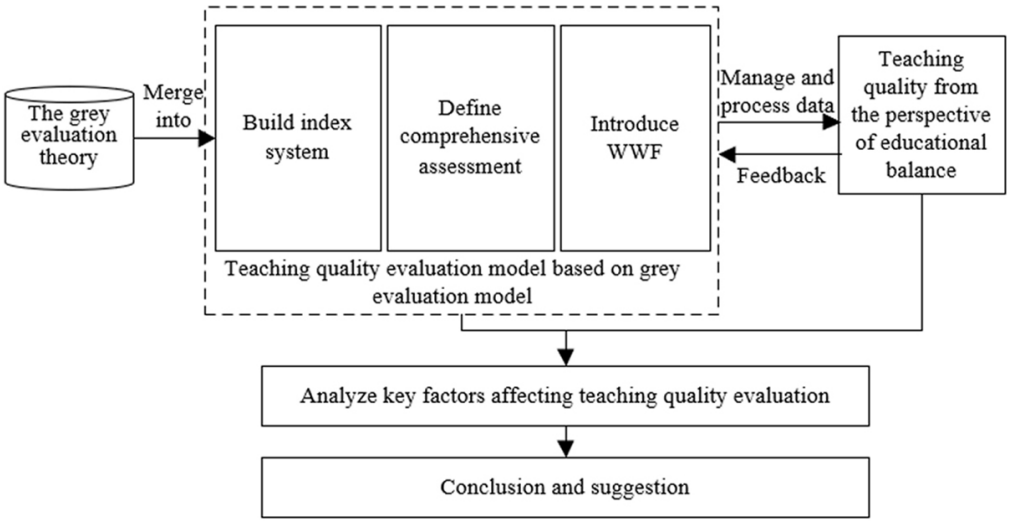

Fig. 4. Research architecture

The WWF-grey evaluation model can process complex and uncertain data with high precision and give accurate evaluation results. It takes the interrelationships between data into consideration when handling data of various types, so the accuracy of evaluation results could be improved, and the fairness of the evaluation results could be ensured through the calculation of unit comprehensive clustering coefficients. This method takes into account the importance of all evaluation indexes and assigns corresponding weights to them according to their influence on the quality of teaching, thereby ensuring the fairness of evaluation results. For this reason, this paper introduced the WWF-grey evaluation model into the conventional grey clustering evaluation, and calculated the unit comprehensive clustering coefficients of each index of teaching quality evaluation from the perspective of educational balance, aiming at giving fair, accurate, and effective evaluations. Figure 4 shows the specific architecture of the research.

Taking college PE as an example, this paper listed the evaluation objects, evaluation indexes and different gray classes when using improved grey clustering to evaluate teaching quality from the perspective of educational balance.

Evaluation objects are:

1. Teachers: include aspects of teaching skills, course design, and student interaction, etc.
2. Students: include learning effect, participation, and sports skills, etc.
3. Courses: include course content, course difficulty, and course design, etc.
4. Teaching environment: include facilities and equipment, teaching circumstance, and safety measures, etc.

Evaluation indexes are:

1. Indexes related to teachers: teachers' professional ability, teaching methods, classroom management, interaction and feedback, etc.
2. Indexes related to students: students' academic performance, skill mastery level, and classroom participation, etc.
3. Indexes related to courses: adaptability of the course, effectiveness of the course, and interestingness of the course, etc.
4. Indexes related to teaching environment: completeness of teaching facilities, comfortness of environment, completeness of safety measures, etc.

When using the improved grey clustering for evaluation, the evaluation objects can be divided into several gray classes according to different evaluation goals and indexes. In this study, teachers were divided into several grey classes according to their level of teaching ability: excellent, very good, good, average, not good; students were divided into several grey classes according to their academic performance: excellent, very good, good, average, not good; courses were divided into several grey classes according to their quality: excellent, very good, good, average, not good; and the teaching environment was also divided into several grey classes according to the completeness degree of teaching facilities: excellent, very good, good, average, not good.

Assuming: the number of evaluation objects, evaluation indexes, and gray classes of teaching quality evaluation from educational balance perspective is N, M, and g, respectively; s_j represents the weight of index j; f_{ij} represents the observed value of evaluation object i with respect to j, the specific construction steps of the gray clustering evaluation model are described in detail below.

Step 1: Determine the grey class of teaching quality evaluation. Assuming: $[d_j, e_j]$ represents the value range of index j of object i; according to the requirements of

teaching quality evaluation from the perspective of educational balance, the results were divided into g grey classes, namely $[Q_1, Q_2]$, ..., $[Q_{2p-1}, Q_{2p}]$, ..., $[Q_{2g-1}, Q_{2g}]$.

Step 2: Construct a new WWF for teaching quality evaluation. Let the value of WWF belonging to grey class p within the range of $[Q_{2p-1}, Q_{2p}]$ be equal to 1, link $(Q_{2p-1}, 1)$ to the start point $(Q_{2p-2}, 0)$ of grey class p and $(Q_{2p}, 1)$ to the end point $(Q_{2p+1}, 0)$ of grey class p. In grey class *1*, let the value of WWF belonging to this grey class within the range of $[Q_1, Q_2]$ be equal to 1; in grey class g, let the value of WWF belonging to this grey class within the range of $[Q_{2g-1}, Q_{2g}]$ be equal to 1. For grey classes l and g, respectively, extend the index definition ranges to d_j and e_j in the left and right directions, then the WWF $K_j^p(c)$ could be attained. The following formulas give the derived membership functions:

$$K_j^1(c)=\begin{cases}0, c\notin[d_j,Q_3]\\ \dfrac{Q_3-c}{Q_3-Q_2}, c\in[Q_2,Q_3]\\ 1, c\in[d_j,Q_2]\end{cases}$$

$$K_j^p(\mathrm{c})=\begin{cases}0, c\notin[Q_{2p-2},Q_{2p+1}]\\ \dfrac{c-Q_{2p-2}}{Q_{2p-1}-Q_{2p-2}}, c\in[Q_{2p-2},Q_{2p-1}]\\ 1, c\in[Q_{2p-1},Q_{2p}]\\ \dfrac{Q_{2p+1}-c}{Q_{2p+1}-Q_{2p}}, c\in[Q_{2c},Q_{2p+1}]\end{cases}\quad K_j^p(c)=\begin{cases}0, c\notin[Q_{2z-2},e_j]\\ \dfrac{c-Q_{2r-2}}{Q_{2z-1}-Q_{2r-2}}, c\in[Q_{2z-2},Q_{2z-1}]\\ 1, c\in[Q_{2r-1},e_j]\end{cases} \tag{7}$$

Step 3: Assuming ω_j represents the weight of index, then the formula for calculating the comprehensive clustering coefficient ω_j^p is:

$$\omega_i^p=\sum_{j=1}^{M}K_j^p(c_{ij})\cdot\delta_j \tag{8}$$

Then the formula for calculating the unit comprehensive clustering coefficient γ_i^p of object i with respect to grey class p is:

$$\gamma_i^p=\upsilon_i^p/\sum_{p=1}^{g}\upsilon_i^p \tag{9}$$

The criterion for judging whether object i belongs to grey class p^* is $\gamma_i^p=max_{1\le p\le g}\{\gamma_i^p\}$.

4 PREDICTION OF TEACHING QUALITY FROM THE PERSPECTIVE OF EDUCATIONAL BALANCE

Grey model GM (1, 1) is a kind of prediction model in grey system theory, which is mainly used to process data prediction problems with small-size samples and incomplete information. This model is characterized by simple data processing, insensitivity to initial conditions and high prediction accuracy, and so it has been widely used in many fields. The data of teaching quality improvement is usually small-sized sample data, which is suitable for GM (1,1) model to make predictions. Moreover, some information might not be available during teaching process, and

GM (1,1) model can deal with such incomplete information and makes the prediction results more accurate. Therefore, this paper applied the GM (1,1) model to the prediction of teaching quality improvement and predicted the future trend of teaching quality variation based on history data, thereby providing useful evidences for teaching reform and decision-making.

The modelling steps of the GM (1, 1) model are:

Step 1: Assuming $F^{(0)} = (f^{(0)}(1), f^{(0)}(2), ..., f^{(0)}(N))$ represents the original time sequence of teaching quality evaluation indexes from the perspective of educational balance, after accumulation, the generated one-time accumulated sequence is represented by $F^{(1)} = (f^{(1)}(1), f^{(1)}(2), ..., f^{(1)}(N))$, then $f^{(0)}(l) + mf^{(1)}(l) = n$ is the original form of GM (1,1).

Step 2: Assuming $V^{(1)} = (v^{(1)}(1), v^{(1)}(2), ..., v^{(1)}(n))$, $V^{(1)}$ is the generated sequence of close neighbour mean, and there is $v^{(1)}(lN) = 1/2(f^{(1)}(l) + f^{(1)}(l–1))$, then $f^{(0)} + nvv^{(1)}(l) = m$ is called the basic form of $WU(1,1)$.

Step 3: Assuming $F^{(0)}$ is a non-negative sequence, $F^{(1)}$ is defined by Step 2, then there is:

$$\frac{df^{(1)}}{dt} + nf^{(1)} = m \tag{10}$$

The above formula is the whitening equation of model $f^{(0)}(l) + nv^{(1)}(l) = m$.

Step 4: the solution of equation $df^{(1)}/dt + ndf^{(1)} = m$ is a time response function.

Step 5: The time response sequence of $f^{(0)}(l) + nv^{(1)}(l) = m$ is given by the following formula:

$$\hat{f}^{(1)}(l+1) = \left(f^{(0)}(1) - \frac{m}{n} \right) e^{-ml} + \frac{m}{n} \tag{11}$$

The restored value can be attained by the following formula:

$$\hat{f}^{(0)}(l+1) = (1 - e^{n}) \left(f^{(0)}(1) - \frac{m}{n} \right) e^{-nl} \tag{12}$$

5 EXPERIMENTAL RESULTS AND ANALYSIS

Table 1 is a correlation coefficient matrix. As can be known from the data in the table, the correlation coefficients between “teacher index”, “student index”, “course index” and “teaching environment index” are all above 0.7, indicating significant positive correlations between teacher’s performance, student’s performance, course quality, and teaching environment, and this has reflected teacher’s core status in the education process. Teachers’ teaching effects, methods, and attitudes can directly affect the performance of students, the quality of courses, and the teaching environment. The correlation coefficient between “student index” and “course index” is 0.762, which is a relatively high and positive value, indicating that student’s performance is closely related to course quality, and this means that high-quality courses can better promote students’ learning and development. The outstanding performance of students can also reflect the success of course design. The correlation coefficient between “course index” and “teaching environment index” is 0.836, which is the highest among all combinations, indicating that course quality is significantly correlated with teaching environment. A good teaching environment is conducive to improving course quality, and vice versa. The correlation coefficient between “student index” and “teaching environment index” is 0.728, indicating a high correlation, which also means that the student’s learning performance is closely related to the quality of teaching environment.

Table 1. Correlation coefficients

	Teacher Index	Student Index	Course Index	Teaching Environment Index
Teacher index	1	0.762	0.758	0.769
Student index	0.781	1	0.762	0.728
Course index	0.763	0.641	1	0.836
Teaching environment index	0.784	0.769	0.825	1

Table 2. Comprehensive assessment results of some samples

Sample No.	Teacher Index	Student Index	Course Index	Environment Index	Comprehensive Index	Category
1	–1.352	3.417	2.141	1.069	2.196	3
2	0.241	1.269	3.629	2.305	3.25	1
3	0.469	1.352	1.027	2.415	2.301	5
4	0.284	1.041	3.625	2.358	3.26	2
5	0.435	1.852	2.417	3.629	2.68	5
6	0.389	1.625	2.136	2.051	1.625	4
7	0.624	1.485	2.958	2.345	3.598	2
8	0.417	1.625	3.041	2.11	0.924	5
9	–1.625	4.329	2.519	2.639	3.268	4
10	0.295	1.062	3.026	2.574	3.15	5
...	...	...	...	...	...	...
250	0.215	1.925	3.958	2.619	3.41	2
251	0.269	1.352	2.301	2.051	2.695	5
252	0.324	1.47	2.096	2.396	–0.157	4
253	–0.041	1.039	1.352	3.147	1.368	1
254	–1.628	2.14	2.041	3.625	3.528	1

According to the values of "comprehensive index", each teaching unit was assigned to a category, 1 for "very good", 2 for "good", 3 for "average", 4 for "poor", and 5 for "very poor". When analyzing Table 2, it can be seen that a "comprehensive index" is generally closely related to "category", which means that a teaching unit with a higher "comprehensive index" usually gets better evaluation results. For each index, the size of the value can not directly determine the final evaluation of the teaching unit, because the final evaluation considered all indexes, not just one. Similarly, even if a certain index has a lower score, a teaching unit might still get a good evaluation if the scores of other indexes are high enough. This data emphasizes that, multiple indexes should be considered comprehensively in teaching quality evaluation, and it's not right to pay attention to only one index. In the meantime, different indexes can influence each other, which needs to be considered in the evaluation process as well.

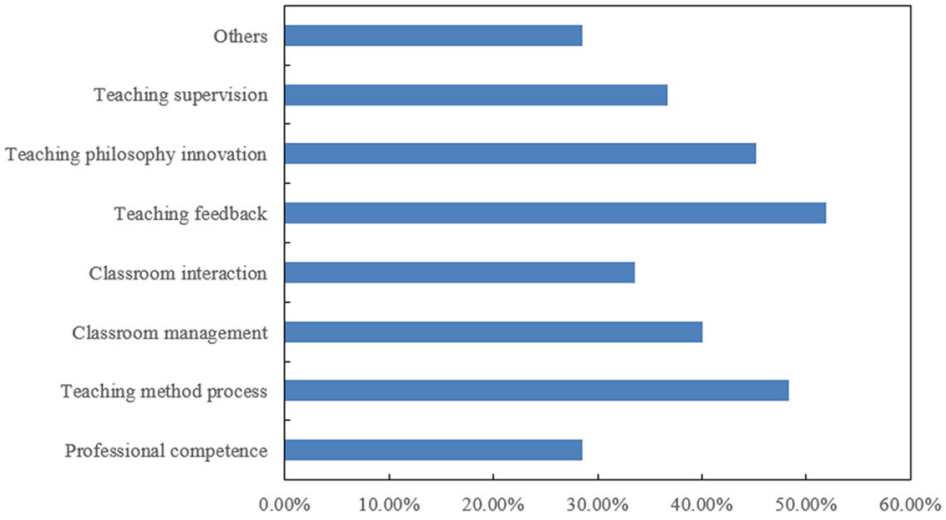

Fig. 5. Effective proportions of teacher index improvement items

Figure 5 shows the effective proportions of different teacher index improvement items, including "professional competence", "teaching method process", "classroom management", "classroom interaction", "teaching feedback", "teaching philosophy innovation", "teaching supervision" and "others". Data in the figure shows that, the effective proportion of "teaching feedback" is the highest, reaching 51.90%, indicating that teachers can improve their teaching effect through an effective feedback mechanism, which plays an important role in improving teaching quality and achieving educational balance. The effective proportions of "teaching method process" and "teaching philosophy innovation" are relatively high as well, which are 48.30% and 45.20%, respectively, indicating that teachers have made some efforts in teaching method selection and teaching philosophy innovation, and have achieved certain results. The effective proportions of "classroom management" and "classroom interaction" are 40.10% and 33.60%, respectively, indicating there is still room for improvement in these two aspects. Good classroom management and interaction can improve students' learning effect, thereby raising teaching quality. The effective proportions of "professional competence", "teaching supervision" and "others" are relatively low, which are 28.50%, 36.70% and 28.50%, respectively, indicating that more improvement is needed in these aspects.

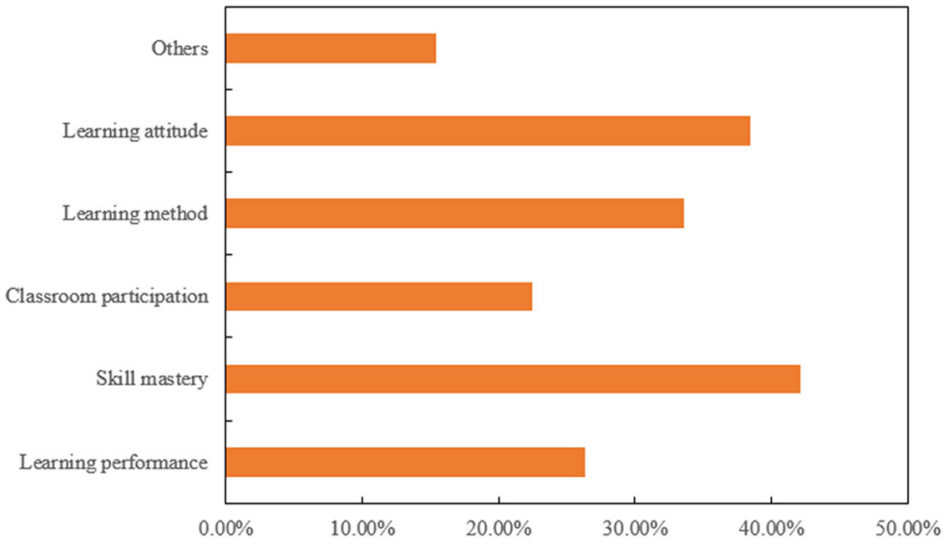

Fig. 6. Effective proportions of student index improvement items

Figure 6 shows the effective proportions of different student index improvement items, including "learning performance", "skill mastery", "classroom participation", "learning method", "learning attitude", and "others". The improvement item "skill mastery" takes the highest proportion, reaching 42.10%, indicating that significant achievements have been attained in this aspect. The mastery degree of skills has a direct influence on students' learning effect, and therefore, this index has a significant role in promoting educational balance. The effective proportions of "learning attitude" and "learning method" are 38.50% and 33.60%, respectively, so the improvements of these two indexes have an important impact on the learning effect of individual students and the overall education quality improvement. An improvement in these aspects can positively influence the realization of educational balance. The effective proportions of "learning performance" and "classroom participation" are 26.30% and 22.50%, respectively. Although these two indexes improved only by a small proportion, they have a positive impact on educational balance. Learning performance is an important measure of students' learning effect, and classroom participation is directly related to students' learning enthusiasm and teaching effect. The improvement of other items takes the lowest proportion of 15.40%, and the items include some other student index improvement aspects, such as learning habit, and self-management ability, etc.

Figure 7 shows the effective proportions of different course index improvement items, including "adaptability", "effectiveness", "interestingness", "difficulty", "practicality", "assessment method" and "others". The improvement of "assessment method" takes the highest proportion, reaching 69.30%, indicating that the schools are looking for more impartial, equitable, and comprehensive methods to evaluate students' learning results to promote educational balance. The effective proportions of "interestingness" and "adaptability" are also relatively high, which are 61.30% and 55.20%, respectively, indicating that the schools are making efforts to develop more attractive and adaptable courses to meet the needs and interests of different students, thereby improving the quality of education. The effective proportion of improvement item "effectiveness" is 48.20%, indicating that schools are working to improve the effectiveness of courses so that students can acquire more knowledge and skills from the courses. The effective proportions of "difficulty", "practicality" and "others" are lower, which are 33.80%, 25.10% and 35.70%, respectively, indicating that improvements in these aspects still require more effort.

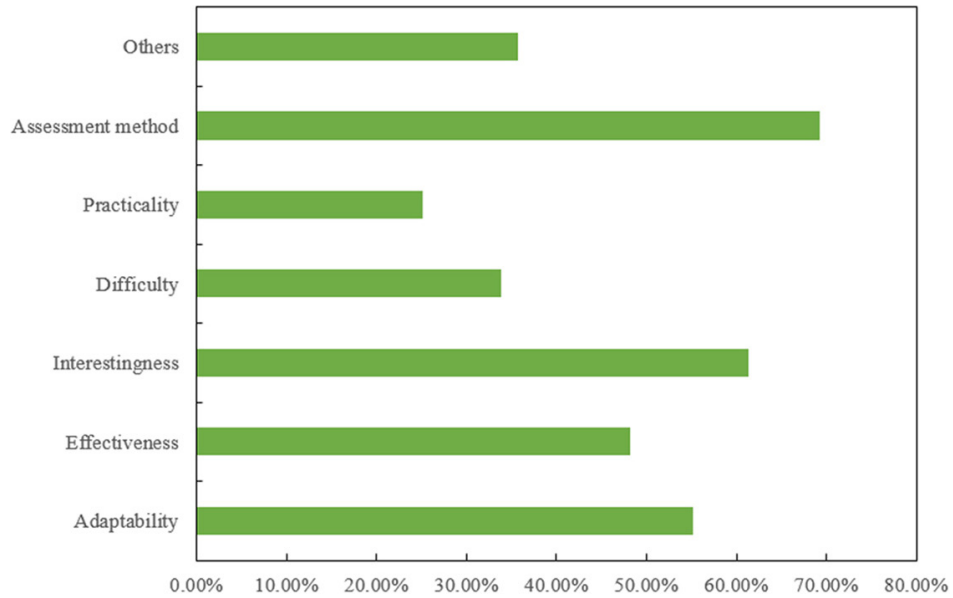

Fig. 7. Effective proportions of course index improvement items

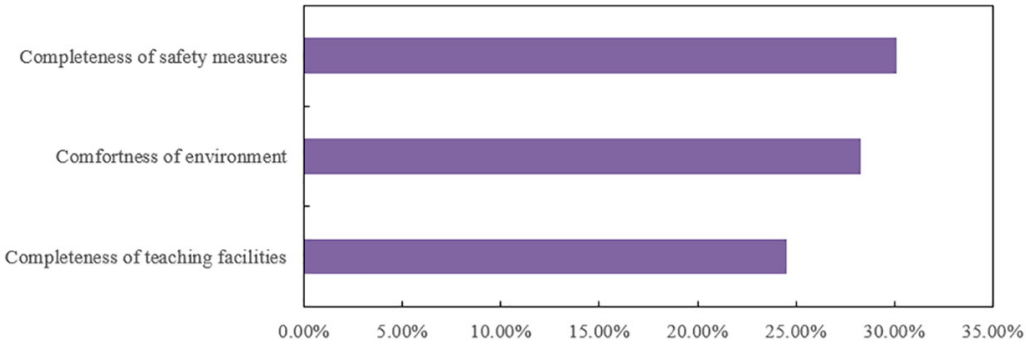

Fig. 8. Effective proportions of teaching environment index improvement items

Figure 8 shows the effective proportions of different teaching environment index improvement items, including "completeness of teaching facilities", "comfortness of environment", and "completeness of safety measures". The effective proportion of "completeness of safety measures" accounts the highest, reaching 30.1%, indicating that the educational institutions attach great importance to providing a safe learning environment. A safe learning environment can make students more focused on learning and reduce their learning barriers caused by safety issues, thus it has a positive impact on promoting educational balance. The effective proportion of "comfortness of environment" is 28.3%, this may indicate that educational institutions are working to provide a more comfortable learning environment. A comfortable learning environment can increase students' enthusiasm for learning, help improve learning effects, thereby promoting educational balance. The effective proportion of "completeness of teaching facilities" is the lowest at 24.5%. Although the value is small, still, the completeness of teaching facilities has an important impact on improving teaching effect, especially the teaching effect of practical courses. Therefore, the improvement of this index also has a positive effect on educational balance.

6 CONCLUSION

This study explored the teaching quality monitoring and evaluation problem from the perspective of educational balance. At first, the mechanism of promoting educational balance by information technology was expounded, the necessity of building distance cooperative learning communities based on Internet technology was explained, and the principle and necessity of a comprehensive evaluation based on the evaluation results of different evaluators were introduced. Then, the WWF-grey evaluation model was innovatively introduced conventional grey clustering evaluation and the unit comprehensive clustering coefficients of teaching quality evaluation indexes were calculated from the perspective of educational balance to give fair, accurate, and effective evaluations. After that, the grey GM (1,1) model was applied to the prediction of teaching quality improvement effect and the future trend of teaching quality changes was predicted based on history data The results provided references for teaching reform and educational decision-making. Combining with experiment, the correlation coefficient matrix was analyzed, the comprehensive assessment results of some samples were attained, the effective proportions of different improvement items of teacher index, student index, course index, and teaching environment index were given, and the promoting effect of all indexes on educational balance was discussed.

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