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ORIGINAL

EVALUATION OF IDEOLOGICAL AND POLITICAL TEACHING QUALITY OF PHYSIOLOGY COURSE FOR REHABILITATION

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ABSTRACT

The development of the information industry is a cross-era impact for any industry, especially under the influence of the database, and the systematic analysis of the data in the industry can improve the accuracy of the output vector and data analysis. With the increase of data volume, for the difficulty of data processing increased significantly, the number of college students growing rapidly in recent years, to the accurate analysis of teachers and students need to take information technology, improve the accuracy of the operation, in the analysis of students and teachers through the system processing education data, the results can be applied to the education management. Based on the above content, on the basis of the dragonfly algorithm, through the improvement of the algorithm, the quality of rehabilitation physiology ideological teaching evaluation, first constructed the course ideological teaching quality evaluation system, then on the basis of determining the evaluation index, the teaching quality evaluation score, in order to through the study of rehabilitation physiology ideological teaching quality to provide reference.

KEYWORDS: Dragonfly algorithm; BP neural network; Analytic hierarchy process

1. INTRODUCTION

With the rapid development of my economy, the domestic colleges and universities for classroom teaching reform research, research also obtained more obvious effect, although on the whole, curriculum teaching reform has entered a new stage, but in the ideological classroom teaching reform, especially for students learning information and scheduling research, for the

teaching index is still uncertain (T. Du, Ceng, Huang, Liu, & Wei, 2020).

The study of ideological and political work in colleges and universities is one of the core contents of the training of college students (X. Zhang, Qian, & Qiu, 2019). It is not only the responsibility of colleges and universities, but also the demand of the society to cultivate a group of students with superior thought and noble moral character for the society through the construction of an effective ideological and political work framework and improve the work content of the society (X. Du, Zhang, & Wang, 2020).

Rehabilitation professional physiology as a part of many professional colleges and universities, for the optimization of ideological teaching quality evaluation and promotion is the key to enhance their comprehensive competitiveness, ideological political classroom has always been education part, and education framework can conform to the growth of students will directly affect the quality of talents in colleges and universities (Li, Huang, & Huang, 2018).

In combining ideological and political theory and practice at the same time, teachers for ideological and political cognition need and the school construction framework consistency, in rehabilitation professional physiology course, ideological teaching quality evaluation at the same time, for the teaching practical experience and application mode need to make strict requirements, can according to the students and teaching content of scientific and reasonable rehabilitation physiology course (He, Huang, & Wang, 2019), ideological teaching quality evaluation system construction is still difficult. Based on the above contents, it can be seen that under the background of modernization, the evaluation system constructed by following the ideological and political education theory is of great significance for both university students and universities (H. Wang, Li, & Qi, 2020; Zhao & Du, 2018).

Combined with the above analysis background and significance of the ideological and political teaching quality evaluation system of rehabilitation physiology courses, it can be seen that the research at home and abroad on this direction is still in a relative shortage. Therefore, on the basis of explaining the youth algorithm, this paper develops the quality evaluation system of the ideological and political teaching of rehabilitation professional physiology courses, and then the quality evaluation method based on the algorithm is proposed by determining the initial value and the parameter value.

Subsequently, the improved dragonfly algorithm proposed in this topic was found through experiment, which can further enhance the evaluation results of ideological and political teaching quality evaluation of rehabilitation professional physiology courses, and then provide reference for the teaching optimization of ideological and political classroom in universities.

2. Research status of dragonfly algorithm

Dragonfly algorithm is a heuristic intelligent algorithm proposed by Mirjalili of Australia in 2016, Its principle is to simulate the living habits of dragonflies in nature, and build models based on five living habits of dragonflies to achieve the goal of global optimization and local optimization. This algorithm optimizes related problems through iterative solution. Because of its simple mathematical model, fast convergence speed and strong stability, it has been used by many scholars at home and abroad (Han & Chen, 2017; Liu & He, 2022).

In foreign countries, Dragonfly algorithm is combined with a new crime prediction model-gradient tree (GBT). From the final experimental results, it is found that using DA to optimize parameters has a positive impact on improving the prediction performance of GTB, because its error is minimal than that of unoptimized GTB (Zhuang, 2019). This shows that this algorithm has good optimization ability. Scholars have studied the feature selection of dragonfly algorithm in binary counting (Dong & Xu, 2019). Through research, it is proved that dragonfly algorithm is better than PSO, GA and other algorithms in feature selection. Scholars have optimized the local optimization process of dragonfly algorithm, which makes the optimization result of dragonfly algorithm more stable (S. Zhang & Gao, 2020).

Some foreign scholars also put forward a new model of teaching quality evaluation based on the listening algorithm (De Silva & Jang, 2015). The method has been widely recognized by the academic community, believing that the improved algorithm can enhance the efficiency and accuracy of the operation. Subsequently, the scholar also proved that the algorithm is more robust through experiments (Zhong, Du, & Du). The algorithm improved combined with the data analysis results can determine the calculation results of the data at more levels in line with the optimization and extension of the algorithm (Ma & Guo, 2016; Wu & Wu, 2017).

Inspired by the dragonfly algorithm, scholars use the dragonfly algorithm to optimize the structure of the analysis frame. Aiming at solving the optimization problem of discrete functions, an improved DA algorithm is proposed, which improves the performance of the algorithm (W. Wang, Zhu, Li, Zhao, & Jie, 2020). The effectiveness and robustness of the proposed algorithm are verified by studying five planar and spatial steel frames with discrete size variables. Numerical results show that, compared with other algorithms, this algorithm can achieve the lightest weight with the least number of structural analysis, and meet the requirements of structural constraints (Tao, Zhao, & Sun, 2020). After collecting and sorting out the domestic research data on the cleaning algorithm, it is found that some scholars have introduced the research results at home and abroad to prove that the dragonfly algorithm can optimize

the operation results through the diversified analysis (Sun, 2021). From the final results, it is found that the improved dragonfly algorithm has better performance than the original dragonfly algorithm. Some scholars for the study of liquidation through mathematical function of its convergence comprehensive analysis, in the experimental analysis results, in the local optimal solution can better handle the problems in the process of operation, in order to improve the youth algorithm efficiency and optimization level, in the input process through diversity processing simulation data calculation, the results show that through the mode improved dragonfly algorithm, can be more accurate and efficient data processing. Some scholars have established the decision model of annual outage maintenance plan by using dragonfly algorithm, and improved dragonfly algorithm (Cuadrado, Lim, Alcontin, Calang, & Jumawan, 2019). Finally, compared the improved dragonfly algorithm before and after numerical simulation, after determining the research results by summarizing multiple scholars and experiments, it can be seen that the results of the training algorithm are improved, with higher computing efficiency and accuracy.

In addition, some scholars also put forward targeted optimization solutions for the algorithm, which improves the basic problems and operation accuracy of the algorithm. Combined with the research results of many scholars, it can be more clearly seen that effective optimization solutions have been put forward in the domestic research on youth algorithm (Fu, Chen, & Kang, 2016).From the above research, we can see that dragonfly algorithm is widely used in many fields because of its good global optimization ability and high stability. However, dragonfly algorithm also has the shortcomings of poor local optimization ability and slow convergence speed. In addition, there are few researches on structural damage identification using dragonfly algorithm at present. Therefore, how to improve the defects of dragonfly algorithm and apply it to actual structure damage identification will be the focus of follow-up research work.

3. Evaluation model of ideological and political teaching quality of physiology course for rehabilitation majors based on improved dragonfly Algorithm

3.1 Principle of Dragonfly Algorithm

The dragonfly algorithm is inspired by the migration and foraging behavior of dragonflies in groups. Migration can be regarded as a dynamic behavior of dragonflies, and foraging can be regarded as a static behavior of dragonflies, as shown in Figure 1.

In dynamic behavior, dragonflies migrate in groups in one direction, which is equivalent to global optimization in algorithm optimization. In all populations, the rules of separation, alignment and aggregation must be

observed. At the same time, in order to survive, animals must forage and avoid natural enemies. Therefore, Mirjalili established a mathematical model based on five dragonfly population behaviors: dispersion, clustering, aggregation, food attraction and natural enemy rejection

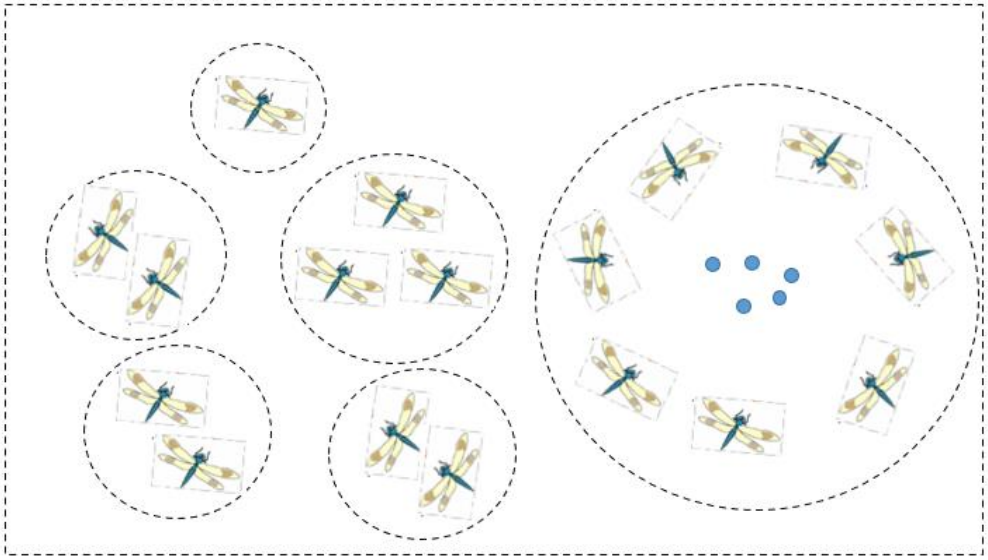

Figure 1: Dynamic and static dragonfly populations

Dispersion: Describes the distance between the current individual and other individuals to avoid collision.

$$S_i = -\sum_{j=1}^{N} (X - X_j)$$

Clustering degree: Describes the clustering degree between the current individual and other nearby individuals.

$$A_i = \frac{\sum_{j=1}^{N} V_j}{N}$$

Aggregation degree: Describes the distance between the current individual and the population center.

$$C_i = \frac{\sum_{j=1}^{N} V_j}{N} - X$$

Food attractiveness: Describes how far an individual is from food at present.

$$F_i = X^+ - X$$

Natural enemy rejection: Describes the degree to which the individual is far away from natural enemies at present.

$$E_i X^- + X$$

In the above models and formulas describing the clearing method, food can be regarded as the optimal solution obtained in the algorithm. On the contrary, the worst calculation is to position the natural enemy as the calculation result of the algorithm. The population can be divided into two modes in the operation process, and then describe the calculation process of the algorithm. The optimization process using dragonfly algorithm is to set the relevant parameters of the algorithm, randomly generate the individual position and iteration step of dragonfly population in initialization and define the upper and lower boundaries of X and X1 before calculation to ensure that the algorithm can optimize the problem in a certain range. After each iteration is completed, eliminate individuals who do not meet the requirements, At the same time, the best individual of the previous generation is retained, and then X and X1 are updated to enter the next iteration. If better individuals than the previous generation can be generated, the individuals of the previous generation are replaced. If better individuals cannot be generated, X and X1 are continuously updated to enter the next iteration, and the operation of the algorithm is not stopped until the set iteration times are reached or the requirements of relevant values are met.

3.2 Evaluation of ideological and political teaching quality of physiology course for rehabilitation majors based on improved dragonfly algorithm

3.2.1 BP neural network

After determining the model designed in this topic, The way the data is calculated is being repeatedly tested, the data of the model based on the improved algorithm can be calculated, The specific model is as follows:

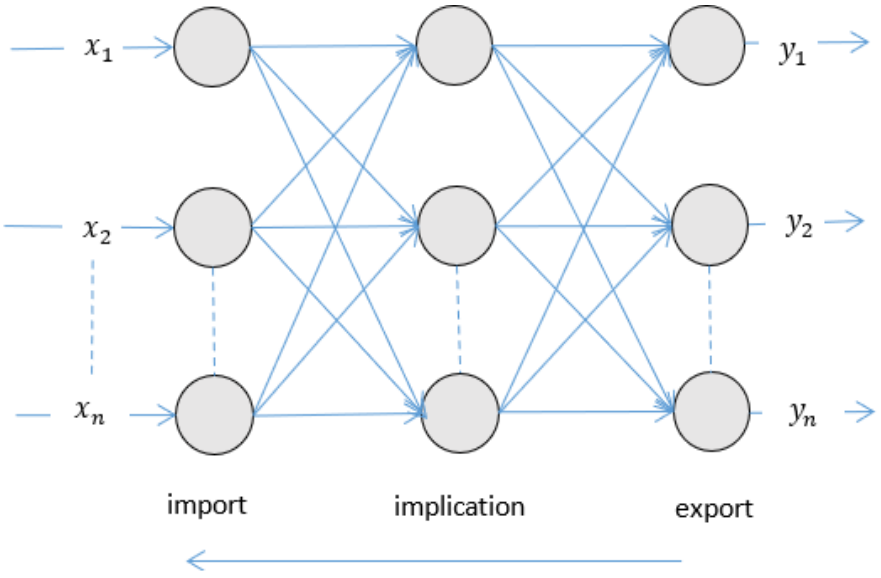

Figure 2: Topology of the BP Neural Network1

On the basis that the output results of the model described in the figure above are difficult to meet the budget requirements, it can be calculated again through repeated iteration or back propagation, and the two processes can be repeated. The operation process can be ended after the budget result gets the range value in the region. This description of the algorithm is only through the three-layer network algorithm. The analysis was performed, and the specific expressions are as follows.

$$E = \frac{1}{2m}\sum_{k=1}^{m}\sum_{o=1}^{q}(d_0(k) - y_0(k))^2$$

BP neural network has strong non-linear mapping ability and can approve the non-linear function with any accessibility. However, because its method is gradient descent algorithm, the selection of many parameters in the training process has no theoretical basis, so it has certain limits.

First, the data operation performed by the model. Due to the computational problem, the results of the processing of a large amount of data are relatively slow, and during the operation of the data, due to the application and irregular data influence. Error values are easily obtained in the process of calculating the minimum value of the data.

Secondly, the above parameter model is verified by most research results and experiments, but because the operation results are too complex, the learning and training time is relatively long when the data amount is too large, and the efficiency of the data operation results is too low. Finally, it is difficult to obtain the relatively stable operation results based on the neural network. During the neural network operation and training, when the total number of samples changes, the completed operation process needs to be recomputed. Therefore, the operation efficiency of this mode is too low, and it is greatly affected by the samples.

3.2.2 DA-BP algorithm flow

The process of evaluating the quality of ideological and political teaching of rehabilitation professional physiology courses through the improved dragonfly algorithm is mainly realized through the following steps.

Step I: First, the model to improve the listening algorithm proposed in this paper. The main steps are determining the number of neural network layers and the number of samples used at all levels; input the ideological and political teaching quality evaluation data of rehabilitation students and complete the data processing; After the data calculation, obtain two data sets.

Step 2: After obtaining the connection value and the threshold value, the

data encoding process is set to m. Finally, the three multiplier output nodes of the network model are replaced by R, S1 and S2, and the expression S of the length is obtained:

$$S = RS + S_1S_2 + S_1 + S_2$$

Step 3: After computing the sample, the basic sample data is obtained, and the initial data is determined after initialization, and then calculated in an iterative way. Step 4: The algorithm of this paper determines the vector and the position, which is also the dragonfly algorithm to evaluate the quality of ideological and political teaching. Step 5: The analysis of the data will be calculated repeatedly, and the sample data will be input. Evaluation the quality of the rehabilitation physiology course based on the Dragonfly algorithm, and the optimal solution will be explained.

$$firness = \frac{1}{k}\sum_{i=1}^{k}(y_i - \hat{y}_i)$$

Step 6: Update food source position X + (current optimal solution) and natural enemy position X- (current worst solution), and update five behavior weights s, a, c, f, e and inertia weight w. Step 7: Update S, A, C, E, and F according to the formula. Step 8: Update the step vector and position vector according to the formula. Step 9: If the iteration times T > T, save the optimal connection weight c_j、ω_{ij} and threshold ε、θ_j; Otherwise, t=t+1 returns Step5. Step 10: Take the connection weight c_j、ω_{ij} and threshold value ε、θ_j corresponding to the optimal solution as the initial connection weight and threshold value of BP neural network, train BP neural network and make prediction.

3.3 Evaluation system of ideological and political teaching quality of physiology course for rehabilitation majors

Combined with references and relevant materials, the AHP structural model of ideological and political teaching quality evaluation of physiology course for rehabilitation majors is constructed by using analytic hierarchy process, as shown in Figure 1.

Choosing the teaching quality data of ideological and political education in a university from 2012 to 2021 as the research object, In this paper, the maximum value method is used to standardize the data.

According to the 1-9 scale method, according to the relative order of each evaluation index, and through the pairwise comparison method, the scores of the evaluation index of ideological and political teaching quality of physiology course for rehabilitation majors are constructed as shown in Table 1 and the evaluation scores as shown in Table 1.

Table 1: Evaluation system of ideological and political teaching quality of physiology course for rehabilitation majors

FIRST-CLASS INDEX	SECONDARY INDEX	TERTIARY INDEX
EVALUATION INDEX OF IDEOLOGICAL AND POLITICAL TEACHING QUALITY OF PHYSIOLOGY COURSE FOR REHABILITATION MAJORS	Basic quality a	Instrument A1, language A2, blackboard writing A3, knowledge A4, care for learning A5
	Teaching attitude b	Prepare lessons B1 on time, start and finish classes B2 on time, discipline B3 in class, ask questions B4, encourage students to ask questions B5, listen to opinions B6 with an open mind, and answer questions B7 patiently
	Teaching method c	Inspiration teaching C1, multimedia teaching C2 and flexible application C3 in class
	Teaching ability d	Difficult point analysis D1, key content induction D2, clear question answer D3, sudden problem processing D4, animation use D5
	Teaching effect e	Homework quality E1, software use E2, clear problem E3, learn to use E4, and be a teacher E5

Table 2: Scores of ideological and political teaching quality evaluation indexes of physiology course for rehabilitation majors

INDICATOR SERIAL NUMBER	2016	2017	2018	2019	2020	2021
1	0.06	0.0609	0.0973	0.1064	0.1352	0.1468
2	0.1487	0.131	0.1794	0.1693	0.2059	0.2112
3	0.1896	0.1967	0.1976	0.2433	0.2542	0.2865
4	0.2043	0.2043	0.2471	0.2537	0.2612	0.2602
5	0.1663	0.1553	0.1571	0.1571	0.2777	0.2869
6	0.102	0.1069	0.13 L2	0.1652	0.1846	0.1895
7	0.0807	0.1097	0.1389	0.1599	0.1759	0.2181
8	0.082	0.0917	0.1033	0.1027	0.1133	0.1161
9	0.0662	0.0757	0.0926	0.0943	0.0897	0.1024
24	0.0611	0.0585	0.0585	0.0834	0.1116	0.1456
25	0.0426	0.0468	0.0601	0.071	0.0893	0.1139
26	0.0359	0.0384	0.0518	0.0654	0.0879	0.1158

This topic is based on an improved youth algorithm, right. Ideological and political courses of rehabilitation major in universities. Teaching quality evaluation. The formula is as follows:

$$RMSE = \sqrt{\frac{1}{n}\sum_{k=1}^{n}(x_k - \hat{x}_k)}^{2}$$

$$R = \frac{\sum_{k=1}^{n}(x_k - \hat{x}_k)}{\sqrt{\sum_{k=1}^{n} x_k^2}\sqrt{\sum_{k=1}^{n} \hat{x}_k^2}}$$

In the above two formulas, the improved dragonfly algorithm can calculate the data with high accuracy. The results show that when the value is closer to the moment, it represents the correlation between the accuracy and the data sample.

4. Experimental results of ideological and political teaching quality evaluation of physiology course for rehabilitation majors based on improved dragonfly Algorithm

According to the literature, the ideological and political teaching quality of physiology course for rehabilitation majors is divided into five grades, which are very good, good, average, poor and very poor. The evaluation grades are shown in Table 3.

Table 3: Classification of evaluation grades

SCORE	RESULTS
[4.2, 5]	Very good
[3.4, 4.2]	Better
[2.6, 3.4]	General
[1.8, 2.6]	Poor
[1, 1.8]	Very poor

The collected data were scored by experts, and a total of 6 groups of data were obtained. The data is divided into two parts. The first four groups of data are used as training sets to establish the evaluation model of ideological and political teaching quality of physiology course for DA-BP rehabilitation majors.

After calculating the data of the test set, the research object and the ideological and political teaching quality of the rehabilitation professional physiology course can be evaluated, and then used to verify that the improved dragonfly algorithm proposed in this subject has higher operation efficiency and accuracy. During the operation, the number of population iterations is set to 10 and 100 respectively, and the following figure is obtained from the results of the calculation:

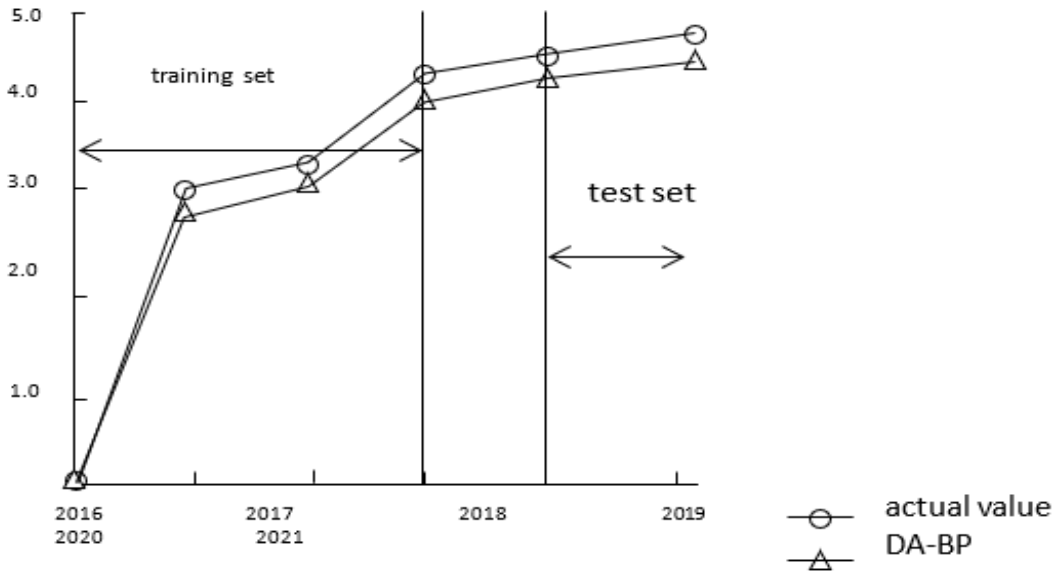

Figure 3: Evaluation results

In order to verify the accuracy and effectiveness of the DA-BP model, we compare the DA-BP with GA-BP, PSO-BP and BP. Parameters of PSO are: maximum iteration times T=100, population size N=10, learning factor c1=c2=2, search interval [-1,1]. Genetic algorithm parameters: Based on the determination of the above data, the population and cross probability, this paper sets the parameters set in the evaluation of the quality of physiology courses for rehabilitation students, including input, output and hidden layer. This is also the basis of the network model construction. The number of iterations of the neural network is 1000, and the algorithm results are shown in Table 4.The content in the table can more clearly show the higher effectiveness of the improved dragonfly algorithm (X. Du, Wang, & Cui, 2022).

Table 4: Comparison results of different algorithms1

METHOD	TRAINING SET		TEST LEVEL	
	RMSE	R	RMSE	R
DA-BP	0.0089	0.9956	0.0373	0.9893
GA-BP	0.0162	0.9786	0.0392	0.971 l
PSO-BP	0.0168	0.9763	0.0459	0.9642
BP	0.0176	0.9652	0.0472	0.9456

Based on the survey results in the above table, it can be clearly seen that in the improved dragonfly algorithm based on the current topic, the improved algorithm is better compared with the other three algorithms. In the two data sets, the data obtained by the improved algorithm is smaller, which can also reflect that the improved algorithm proposed in this paper can more accurately evaluate the ideological and political teaching quality of the physiology class of students majoring in rehabilitation, and can be more conducive to the guidance of education management in the subsequent operations, and the prediction effect is the best; The evaluation accuracy of DA-BP GA-BP and PSO-BP is better than that of BP. The main reason is that swarm intelligence algorithms DA GA and PSO optimize the parameters of BP model and improve the evaluation accuracy of BP model.

5. Conclusion

Through the data and the collation of the literature review on the ideological and political teaching quality evaluation, it is found that there are relatively few relevant research results, especially for the rehabilitation professional physiology courses, and even fewer ideological and political teaching quality evaluation. Therefore, based on this concept, we evaluate the quality of rehabilitation professional physiology courses and ideological and political teaching by improving the liquidation method, and first determine the evaluation system and evaluation indicators. Get 25 course ideological and political teaching evaluation indicators. Then, the index is output through the improved clearing method. In order to further improve the feasibility and accuracy of this paper, the four algorithms show that the improved algorithm

can be more accurate and efficient. The quality of ideological and political teaching of rehabilitation professional physiology courses is evaluated to provide reference for the optimization and improvement of ideological and political teaching.

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