Journal of Combinatorial Mathematics
and Combinatorial Computing
www.combinatorialpress.com/jcmcc

Combinatorial Press

Construction of Labor Education Evaluation Mechanism and Analysis of Implementation Path Based on Fuzzy Clustering Algorithm

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ABSTRACT

The evaluation of labor education under the modernization of education should establish a long-term evaluation mechanism of labor education to achieve the goal of educating people by labor to build morality, labor to enhance intelligence, labor to strengthen the body, labor to cultivate beauty, and labor to innovate. In this paper, we use fuzzy clustering algorithm to construct labor education evaluation mechanism based on teacher evaluation standard. The results of this model for labor education evaluation are basically the same as those of manual evaluation, and can be used for the evaluation of the quality status of labor education. Based on this, the study plans in detail the pre-implementation preparation, specific implementation steps and continuous optimization process of the evaluation mechanism. It also analyzes the implementation path of the labor education evaluation mechanism based on the fuzzy clustering algorithm by taking the example of Z elementary school in city A. The overall evaluation score of the quality of labor education in Z elementary school is 4.013, and there are still many areas that need to be improved. The evaluation mechanism of labor education based on fuzzy clustering algorithm was run in this school for 8 weeks, and the educational effect was continuously optimized through the incentive mechanism. Finally, the second-level fuzzy judgment method is introduced to further optimize the mechanism. Based on the new evaluation mechanism of labor education, individual student development can be evaluated, curriculum quality can be assessed, and operable solutions can be provided for the improvement of the quality of school labor education.

Keywords: Fuzzy Clustering Algorithm; Education Evaluation Mechanism; Second Level Fuzzy Judgment Method; Implementation Path

1. Introduction

With the growing demand for comprehensively developed talents in the society, the position of labor education in the education system is becoming more and more prominent. Labor education is an

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Received 20 February 2024; Revised 15 April 2024; Accepted 20 November 2024; Published Online 16 April 2025.
DOI: 10.61091/jcmcc127b-327

important content of the national education system, which has the important value of cultivating morality, increasing intelligence, strengthening physical fitness, and cultivating beauty, and students, as future workers engaged in modernization construction, must receive labor education for their growth and success [1-2]. In order to promote the progress and development of society, labor education is included in the training system of social builders and successors in the new era, which lays a solid foundation for the sustainable development of labor education [3]. Labor education is an education carried out by labor, which cannot be limited to physical labor only, and it is inseparable from moral education, intellectual education, aesthetic education and physical education, and it is a systematic and complete type of education, which forms an indispensable and important part of a higher level of talent cultivation system [4-6]. Through labor education, students can learn knowledge beyond textbooks, such as teamwork, responsibility, self-management, etc., which is conducive to cultivating students' positive attitudes, good habits, correct values, view of labor, hands-on ability, and sense of innovation, and it can also exercise students' willfulness, as well as enhance their self-confidence and self-esteem of the important education [7-10].

However, the problem of imperfect evaluation system in labor education has also gradually surfaced and become one of the key factors restricting the in-depth development of labor education. In many schools, the evaluation of labor education is still stuck in the traditional, single evaluation method, such as the completion of labor results as the main evaluation standard, ignoring the diversity and comprehensiveness of the evaluation process, which is not only difficult to comprehensively reflect the students' labor skills and labor attitudes, but also difficult to stimulate the students' interest in labor and innovation ability. And the evaluation criteria show school differences, grade differences, class differences, resulting in the evaluation results are not comparable, not only is not conducive to the promotion of fair competition among students, but also is not conducive to the accurate assessment of the effect of labor education by teachers [11-12]. Therefore, strengthening labor education and building a scientific and effective evaluation mechanism for labor education is one of the issues that need to be focused on in the current education field.

Several scholars have already studied such problems. Xiaohang and Lin [13] developed a computerized decision support system for labor education evaluation that integrates management, supervision, and evaluation boards. Wang et al [14] constructed a model of labor education evaluation elements based on big data analysis, with 14 indicators and 21 indicator monitoring sites in the model, and combined with the hierarchical analysis method to calculate the weights between these indicators, so as to form the whole education evaluation system. Lin [15] assisted the VGG-16 (Visual Geometry Group-16) network to capture and analyze the correlations of multiple elements of labor education, such as teaching mode, student participation, and practice effects, through the NADE (Naive Bayes Autoencoder) method, as a means of pedagogical evaluation of labor education. Chen [16] created an intelligent evaluation system supported by data mining technology, which evaluates the quality of labor education delivery with the results of content and needs analysis in labor education, and the system can make evaluation choices. Ying [17] established a personalized labor education evaluation system with the help of K-mean clustering algorithm, particle swarm optimization algorithm, and hierarchical analysis method relying on big data and k-mean. Hu and Lv [18] used a systematic assessment model (background, input, process, and outcome) to design four evaluation indicators for labor education in colleges and universities, combined with the entropy weight method and the K-mean algorithm to perform weight comparisons and cluster analysis, respectively, in order to evaluate the effect of labor education. However, these solutions still do not address the process and comprehensive nature of labor education evaluation, and do not specifically build the evaluation mechanism, but only do a lot of practice in evaluating the effect of the implementation of the method.

And in data mining technology, fuzzy clustering algorithm is an important clustering method, which has the advantages of robustness to noise and outliers, inclusiveness of data distribution and automatic selection of the number of categories [19]. Therefore, applying the fuzzy clustering

algorithm to the evaluation system of labor education can realize the objective evaluation of labor education and improve the scientificity and accuracy of evaluation.

In this study, the evaluation mechanism of labor education is constructed by exploring the evaluation standard of students' labor education under the modernization of education, and the fuzzy C-mean clustering algorithm is used to construct the evaluation model of labor education. After verifying that the model can be used to evaluate the quality of labor education, it was implemented in Z elementary school in city A according to the steps of preparation before implementation, specific implementation steps and continuous optimization. By analyzing the current situation of the evaluation mechanism of labor education in Z elementary school, we use the labor education evaluation mechanism based on the fuzzy clustering algorithm to assess the quality of education and construct an incentive mechanism to continuously optimize the effect of education. Finally, the optimization process based on fuzzy clustering algorithm is further proposed.

2. Construction of Labor Education Evaluation Mechanism Based on Fuzzy Clustering Algorithm

The evaluation mechanism of labor education is a system integrating evaluation, monitoring and supervision, etc., in order to more effectively promote the scientific implementation of the spirit of the Opinions and the Outline by localities and schools, and to realize the new requirements, tasks and missions of labor education in the new era, so as to realize the functions of orientation, standardization, identification, diagnosis, correction of errors and feedback of labor education through the establishment of the evaluation mechanism, which, along with the demonstration mechanism, jointly provides a guarantee for the promotion of labor education in the new era. The promotion of labor education in the new era is guaranteed. This study explores the evaluation standard of students' labor education under the modernization of education, constructs the evaluation mechanism of labor education based on fuzzy clustering algorithm, guides the formation of students' values of labor education, cultivates the excellent labor spirit, model spirit and craftsmanship, and becomes a socialist successor with all-round development of morality, intelligence, physicality, aesthetics and labor.

2.1. Evaluation criteria for labour education under the modernization of education

Labor education evaluation is the key to checking the effectiveness of the implementation of labor education. The evaluation standard of labor education is mainly based on the evaluation standard of teachers.

Teachers' evaluation standards are mainly based on the scientific effectiveness of the teaching design, organization and implementation of labor education courses and practical training as the standard for setting students' labor education evaluation indexes. Teachers should do a good job in the teaching design of labor education courses and practical training, plan the teaching content, pay attention to the learning and practice of the methods and skills of the courses and practical training, and cultivate students' good labor habits and labor ability [20]. Teachers in the labor education evaluation index selection through written tests, practical exercises and practice and other forms of labor classroom performance, labor knowledge learning, labor activity participation and labor practice performance to assess and evaluate the establishment of students' labor values, the mastery of labor knowledge, labor operation and labor skills, labor awareness and labor habits, labor behavior implementation and so on. Focusing on the scientific and rational evaluation of labor education and the diversity of evaluation methods, the evaluation indexes of labor education can be more effective in testing the effect of labor education.

2.2. Evaluation mechanism of labor education based on fuzzy clustering algorithm

Evaluation is the process of measuring what is to be evaluated and making a meaningful judgment using certain criteria. Clustering is a process of dividing things without any a priori knowledge, through which similarities between things can be found so that the results can be better revealed. The weights of the fuzzy comprehensive judgment method in the previous evaluation system of labor education are often considered to be fixed, which has a great subjective factor in it, and the reasonableness of these weights contains many perceived factors, which makes the results of the evaluation lose their reasonableness. On the other hand the fuzzy comprehensive evaluation method in the process of synthesizing the information, although it can get a digital result, but also therefore lost a lot of useful information, which is likely to be very helpful for the improvement of teaching methods. Based on the appeal problem, adding some interactive links in the evaluation system of labor education can solve the problem of unidirectional flow of evaluation data, and the use of fuzzy clustering algorithm in the fuzzy comprehensive judgment method can make up for the unreasonable evaluation phenomenon caused by subjective factors in the traditional evaluation system.

2.2.1. FCM algorithm. Fuzzy C-mean clustering algorithm (FCM) is a widely used algorithm in cluster analysis and it is one of the most popular algorithms applied. If teachers are considered as an observation, the score of each teacher will form a matrix X which is the data object. Evaluating the quality of labor education of teachers is a fuzzy process, and the FCM algorithm is an algorithm that is mature to some extent, so we choose this fuzzy clustering algorithm in the evaluation of labor education [21].

Suppose a vector of order P, X, divides the object into c clustered sets by a clustering algorithm, where the center of mass of each set is a vector of order P, V, where the fuzzy classification method consists of sets specified as:

$$\mathsf{J}_{fc} = \left\{ U \in \Re_{cn} \mid \underset{\substack{1\le i\le c \\ i\le k\le n}}{\forall} u_{ik} \in [0,1], \sum_{i=1}^{c} u_{ik} = 1, 0 < \sum_{i=1}^{n} u_{ik} < n \right\} \tag{1}$$

R is a c-row, n-column matrix that has the objective function shown in the following equation:

$$J(U,V) = \sum_{i=1}^{c}\sum_{k=1}^{n} \left(u_{ik}\right)^{m} d_{ik}^{2} \tag{2}$$

where $U \in \mathsf{J}_{fc}$, $V \in \Re_{pc}$, $m \in [1,\infty)$ are the weighting coefficients, where element X_k is at a distance V_i from the center of mass of the i th cluster:

$$d_{ik}^{2} = \left\| x_k - v_i \right\|^{2} \tag{3}$$

Optimization by Objective Function the FCM algorithm obtains a fuzzy classification of a collection of objects by iterative optimization of the objective function.

The process of FCM algorithm:

1) Determine c and initialize V, and iterate the coefficients t.

2) Update $U^{(t)}$ to $U^{(t+1)}$ for all i:

$$u_{ik}=\begin{cases}\dfrac{\left(d_{ik}^{2}\right)^{\frac{1}{m-1}}}{\sum_{j=1}^{c}\left(d_{jk}^{2}\right)^{\frac{1}{m-1}}}\cdots\cdots\cdots d_{ik}\neq 0\\ 1\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots d_{ik}=0\\ 0\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots d_{ij}=0,j\neq k\end{cases} \tag{4}$$

3) Update center of mass $V^{(t+1)}$ with $U^{(t+1)}$, where $t+1$ denotes the $t+1$th iteration:

$$v_i=\frac{\sum_{k=1}^{n}\left(u_{ik}\right)^{m}x_k}{\sum_{k=1}^{n}\left(u_{ik}\right)^{m}} \tag{5}$$

4) Compare $v^{(t)}$ with $v^{(t+1)}$ and if $\left\|V^{(t)}-V^{(t+1)}\right\|\leq\varepsilon$, that iteration stops. Instead make $t=t+1$ and jump to step 2).

Here ε is a predetermined very small number greater than 0, m affects the fuzziness of clustering, m the larger the more fuzzy, generally take $m=2$, this time $m-1=1$, which is conducive to simplify the calculation. The choice of clustering distance in the drastic analysis is also important, we generally use the Euclidean distance.

2.2.2. Evaluation factor set. The first thing to do in the construction of the labor education evaluation model is to determine the set of factors for judging, and we improve and determine the set of factors for judging by combining qualitative and quantitative analysis methods, thus arriving at a set of more reasonable evaluation factors. The set of evaluation factors with 10 comprehensive factors is shown in Table 1. The study evaluates labor education in 3 aspects, namely, teaching methods, teaching ability and teaching factors.

Table 1. Evaluation factors set

First-degree assessment	Secondary evaluation factor
Teaching method (U1)	The lecture is sensitive to the students' attention (U11)
	The elaboration of the problem is illuminating (U12)
	The content is enriched and the amount of information is large (U13)
	Can give students think, association, innovation and enlightenment (U14)
Teaching ability (U2)	Be proficient in the course and use it freely (U21)
	The elaboration of the problem is concise and accurate (U22)
	Ability to mobilize students' emotions and be active in the classroom (U23)
Teaching factor (U3)	The lecture is enthusiastic and full of spirit (U31)
	New ideas, new concepts and new results of teaching content can respond or contact subject development (U32)
	Can effectively use various teaching media (U33)

The evaluation factors for each level are shown below:

$$U=\{U1,U2,U3\} \tag{6}$$

$$U1=\{U11,U12,U13,U14\} \tag{7}$$

$$U2=\{U21,U22,U23\} \tag{8}$$

$$U3=\{U31,U32,U33\} \tag{9}$$

Next, various types of parameters, weights, etc., are determined, and with the availability of initialized parameters, data input, counting of data frequencies, calculation of the degree of affiliation, and determination of the evaluation results are carried out.

2.2.3. Labor education evaluation model based on FCM algorithm. The research model of labor education evaluation based on FCM algorithm is shown in Figure 1. Where A is the process of clustering, X is the teacher's score, c (number of categories, starting set at 5) and m (smoothing coefficient, starting set at 2) are the covariates.

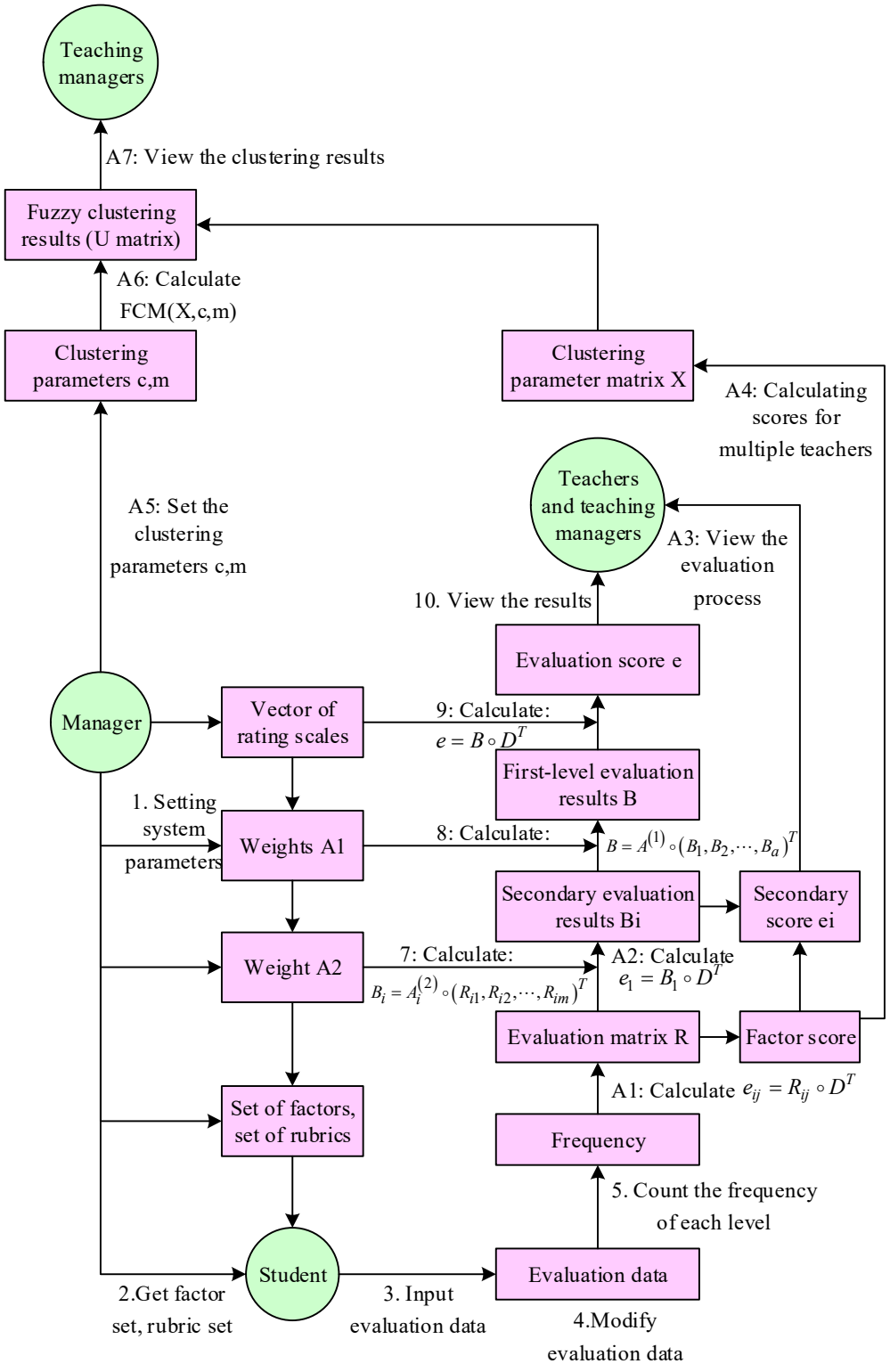

Fig. 1. Labor education evaluation model

2.2.4. Example of model realization. The fuzzy mean clustering algorithm used in this paper is more computationally complex than the systematic clustering algorithm, where we set m to a constant value and c to a variable.

1) Algorithm steps:

(1) Set an initial c, and take any c samples from the sample points as the clustering center.

(2) For all i, update $U^{(1)}$ to $U^{(t+1)}$.

(3) Update the center of mass $V^{(t+1)}$ based on $U^{(0+1)}$.

(4) Compare $v^{(t)}$ and $v^{(t+1)}$, if $\left\|V^{(t)}-V^{(t+1)}\right\| \le \varepsilon$, the algorithm terminates. Otherwise, make $t=t+1$ and go to step 2. (Where ε is set to 0.001).

2) The flow of the algorithm is shown in Fig. 2. The meaning of the symbols in the figure is as follows:

χ : $\chi=\{x_1,\cdots,x_n\}$ represents a collection of n data points.

x_i : A ten-dimensional data point.

C_i : The i th class of the division.

$U(t)$: The set of all divided classes C_i for the t th iteration.

$V(t)$: The sum of squared errors (SSE) for the t th iteration.

ε : The maximum error range for $V(t)$ th and $V(t+1)$ th.

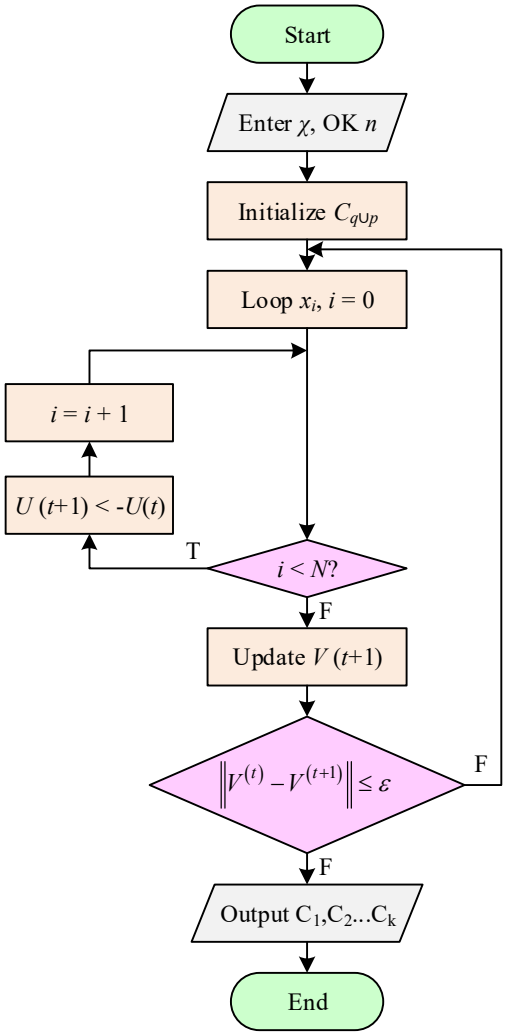

Fig. 2. Fuzzy clustering algorithm flow chart

2.3. Evaluation of the effectiveness of the application of fuzzy clustering algorithm

According to the set of judging factors, the evaluation data of labor education of 500 students in 8 classes of Z elementary school in city A and 10 comprehensive factors are selected as data set Z, and the fuzzy C-mean clustering algorithm is used to carry out a comprehensive evaluation of labor education in this school, and the initial data of these 10 indicators are normalized to be dimensionless,

and the indicators are transformed into values between [0, 1], and for the indicators of the positive class using the formula (10) for the Processing:

$$x_{ij}^{*} = \frac{x_{ij} - x_j^{\min}}{x_j^{\max} - x_j^{\min}} \tag{10}$$

For the negative category indicators are processed utilizing equation (11):

$$x_{ij}^{*} = 1 - \frac{x_{ij} - x_j^{\min}}{x_j^{\max} - x_j^{\min}} \tag{11}$$

The data after the dimensionless evaluation of labor education in 8 classes are shown in Table 2. The weight coefficients in Table 2 are substituted into the fuzzy C-mean clustering, and then the fuzzy C-mean clustering equations (2) to (5) are used to obtain the clustering results of the quality of labor education in data set Z, and the quality level of the labor education in data set Z is judged according to the affiliation matrix, and the results are shown in Table 3. The value of adaptive function $L(c)$ is shown in Table 4. When the number of clusters is 4, the value w of $L(c)$ is the largest (1.12×109), and the clustering effect is the best at this time.

Table 2. Standardized indicator data

Class	U11	U12	U13	U14	U21	U22	U23	U31	U32	U33
C1	3.0941	1.2508	8.0998	4.4814	4.7794	0.9477	3.0487	1.4506	6.8032	1.2789
C2	6.0212	3.2403	3.9389	3.1708	1.9739	4.5275	7.5248	1.3117	8.7479	7.9402
C3	6.0616	8.9172	0.8649	8.5966	7.3272	8.5581	1.7777	0.4169	6.307	2.1686
C4	1.4957	8.6559	6.1027	1.487	8.9711	7.658	1.3415	8.0807	4.5378	4.8787
C5	2.9296	1.7583	6.5327	4.0852	7.7198	2.3584	8.7621	8.0519	7.4615	5.0937
C6	6.4426	1.4557	1.7423	4.4232	6.3963	8.8062	4.4238	8.6341	3.019	2.8364
C7	8.1995	6.1468	1.3191	2.017	3.5807	0.2094	5.1985	1.7004	2.141	5.4775
C8	8.8631	3.994	6.4392	0.2351	7.3888	2.5679	1.7633	6.5197	0.4999	5.5597
W_i	0.051	0.053	0.083	0.107	0.132	0.102	0.082	0.126	0.177	0.087

Table 3. Clustering centers

Cluster center	C1	C2	C3	C4	C5	C6	C7	C8
Center 1	0.16	0.33	0.04	0.19	0.26	0.24	0.13	0.11
Center 2	0.01	0.08	0.39	0.33	0.2	0.01	0.2	0.28
Center 3	0.08	0.23	0.33	0.04	0.23	0.17	0.36	0.01
Center 4	0.24	0	0.33	0.3	0.33	0.07	0.18	0.28

Table 4. Number of clusters and the value of $L(c)$

Clustering number	1	2	3	4
$L(c)$	4.33×107	9.12×107	2.52×107	1.12×109
Clustering number	5	6	7	8
$L(c)$	2.26×107	9.36×106	6.54×106	6.78×106

The evaluation results of the model and the manual are shown in Table 5, and the evaluation results obtained by using the evaluation method constructed in this paper are basically consistent with the manual evaluation results. Among them, the errors for class 3 and class 6 are acceptable because the model has a certain error range and the manual evaluation results have a certain subjectivity.

Therefore, the evaluation model can basically realize the evaluation of the quality status of labor education.

Table 5. Model and artificial evaluation results are compared

Class	Bad	Qualified	Good	Excellence	Model evaluation results	Artificial assessment
1	0.23	0.242	0.214	0.299	Excellence	Excellence
2	0.212	0.245	0.317	0.2	Good	Good
3	0.212	0.267	0.197	0.321	Excellence	Good
4	0.231	0.24	0.225	0.317	Excellence	Excellence
5	0.315	0.253	0.197	0.233	Bad	Bad
6	0.24	0.291	0.183	0.243	Qualified	Bad
7	0.267	0.271	0.202	0.234	Qualified	Qualified
8	0.221	0.209	0.108	0.466	Excellence	Excellence

3. Path of implementation of the evaluation mechanism for labor education

3.1. Pre-implementation preparation of evaluation mechanisms

In the preparatory stage before the implementation of the evaluation mechanism for labor education, it is first necessary to have an in-depth understanding and accurate grasp of the connotation and objectives of labor education and its status and role in education, so as to ensure the scientific and targeted design of the evaluation mechanism. Secondly, a status quo analysis should be conducted, including investigation and research on the existing resources, teachers' strength, students' labor skills and labor attitudes of labor education in schools, so as to accurately identify the advantages and shortcomings of the implementation of labor education, and to provide a basis for the construction of the evaluation mechanism. Again, the objectives and principles of labor education evaluation should be clarified. The evaluation objectives should be consistent with the cultivation objectives, focusing on the cultivation of students' labor skills, labor attitude and labor values. In principle, the evaluation should adhere to the scientific, fair, educational and developmental aspects to ensure that the evaluation results can truly reflect the actual effects of labor education and promote the overall development of students. Finally, a detailed implementation program is formulated. This includes the specific process of evaluation, methodology, selection of tools and application of evaluation results. On this basis, it is also necessary to train the teachers involved in the evaluation, improve their evaluation ability and awareness, and ensure the smooth implementation of the evaluation. At the same time, a sound feedback mechanism is set up to feedback the evaluation results to teachers and students, which is used to guide the improvement of teaching and learning, as well as the optimization of practical activities in labor education.

3.2. Specific implementation steps for the evaluation mechanism

Specific implementation steps are the key links to ensure that the evaluation mechanism can operate effectively and achieve the desired goals.

1) Develop a detailed implementation program. The detailed implementation program includes the evaluation cycle, methods, tools, etc., and clarifies the evaluation subjects, including teachers, students' self-assessment, peer assessment and other multi-evaluation subjects, as well as social enterprises and other external evaluation. This can comprehensively evaluate the effectiveness of students' labor education from multiple angles and levels.

2) Establish and improve the incentive mechanism. For students with outstanding performance in labor education, commendation and rewards should be given to stimulate students' enthusiasm and

initiative. For students with poor performance, targeted guidance and assistance should be provided to encourage their improvement, effectively promote the implementation of labor education evaluation mechanism, promote the overall development of students, and cultivate more high-quality technical skills for the community.

3.3. Continuous optimization of evaluation mechanisms

In the process of constructing the evaluation mechanism of labor education, continuous optimization and feedback mechanism are the key to ensure the effectiveness and adaptability of the evaluation mechanism.

1) Continuous optimization requires that the evaluation mechanism can be dynamically adjusted according to the actual effectiveness of labor education, changes in social needs and updates in educational policies. This requires the establishment of a multifaceted feedback mechanism that includes teachers, students, industry experts and all sectors of society to collect comprehensive information on the effectiveness of labor education implementation. Through regular evaluation reports and feedback meetings, problems in the evaluation mechanism, such as unreasonable evaluation indexes, unscientific evaluation methods, and the lack of wide application of evaluation results, can be discovered in time, and the evaluation mechanism can then be corrected and improved.

2) The optimization of the evaluation mechanism should not only focus on the application of evaluation results, but also on the improvement of the evaluation process. This means that a set of scientific and reasonable evaluation process management mechanism should be established to ensure that each step of the evaluation activities can be carried out in an efficient and orderly manner. For example, the professionalism and systematicity of the evaluation work should be improved by clarifying the person responsible for the evaluation, optimizing the evaluation tools and standardizing the evaluation procedures.

3) The continuous optimization of the evaluation mechanism should also focus on cultivating students' self-evaluation ability. Guiding students to participate in the self-evaluation and mutual evaluation of labor education can not only improve students' understanding of the importance of labor education, but also promote students' active participation in the practice of labor education, thus improving the effectiveness of labor education.

4. Analysis of the path of implementation of the evaluation mechanism for labor education

This study analyzes the implementation path of labor education evaluation mechanism based on fuzzy clustering algorithm by taking Z elementary school in A city as an example.

4.1. Pre-implementation preparations

Evaluation of elementary school labor education is an important guideline to understand the development status of elementary school labor education, which is the fundamental of the development and innovation of elementary school labor education teaching, and also the basis for promoting the innovative development of elementary school labor education teaching. Evaluation of elementary school labor education mainly includes evaluation of students' usual performance, comprehensive evaluation of school segments and monitoring of students' labor literacy.

This paper adopts a questionnaire survey to understand the current situation of labor education in this elementary school.

1) Purpose and Target of the Survey. In order to understand the current situation of the development of labor education in Z elementary school, a questionnaire survey is adopted to evaluate the current situation of the development of labor education in this elementary school. The questionnaire was targeted at the students of Primary School Z. A total of 500 questionnaires were distributed. Considering the younger age of the students in the lower grades and their limited ability to answer the questionnaires, the questionnaire was targeted at the middle and upper grades, and 500 students were randomly selected from the middle and upper grades of the school to carry out the survey. At the same time, a survey was conducted on the teachers of School X. Teachers surveyed included labor teachers, school leaders, student classroom teachers, and classroom teachers of the elementary school, and a total of 150 teachers were surveyed.

2) Survey Methods and Tools. The questionnaire design of this study is based on the relevant regulations of labor education such as the labor education guidance outline and curriculum standards, combined with the CIPP education evaluation model [22]. The questionnaire on the current situation of labor education in elementary school Z is shown in Table 6. The four steps involved in the CIPP education evaluation model were taken as the first-level evaluation indicators, and nine second-level indicators were identified by combining the existing labor education evaluation in the school, on the basis of which 21 third-level indicators were designed.

Table 6. Z primary school labor education status survey questionnaire

Primary indicator	Secondary indicator	Tertiary indicator
Background evaluation (labor education development) A	Culture target A1	Clear target A11
		Reasonable target A12
	Education content A2	Daily labor A21
		Productive labor A22
	Student demand A3	Service work A31
		Initiative A32
		Cognitive condition A33
Input evaluation (labor education guarantee) B	Conditional assurance B1	Teaching resources B11
		Faculty B12
	Professional support B2	Research and guidance B21
Process evaluation (labor education implementation) C	The status quo of the curriculum C1	Course development C11
		Course opening C12
		Teaching content C13
		Teaching form C14
	Faculty and student participation C2	Student participation C21
		Teacher guidance C22
		Teacher-student relationship C23
Results evaluation (labor education effect) D	Student gain D1	Knowledge skill D11
		Thought idea D12
	Teacher harvest D2	Instructional idea D21
		Teaching ability D22

3) Statistics of questionnaire survey results. The data collected through the questionnaire survey is organized and the results of the evaluation of labor education in Z elementary school are calculated, and the evaluation results on the first-level indicators of the evaluation of labor education in Z elementary school are shown in Figure 3. With a full score of 5 points, the evaluation mean on each level one indicator is 4.091, 3.954, 4.002, 4.004, respectively, and the overall evaluation score still has room for improvement at 4.013, which indicates that there are still many areas of labor education in the elementary school that need to be improved.

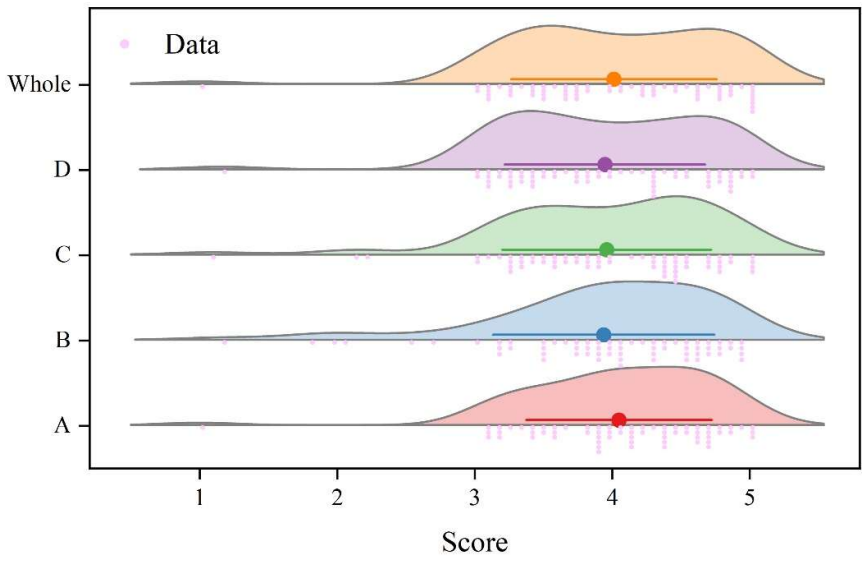

Fig. 3. Primary index evaluation results

In order to further understand the actual situation of labor education in Primary School Z, according to the information collected from the survey, the secondary and tertiary indicators of labor education in this elementary school were evaluated, and the evaluation results are shown in Table 7. It can be understood from the above table that among the second-level evaluation indicators, the scores of professional support (3.806) and teachers' harvest (3.859) are low, which indicates that Primary School Z needs to further optimize and improve in these aspects. A compilation of the scores of the three-level evaluation indicators of labor education in Elementary School Z revealed that the top three items with the lowest scores in the three-level indicators were: research and guidance (3.806), curriculum development (3.84), and student participation (3.847). Although there are individual items with higher scores, there is still room for improvement in the overall effect of labor education in the school, which requires the school to further increase the degree of attention to labor education in the process of development, to build a labor education evaluation mechanism in line with the current situation of school development in the light of the actual situation of the school, and to discover the deficiencies in labor education in the school in a timely manner through scientific evaluation and provide a reference for the optimization of labor education evaluation mechanism in the school. The evaluation of labor education in this school will provide a reference for optimizing the evaluation mechanism of labor education in this school.

Table 7. Evaluation of secondary and tertiary indicators

Secondary indicator	Mean	Tertiary indicator	Mean
Culture target A1	4.075	Clear target A11	4.183
		Reasonable target A12	3.967
Education content A2	4.104	Daily labor A21	4.147
		Productive labor A22	4.061
Student demand A3	4.094	Service work A31	4.137
		Initiative A32	4.124
		Cognitive condition A33	4.022
Conditional assurance B1	4.102	Teaching resources B11	4.181
		Faculty B12	4.022
Professional support B2	3.806	Research and guidance B21	3.806
The status quo of the curriculum C1	3.995	Course development C11	3.84
		Course opening C12	3.961
		Teaching content C13	4.091
		Teaching form C14	4.089
Faculty and student participation C2	4.009	Student participation C21	3.847
		Teacher guidance C22	4.036
		Teacher-student relationship C23	4.143
Student gain D1	4.148	Knowledge skill D11	4.114
		Thought idea D12	4.181
Teacher harvest D2	3.859	Instructional idea D21	3.916
		Teaching ability D22	3.802

4.2. Specific implementation steps

In order to improve the evaluation mechanism of labor education in Z Primary School, the labor education evaluation mechanism based on fuzzy clustering algorithm constructed in this paper is promoted in Z Primary School, and the evaluation results are analyzed to adjust the education mode in a timely manner after 8 weeks of labor education. Reward the excellent results, play the role of modeling and leading the excellent results, and motivate the majority of labor education teaching staff and full-time researchers to engage in labor education teaching research and practice exploration on a sustained basis. Students are instructed to comprehend the noble spirit and fine qualities of role models from their concrete deeds. Require students to strive to be on par with the role models in their daily labor practices. Students' labor education is incorporated into the index system for comprehensive quality evaluation, joining the Communist Party, and evaluating excellence in higher education, and students are motivated to participate in labor through the establishment of awards such as the Star of Labor and the Master of Labor.

4.3. Continuous optimization

The optimization process of labor education evaluation model based on fuzzy clustering algorithm is shown in Figure 4. The improvement of labor education quality evaluation mechanism is a process focusing on identifying problems and solving problems, a process of short answer to complex excess, from simple average algorithm to weighted average algorithm, and then to classified weighted average algorithm. Teacher evaluation is a fuzzy process, the introduction of the fuzzy theory, it makes the teacher evaluation mechanism from the previous a priori to the later fuzzy clustering, but the comprehensive judgment method based on the fuzzy theory has its inherent shortcomings, in which

the information distortion is a problem, this paper through the introduction of the second level of fuzzy judgment method to further optimize the mechanism.

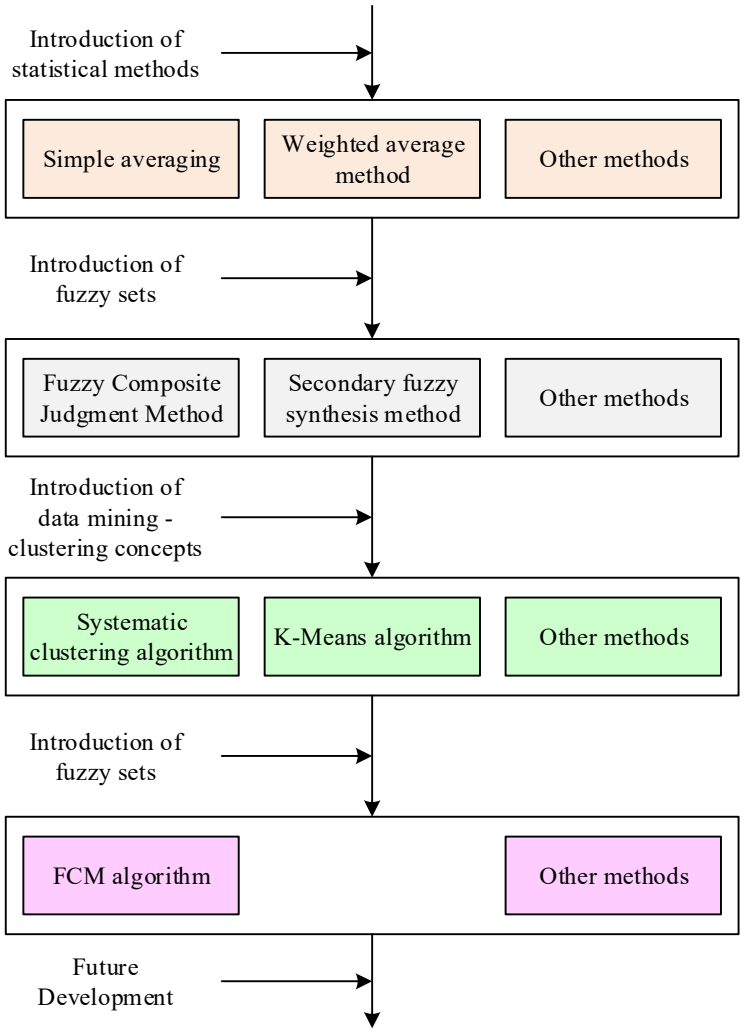

Fig. 4. Schematic diagram of the evaluation model improvement

5. Conclusion

The study constructed a labor education evaluation model based on the FCM algorithm, and the results of the model on labor education evaluation have only a small difference with the manual evaluation results, which is applicable to the evaluation of labor education quality. Taking Z elementary school as the research object, the current labor education evaluation mechanism of Z elementary school was optimized according to the implementation paths of pre-implementation preparation, specific implementation steps and continuous optimization of the evaluation mechanism. Before optimization, the overall evaluation score of the quality of labor education in Primary School Z was 4.013. The labor education evaluation mechanism designed in this paper was further promoted by constructing an incentive mechanism and optimizing the labor education evaluation model after running for 8 weeks in this school.

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