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Retraction

Retracted: Index Construction and Application of School-Enterprise Collaborative Education Platform Based on AHP Fuzzy Method in Double Creation Education Practice

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Z. He and X. Sun, "Index Construction and Application of School-Enterprise Collaborative Education Platform Based on AHP Fuzzy Method in Double Creation Education Practice," *Journal of Sensors*, vol. 2022, Article ID 7707384, 15 pages, 2022.

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Research Article

Index Construction and Application of School-Enterprise Collaborative Education Platform Based on AHP Fuzzy Method in Double Creation Education Practice

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At present, China's education reform is developing rapidly, and many schools begin to study and implement school-enterprise cooperative education. There are also some conceptual deviations. In addition, the government's weak implementation of the guarantee policy for the implementation of combination of school and enterprise education, coupled with the lack of relevant laws and regulations, rarely leads to the success and enthusiasm of combination of school and enterprise education. With the development of collaborative training companies, the participation rate needs to be improved, and the influence of school-enterprise colearning is not significant enough. Therefore, we should do more theoretical research on combination of school and enterprise education, so as to further improve the present situation of combination of school and enterprise education in China and promote the in-depth development of combination of school and enterprise education. At the same time, we should constantly improve relevant practices and systems, improve relevant laws and regulations, learn from the successful experience of cooperation between schools and enterprises training at home and abroad, and design a unique path of cooperation between schools and enterprises in combination with China's reality. First of all, this paper deeply analyzes the synergy degree of combination of school and enterprise education. By defining the concepts of the combination of industry and teaching and the combination of colleges and enterprises, synergy degree, and cooperative development level, this paper makes an in-depth interpretation of the education and teaching of schools and enterprises. From the perspective of synergetic theory and interactive mechanism, school-enterprise cooperation needs to be strengthened. Secondly, the model is created through the analytic hierarchy process, in which the hierarchical model uses the 10/10-18/2 scaling method to form the classification matrix. Finally, this paper analyzes on the factors affecting the combination of school and enterprise education and puts forward some perfect countermeasures from three angles of government, school, and enterprise.

1. Introduction

We introduce a method to deal with fuzzy analytic hierarchy process, which uses degree analysis method to determine the comprehensive degree value of pairwise comparison method. Applying the comparison principle of fuzzy numbers, under certain criteria, this decision-making process is illustrated by an example [1]. We propose a degree analysis method of fuzzy analytic hierarchy process and get a clear priority vector from the triangular fuzzy matrix of the equation. Experiments show that the hierarchical analysis method cannot estimate the true weight of fuzzy reference matrix, which leads to a large number of abuses. This paper illustrates with examples that the priority vector determined by degree analysis does not represent the relative importance of decision criteria or procedures [2]. An evaluation system based on analytic hierarchy process and fuzzy comprehensive evaluation is proposed to select the best supplier for garment enterprises. This paper mainly introduces a social manufacturing framework, which can be used to perceive and influence customers and meet the needs of mass customization. Both qualitative and quantitative factors are considered in this method. Its efficiency and feasibility have been verified in Dongguan garment enterprises [3]. The fuzzy overall evaluation method of AHP, through the study of

highway widening trend, will provide a framework for the formulation of highway widening scheme and provide quantitative objective basis for subjective decision-making of highway widening [4]. Based on the performance, aesthetics and ecology of golf courses, the landscape index system is constructed as the target of the landscape evaluation of the lake-view golf course in Kunming. The method, index, and model of the landscape evaluation of the city golf course are discussed by using the semantic differential method, the analytic hierarchy process, and the fuzzy comprehensive evaluation of the landscape evaluation of the lake-view golf course in Dianchi Lake [5]. Aiming at the limitation of AHP fuzzy comprehensive evaluation method, an improved AHP fuzzy comprehensive evaluation method is proposed, which has isomorphism and test evaluation set, and will continue to be applied to the evaluation of higher education quality and comprehensive evaluation of colleges and universities. The results show that the improved method can better test and evaluate the expected consistency of each evaluation factor [6]. The combination of schools and enterprises is a form of talent training that adapts to the development of the times. Make full use of resources from all aspects to enhance practical ability. Therefore, it is of great significance to put forward improvement measures and accelerate the formation of an effective cooperation model for national education and social development [7]. It is of great practical value to form a cooperative education community between schools and enterprises for cultivating students' professional skills. By changing the traditional classroom teaching methods, the connection between professional skills and professional skills is realized, which increases students' professional knowledge and enriches students' professional skills. It provides a new way for students' emotional attitude and character [8]. This paper analyzes the necessity of implementing entrepreneurship education in cooperation between schools and enterprises from the perspective of educational institutions and entrepreneurship education in colleges and universities and puts forward that the curriculum system of entrepreneurship education in colleges and universities should be carried out by both parties. Work together to create a campus entrepreneurial culture atmosphere and improve the effectiveness of entrepreneurship education [9]. This paper analyzes the importance of cooperation between schools and enterprises, suggests setting key courses according to the skills required by specific tasks, and studies the construction methods of modular curriculum design, curriculum improvement, and grading system design [10]. College students' innovation and entrepreneurship education has been paid more and more attention by the society. This is not only the requirement of the times, but also the charm of innovation and entrepreneurship education itself. In view of the present situation of applied entrepreneurship and the difficulties in applied finance, this paper summarizes the reasons that affect students' entrepreneurial ability and discusses the ways to improve financial students' entrepreneurial ability and self-realization [11]. It is the requirement of the progress and development of market economy and the inevitable choice of innovation and entrepreneurship in China to strengthen the innovation and entrepreneurship education of college students to help them consolidate the concept of innovation and entrepreneurship and improve their awareness of innovation and entrepreneurship. The traditional college model lacks innovation and entrepreneurship awareness and innovation and entrepreneurship theory. According to the requirements of innovation construction, colleges and universities should renew their concepts, establish a correct understanding of their abilities, and carry out fundamental reforms and innovations in the concepts, mechanisms, contents, methods, management, and innovative entrepreneurial skills of entrepreneurship education [12]. Many colleges and universities do not mention increasing innovation and entrepreneurship in their personnel training objectives. Moreover, institutional innovation and entrepreneurship education are only forms. Therefore, innovation and entrepreneurship education has not yet penetrated into the whole process of talent development. Some school-enterprise cooperation lacks deep integration into the whole education system and vocational training [13]. It is very important for the development and prosperity of the country to improve students' innovation and entrepreneurship ability and employment development competitiveness in the financial crisis. Combined with the present situation of colleges and universities in China, this paper puts forward some countermeasures to promote students' innovation and entrepreneurship from two main angles: colleges and students themselves [14]. Based on the innovation and entrepreneurship needs of students majoring in tourism management in tourism development, this paper combs the problems existing in the tourism management ability system from three angles of innovation consciousness, innovation ability, and innovation ability and puts forward targeted countermeasures and suggestions [15]. By improving the school's participation in collaborative education and deepening the degree of collaboration between schools and enterprises, it is conducive for the school to set up majors, formulate courses, compile teaching materials, build internal and external training and practice bases, and employ front-line technical skill masters of enterprises to provide practical skill guidance, so as to effectively improve the quality of talent training, ensure that students can meet the requirements of industry enterprises for technical talents through systematic learning of theoretical knowledge and practical skills, effectively shorten the time of students' post adaptation, and truly cultivate skilled talents required by industry enterprises and society.

2. The Current Situation of Students' Dual-Innovation Ability under the Mode of Cooperation between Schools and Enterprises

2.1. Failure to Fully Understand the Importance of Cultivating Innovation and Entrepreneurship. Under the background of education reform, the Ministry of Education has launched various corresponding policies. Under the effect of these policies, colleges and universities have begun to attach importance to the cultivation of entrepreneurial talents and focus on building a talent training platform to provide talents for the society. However, the research shows that some universities do not fully understand the importance of improving entrepreneurial skills, and higher vocational colleges are less invested in this

area than undergraduate colleges, and there are still obvious problems. At present, some universities pay attention to improving students' professional teaching and learning ability according to the cooperation between schools and enterprises model but do not recognize the value of innovative and entrepreneurial courses and activities. Although most VET institutions have established similar training bases in the synergy between enterprises, they often focus on skills training, which runs counter to the VET concept in the new era of schools and is not conducive to the all-round development of students.

2.2. The Existing Cooperation Mechanism Still Needs to Be Improved. Under the existence of many drawbacks, there are obvious defects in the relevant mechanism of cooperation between schools and enterprises at present, especially in cultivating students' innovative and entrepreneurial ability, which only focuses on the improvement of students' professional skills and seriously lacks practical characteristics, which makes it difficult for students to invest in innovative and entrepreneurial activities under such a mechanism and cannot improve their practical ability. Under the new situation, colleges and universities should establish a stable cooperation mechanism with modern enterprises, carry out targeted education, and provide students with an environment and platform for innovation and entrepreneurship.

2.3. Lack of Innovative Practice Platform. At present, the resources of campus bases such as innovation studios and workshops are scarce, and the utilization rate is low. Cooperation between schools and enterprises mode is still under study, and comprehensive operation modes such as negotiation, contact, docking, and monitoring have not yet been formed. It is not well combined with college students' mass entrepreneurship and innovation. Therefore, students' practice of participating in innovation and entrepreneurship is less, and their achievements have not gone out of school and gone to the society in a large scale, so they cannot be tested by the market.

3. Improvement of Analytic Hierarchy Process

By analyzing the specific implementation steps of analytic hierarchy process, the hierarchical model after construction is evaluated. After extensive analysis, an improved algorithm is proposed, and the efficiency of the algorithm is ensured by the practical application of the system. The improved algorithm of the system can effectively reduce the amount of computation, and the algorithm has wide adaptability. The algorithm is not only suitable for the case that all the estimated relative weights $a\_ij = \mu\_i/\mu\_j$ of $I, j(I, j = 1, 2, \cdots, n)$ are completely valid, but also suitable for the following cases: there is no complete confirmation.

3.1. Optimal Selection of Scale. The values of each element of the evaluation matrix reflect the subjective cognition and evaluation of decision makers. In the practical application of analytic hierarchy process, the general scaling methods are three scaling methods, 0.5-0.9 scaling methods, 9/9-9/1 scaling methods, and 10/10-18/2 scaling methods.

Three-scale method: only three values can be selected in the judgment of matrix, which are -1, 0, and 1 as shown in the formula

$$a_{ij}\begin{cases} -1, \text{Means } I \text{ is less important than } J, \\ 0, \text{It means that } I \text{ and } J \text{ are equally important}, \\ 1, \text{Indicates that } i \text{ is more important than } j. \end{cases} \quad (1)$$

a_{ij} denotes the relative weight of element I compared to element J, and $A = (a_{ij})_{mn}$ is the pairwise judgment matrix, where a_{ij} has the following properties: $a_{ij} > 0, a_{ij} = 1/a_{ji}, a_{ii} = 1$.

The pairwise comparison classification matrix formed according to this definition is shown in the formula

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix}. \quad (2)$$

Then, the optimal transfer matrix B of the judgment matrix A is shown in the formula

$$B = \begin{pmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{pmatrix}, \text{where, } b_{ij} = \frac{1}{n}\sum_{k-1}^{n}\left(a_{ik} + a_{jk}\right). \quad (3)$$

The transition matrix B is further transformed into the consistency matrix C.

For matrix $A = (a_{ij})_{nn}$, it is a positive and inverse n-multiplicity matrix. If every $I, j, k = 1, 2, \cdots, n$ has $a_{ij} * a_{ji} = 1$, it is a consistent matrix, as shown in the formula

$$C = \begin{pmatrix} c_{11} & \cdots & c_{1n} \\ \vdots & \ddots & \vdots \\ c_{n1} & \cdots & c_{nn} \end{pmatrix}, \text{where, } c_{ij} = \exp\left(b_{ij}\right). \quad (4)$$

Consistency matrix C is the evaluation matrix needed by AHP.

9/9-9/1 scaling method: the specific values are investigated by Delphi method.

0.5-0.9 scaling method: if A_I is considered as important as A_J, then $a_{ij} = 0.5$; if A_I is more important than A_J, then $a_{ij} = 0.9$; in other cases, it is between 0.5 and 0.9. The even reference matrix $A = (a_{ij})_{mn}$ generated by 0.5-0.9 scaling method has the following properties: $a_{ij} > 0, a_{ij} = 1 - a_{\mu}$; $a_{11} = 0.5$, and the matrix generated by 0.5-0.9 scaling method are complementary matrices.

10/10-18/2 scaling method: in order to improve the paired estimation matrix scaling method, there is also a 10/10-18/2 scaling method. In the 1/9 scaling method, the corresponding ratio to the 9/9-9/1 scaling method is shown in Table 1.

Table 1: Importance of three scale methods.

1-9 scale method	9/9-9/1 scale method	10/10-18/2 scale method	The importance of the representation
1	9/9	10/10	The same important
3	9/7	12/8	A little important
5	9/5	14/6	Important
7	9/3	16/4	Strong important
9	9/1	18/2	Very important
$K1, 2, \cdots 9$	$9/(10-K)1, 2, \cdots 9$	$(9+k)/(11-K)1, 2, \cdots 9$	Range of structural formula K

3.2. Improvement of Algorithm for Calculating Ranking Weight. Suppose there is a criterion C, then the relative weights of specific layers $u_1, u_2, u_3, \cdots, u_n$ of the classification matrix A are carried out, and then the consistency test is carried out. Once the weight vector of a specific layer element relative to the previous layer element is calculated under the criterion, the combined weight of each element relative to the total amount of the target layer is finally obtained.

The sequence weight vectors of the $k-1$ elements of the $k-1$ layer are shown in the formula

$$\omega^{(k-1)} = \left(\omega_1^{k-1}, \omega_2^{k-1}, \cdots, \omega_{k-1}^{k-1}\right). \tag{5}$$

The ordering vector of $k-1$ elements of the k layer is shown in the formula

$$p_j^{(k)} = \left(p_{1j}^{(k)}, p_{2j}^{(k)}, p_{3j}^{(k)}, \cdots, p_{kj}^{(k)}\right). \tag{6}$$

The elements of k layer are sorted according to the elements of $k-1$ layer as

$$p^{(k)} = \left(p_{1j}^{(k)}, p_{2j}^{(k)}, p_{3j}^{(k)}, \cdots, p_{kj}^{(k)}\right). \tag{7}$$

Elements that calculate the weight of the k layer relative to the target are shown in the formula

$$\omega^{(k)} = \left(\omega_1^{(k)}, \omega_2^{(k)}, \cdots, p_k^{(k)}\right) T = P^{(k)} * \omega^{(k-1)}. \tag{8}$$

Or use the summation method as shown in the formula

$$\omega_1^{(k)} = \sum_{j=i}^{k-1} p_{ij}^{(k)} * \omega_k^{(k-1)}, i = 1, 2, \cdots, n. \tag{9}$$

Because calculating the relative weight of each layer element is familiar with calculating the relative weight of the total object, this paper does not propose them one by one.

3.2.1. Eigenvalue Method. If the elements obtained from the hierarchical model satisfy $a_{ij} > 0$ and $a_{ij} = 1/a_{ji}, a_{11} = 1$ and $a_{ik} * a_{kj} = a_{ij}$ at the same time, $A\omega = \lambda\omega$ can be normalized to obtain the relative weight vector. The following methods are as follows:

A judgment matrix constructed under a single criterion between levels: $A = (a_{ij})_{n*n}$, where $a_{ij} = \mu_1/\mu_2$ then has formula (10) according to linear algebraic knowledge

$$\begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix} \begin{pmatrix} a_1 \\ \vdots \\ \mu_n \end{pmatrix} = \begin{pmatrix} \frac{\mu_1}{\mu_2} & \cdots & \frac{\mu_2}{\mu_n} \\ \vdots & \ddots & \vdots \\ \frac{\mu_n}{\mu_2} & \cdots & \frac{\mu_n}{\mu_n} \end{pmatrix} \begin{pmatrix} \mu_1 \\ \vdots \\ \mu_n \end{pmatrix} = n \begin{pmatrix} \mu_1 \\ \vdots \\ \mu_n \end{pmatrix}. \tag{10}$$

There are $A\mu = n\mu$, where

$$\mu = \begin{pmatrix} \mu_1 \\ \vdots \\ \mu_n \end{pmatrix}. \tag{11}$$

Then n is the eigenvalue of Eigen equation $A\omega = \lambda\omega$, and the corresponding eigenvector is

$$\mu = \begin{pmatrix} \mu_1 \\ \vdots \\ \mu_n \end{pmatrix}. \tag{12}$$

Then normalize, that is, $i = 1, 2, \cdots, n$, get $\omega_i = \mu_i / \sum_{j=1}^{n} \mu_j$, and get $\omega = (\omega_1, \omega_2, \cdots, \omega_n)^T$. The above is the ideal case where the ranking of scoring matrix A is 1; that is, the paired scoring matrix only meets the requirements of positive and negative attributes and consistency. However, if $a_{1k} * a_{kj} = a_{ij}$ is invalid, the largest right root is not equal to N. It is necessary to check and adjust the consistency of matrix in order to achieve satisfactory consistency of matrix.

3.2.2. Power Method. In the actual situation of this study, it is found that the amount of calculation is very large. Therefore, when dealing with complex situations, the calculation of square root method becomes more and more limited. Assuming that the matrix is consistent satisfactorily, in order to reduce the system constraints, the power method effectively reduces the computational complexity.

Suppose that the eigenvalue of the judgment matrix is A: $\lambda_1, \lambda_2, \cdots, \lambda_n$, and at the same time $|\lambda_1| > |\lambda_2| > |\lambda_3| > \cdots > |\lambda_n|$, the corresponding eigenvector is $\mu_1, \mu_2, \cdots, \mu_n$, and for

every nonzero $x^{(0)}$, there must be an $a_1, a_2, \cdots, a_n$ such that $a_1 = \sum_{j=1}^{n} a_j \mu_j$. Use the iterative formula $x^{(k+1)} = Ax^{(k)}, k = 0, 1, \cdots$ to find the point sequence and get $\{x^{(0)}, x^{(1)}, \cdots\}$. Then according to what we can get, $x^{(k+1)} = Ax^{(k)} = A^k x^{(0)} = A^k * \sum_{j=1}^{n} a_j A^k \mu_j = \sum_{j=1}^{n} a_j \lambda_j^k \mu_j = \lambda_1^k [a_1 \mu_1 + \sum_{j=2}^{n} (\lambda_1/\lambda_2)^k \mu_j]$, because $|\lambda_1| > |\lambda_2| > |\lambda_3| > \cdots > |\lambda_n|$, so if $\sum_{j=2}^{n} a_j (\lambda_1/\lambda_2)^k \mu_j$ is large enough and K is small enough, we can get

$x_i^{(k+1)}/x_i^{(k)} = (A^k x^{(0)})/(A^{k-1} x^{(0)}) \approx \lambda_1$, so $x_i^{(k+1)}/x_i^{(k)}$ is an approximate estimate of λ_1. The actual calculation ensures that if $|\lambda_1| < 1$ or $|\lambda_1| > 1$, $|\lambda_1^k|$ tends to infinity or infinity. Namely $a = \max\{x_i^{(k)} | i = 1, 2, \cdots, n\}$, and then $x^{(k+1)} = A * (1/a) x^{(k)}, k = 1, 2, \cdots$.

3.2.3. Square Root Method. The square root method is to carry out geometric average on each row vector of judgment matrix A first, and then normalize it. First, a product operation is performed on the elements of the estimated value A of each row that is shown in the formula

$$M_i = \left(\prod_{j=1}^{n} a_{ij} \right)^{1/n}, \tag{13}$$

where $i = 1, 2, \cdots, n$. Normalization is then performed, as shown in the formula

$$\omega_i = \frac{M_i}{\sum_{j=1}^{n} M_1}, i = 1, 2, \cdots, n. \tag{14}$$

Then the maximum eigenvalue of judgment matrix A is shown in the formula.

$$\lambda_{\max} = \frac{1}{n} \left(\sum_{i=1}^{n} \frac{(Aw)_i}{w_i} \right). \tag{15}$$

In the formula, $(Aw)_i$ is the i components of Aw, and $\omega = (\omega_1, \omega_2, \cdots, \omega_n)^T$.

3.2.4. Least Square Method. The judgment matrix

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix} = \begin{pmatrix} \mu_1/\mu_2 & \cdots & \mu_2/\mu_n \\ \vdots & \ddots & \vdots \\ \mu_n/\mu_2 & \cdots & \mu_n/\mu_n \end{pmatrix} \tag{16}$$

is not valid. In other words, the estimated relative weight $a_{ij} = \mu_i/\mu_j$ is not fully applicable to all $I, j(I, j = 1, 2, \cdots, n)$. In this case, the value of $a_{ij}\mu_j - \mu_1$ is not all zero, and the weight set $\{u_1, u_2, u_3, \cdots, u_n\}$ is selected to minimize the sum of squares, as shown in the formula

$$\begin{aligned} \text{Min } Z &= \sum_{i=1}^{n} \sum_{j=1}^{n} (a_{ij} - \mu_1)^2, \\ \text{S.t.} &\sum_{j=1}^{n} \mu_1 = 1. \end{aligned} \tag{17}$$

The generated program is a typical nonlinear program. We use Lagrange coefficients to make nonlinear programming a purely quantitative programming problem and construct Lagrange functions as shown in the formula

$$L = \sum_{i=1}^{n} \sum_{j=1}^{n} \left(a_{ij} \mu_j - \mu_1 \right)^2 + 2\lambda \left(\sum_{j=1}^{n} \mu_1 - 1 \right). \tag{18}$$

In analytical mechanics, the Lagrange function of a dynamic system is a function that describes the dynamic state of the whole physical system. For general classical physical systems, it is usually defined as kinetic energy minus potential energy, which is expressed by the equation, where L is the Lagrange quantity, λ is the kinetic energy, and μ is the potential energy.

In analytical mechanics, assuming that the Lagrange function of a system is known, the Lagrange quantity can be directly substituted into the Lagrange equation, and the motion equation of the system can be obtained with a little operation.

Perform the first partial derivative operation on the above formula as shown in the formula

$$\frac{\partial_L}{\partial_{\mu_1}} = 2 \sum_{i=1}^{n} (a_{i1} \mu_1 - \mu_i) a_{i1} - 2 \sum_{j=1}^{n} \left(a_{j1} \mu_1 - \mu_i \right) + 2\lambda = 0, \tag{19}$$

where $l = 1, 2, \cdots, n$. $\partial_L/\partial_\lambda = 2(\sum_{i=1}^{n} \mu_1 - 1) = 0$.

First, list the steps of the algorithm in theory:

(1) Construct judgment matrix A

(2) Using the least square method to get the maximum eigenvalue $\lambda_{\max}$ and get the corresponding eigenvector

(3) Normalized eigenvector

(4) Calculate the conformance index $CI(0)$, and get the $CR(0)$ of any conformance index RI. If $CR(0) < 0.1$, no iteration is required. The relative weight vector obtained is

$$\omega^{(0)} = \left(\omega_1^{(0)}, \omega_2^{(0)}, \cdots, \omega_n^{(0)} \right)^T. \tag{20}$$

Otherwise, you need to build a complete consistency matrix as shown in the equation

$$B^{(0)} = \begin{pmatrix} \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & \cdots & \frac{\omega_1^{(0)}}{\omega_n^{(0)}} \\ \vdots & \ddots & \vdots \\ \frac{\omega_n^{(0)}}{\omega_1^{(0)}} & \cdots & \frac{\omega_n^{(0)}}{\omega_n^{(0)}} \end{pmatrix}. \tag{21}$$

Adopting iterative equation: $A^{(1)} = tA^{(0)} + (1-t)B^{(0)}$, carrying out iterative operation.

After iteration, the maximum eigenvalue of the judgment matrix is checked for consistency. If the consistency requirement is met, only the eigenvector corresponding to the maximum eigenvalue is normalized, which is the final ranking weight. If the consistency requirement is not met, the iteration must continue until the consistency requirement is met.

Use the talent evaluation system example in this article to demonstrate the algorithm:

This paper only introduces the "comprehensive quality" evaluation system, and the demonstration methods of other evaluation systems in the system are known, so this paper will not list them separately.

First, build the hierarchical model as follows in Figure 1:

Hierarchical model uses 10/10-18/2 scaling method to create classification matrix, it is shown in Table 2.

Then, the maximum eigenvalue of the scoring matrix is obtained by using the least square method: $\lambda_{\max}^{(0)} = 6.6357$; the corresponding eigenvector and the normalized eigenvector are shown as

$$\omega^{(0)} = \left(\omega_1^{(0)}, \omega_2^{(0)}, \cdots, \omega_n^{(0)}\right)^T = (0.1377, 0.1998, 0.2348, 0.2138, 0.2138)^T, \tag{22}$$

$$\mathrm{CI} = \frac{\lambda_{\max} - n}{n-1} = \frac{6.6357 - 5}{5-1} = 0.4089, \tag{23}$$

$$\mathrm{RI} = 1.12, \tag{24}$$

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} = \frac{0.4089}{1.12} = 0.3650 > 0.1. \tag{25}$$

Obviously, the requirement of consistency is not met. Achieve consistency through iterative method.

Construct a complete consistency matrix as shown in the formula

$$B^{(0)} = \begin{pmatrix} \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & \cdots & \frac{\omega_1^{(0)}}{\omega_n^{(0)}} \\ \vdots & \ddots & \vdots \\ \frac{\omega_n^{(0)}}{\omega_1^{(0)}} & \cdots & \frac{\omega_n^{(0)}}{\omega_n^{(0)}} \end{pmatrix} = \begin{pmatrix} 1 & 0.6892 & 0.5694 & 0.624 & 0.624 \\ 1.4621 & 1 & 0.8418 & 0.9541 & 0.9541 \\ 1.7265 & 1.7265 & 1 & 1.1018 & 1.1018 \\ 1.5521 & 1.0971 & 0.9823 & 1 & 1 \\ 1.6567 & 1.0989 & 0.9811 & 1 & 1 \end{pmatrix}. \tag{26}$$

Iterative equation: $A^{(1)} = tA^{(0)} + (1-t)B^{(0)}$; take $t = 0.9$ and iterate, as shown in the formula

$$A^{(1)} = 0.9A^{(0)} + 0.1B^{(0)} = \begin{pmatrix} 1 & 1.323 & 1.3581 & 1.6224 & 1.5618 \\ 0.8934 & 1 & 3.9821 & 3.9321 & 0.8721 \\ 4.5622 & 0.3299 & 1 & 5.2217 & 3.9809 \\ 3.0098 & 2.9832 & 0.9721 & 1 & 0.3750 \\ 0.9023 & 2.3255 & 3.9227 & 3.0445 & 1 \end{pmatrix}. \tag{27}$$

The maximum eigenvalue of $A^{(1)}$ is calculated, and the corresponding eigenvectors are shown as

$$\omega^{(0)} = \left(\omega_1^{(0)}, \omega_2^{(0)}, \cdots, \omega_n^{(0)}\right)^T = (0.3987, 0.5171, 0.7689, 0.8093, 0.5609)^T, \tag{28}$$

$$\mathrm{CI} = \frac{\lambda_{\max} - n}{n-1} = \frac{6.672 - 5}{5-1} = 0.418, \tag{29}$$

$$\mathrm{RI} = 1.12, \tag{30}$$

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} = \frac{0.418}{1.12} = 0.3732 > 0.1. \tag{31}$$

Need to continue iteration.

After 4 iterations, the maximum eigenvalues are shown as

$$\begin{aligned} \lambda_{\max}^{(1)} &= 5.579, \\ \lambda_{\max}^{(2)} &= 5.498, \\ \lambda_{\max}^{(3)} &= 5.4623, \\ \lambda_{\max}^{(4)} &= 5.41, \end{aligned} \tag{32}$$

$$\mathrm{CI} = \frac{\lambda_{\max} - n}{n-1} = \frac{5.41 - 5}{5-1} = 0.1025, \tag{33}$$

$$\mathrm{RI} = 1.12, \tag{34}$$

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} = \frac{0.1025}{1.12} = 0.0915 < 0.1. \tag{35}$$

That is to say, satisfactory consistency requirements are achieved. Then the corresponding eigenvectors are normalized to get the final weight value.

4. Experimental Research and Results

4.1. Data Acquisition and Index Weighting

4.1.1. Data Collection and Processing. This study is distributed to schools in two ways: electronic questionnaire and paper proofreading enterprise training site from 2013 to 2018. There are 341 valid questionnaires, excluding invalid questionnaires. The interest rate is 96.6%, which meets the requirements. And based on this information, explore the cooperation between schools and enterprises in educating people.

4.1.2. Weighting Method of Evaluation Index. In this paper, subjective and objective weighting methods are mainly used to determine and jointly determine the index weight. Entropy

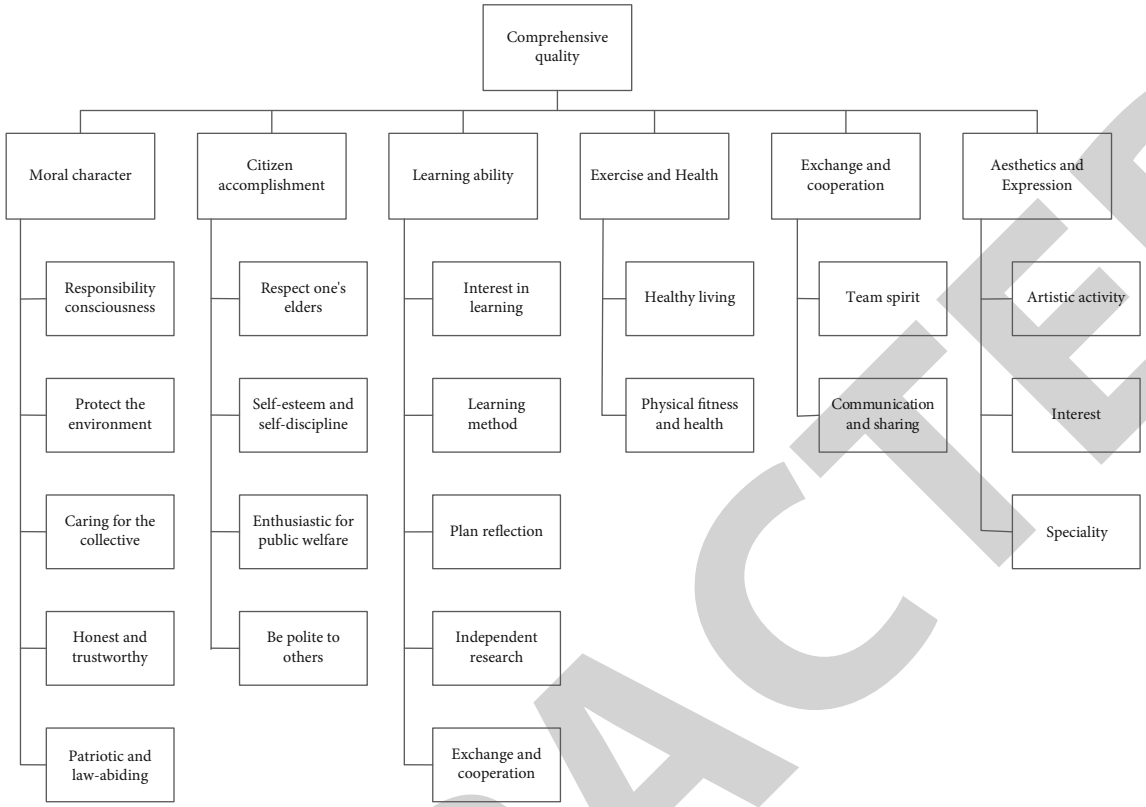

Figure 1: Comprehensive quality hierarchy model.

Table 2: Judgment matrix under scale method.

Criterion 1	B1	B2	B3	B4	B5	B6
B1	10/10	10/10	12/8	14/6	14/6	18/2
B2	10/10	10/10	14/6	16/4	18/2	18/2
B3	8/12	6/14	10/10	16/4	16/4	18/2
B4	6/14	4/16	4/16	10/10	10/10	14/6
B5	6/14	2/18	4/16	4/16	10/10	12/8
B6	2/18	2/18	2/18	6/14	8/12	10/10

method and coefficient of variation method are used to determine the index weight, and finally combined weighting method is used to determine the final weight to weigh the advantages and disadvantages of different methods. This index makes up for the deficiency of single weight model and makes the effectiveness of the index more reasonable.

4.2. Determining the Weight of the Cooperative Education System between Schools and Enterprises

4.2.1. Determine the Weight of Each Index of School-Enterprise Education System. Entropy method. According to the calculation formula, the weight of each index is obtained. See Table 3 for specific data.

Variation coefficient method. According to the weighting formula of variation coefficient method, the characteristic value of each index is substituted into the formula, and the index weight of school general education system is obtained. See Table 4 for details.

Combination weight. According to the calculation formula of combination weight, β is 0.5, and the comprehensive weight of each item in the index system of coeducational system is obtained according to Table 5.

4.2.2. Determine the Weight of Each Index of Enterprise Cooperative Training System. Entropy method. According to the weighting principle of entropy method, the relevant indexes of cooperative training system are weighted, and the weights of each index are obtained according to Table 6.

Variation coefficient method. According to the weighting formula of variation coefficient method, the characteristic value of each index is substituted into the corresponding formula, and the index weight of business cooperation training system is obtained, as shown in Table 7.

Combination weight formula. According to the combination weight calculation formula $\beta = 0.5$, the total weight of the cooperative training system index system can be obtained, as shown in Table 8.

To sum up, the weight of the corresponding indicators of school collaborative education and enterprise collaborative education can be obtained. See Table 9 for more detailed information.

4.3. Empirical Analysis of the Synergy Degree of School-Enterprise Collaborative Education

Table 3: Index weight.

Metric	Entropy value	1-E	Entropy right
D1	0.8713	0.1287	0.0289
D2	0.7875	0.2125	0.0478
D3	0.8101	0.1899	0.0427
D4	0.8473	0.1527	0.0343
D5	0.8577	0.1423	0.032
D6	0.8298	0.1702	0.0383
D7	0.8454	0.1546	0.0348
D8	0.7895	0.2105	0.0473
D9	0.8196	0.1804	0.0406
D10	0.775	0.225	0.0506
D11	0.8242	0.1758	0.0395
D12	0.8535	0.1465	0.0329
D13	0.824	0.176	0.0396
D14	0.8055	0.1945	0.0437
D15	0.778	0.222	0.0499
D16	0.8039	0.1961	0.0441
D17	0.8055	0.1945	0.0437
D18	0.8583	0.1417	0.0319
D19	0.5512	0.4488	0.1009
D20	0.7968	0.2032	0.0457
D21	0.6225	0.3775	0.0849
D22	0.7968	0.2032	0.0457

Table 4: Index weight of school collaborative education system under coefficient of variation method.

Metric	Coefficient of variation	Weight
D1	0.0568	0.0784
D2	0.0573	0.0791
D3	0.004	0.0055
D4	0.032	0.0441
D5	0.044	0.0607
D6	0.0302	0.0417
D7	0.0582	0.0803
D8	0.0579	0.08
D9	0.0658	0.0908
D10	0.0284	0.0392
D11	0.0552	0.0762
D12	0.0281	0.0388
D13	0.0216	0.0298
D14	0.0223	0.0308
D15	0.0354	0.0489
D16	0.0522	0.072
D17	0.0129	0.0177
D18	0.0138	0.019
D19	0.0277	0.0382
D20	0.0022	0.003
D21	0.0129	0.0177
D22	0.0058	0.008

4.3.1. Analysis of Comprehensive Development Level of School-Enterprise Collaborative Education System. Multiplying the respective index weights in the index system of school-enterprise collaborative education system with the original data after entropy method, the comprehensive development level of school-enterprise collaborative education system from 2013 to 2018 can be obtained, respectively, as shown in Table 10 for details.

Analysis Table 10 knows:

(1) From the time point of view, the overall development level of combination of school and enterprise education system is on the rise. Among them, the upward trend of enterprises is clear and develops rapidly, while schools are stable and grow steadily. The overall development level of coeducation in schools has steadily increased from 0.1804 in 2013 to 0.8826 in 2018, with a steady growth rate and almost no growth in recent six years. The overall development speed is slow, showing a gradual upward trend; the overall development level of the joint venture training system increased from 0.1257 in 2013 to 0.4561 in 2016 and from 0.1257 in 2013 to 0.4561 in 2016. The development speed was rapid in 2017, and in 2013: 0.2051671. In the past two years, the overall development level has been significantly improved. To sum up, from 2013 to 2018, the overall development level of cooperation between schools and enterprises in running schools has changed, but the development speed is slightly faster than that of schools, and the overall development level is generally higher

(2) The overall development level of the cooperative school-running system is different from that of the cooperative school-running system, which leads to obvious differences between the two systems in the development process. Overall, the overall development level of coeducation in enterprises increased slightly faster than that in schools from 2013 to 2018. The gap between the overall development level of cooperative education and the overall development level of cooperative education can be divided into two stages: the first stage, the positive distribution stage after 2013. Until 2016, it was the collaborative education system of the school. The overall development level of human system is faster than that of cooperative education system. At present, the overall development level of the general education system in schools has increased from 0.1804 in 2013 to 0.5412 in 2016, while the development level of companies has increased from 0.1257 in 2013 to 0.4561 in 2016. Company leading to the overall development level of the school collaborative training system is better than the overall development level of the company collaborative training system; The second stage, the negative gap stage from 2017

Table 5: Comprehensive weight.

Metric	Entropy weight method	Variability coefficient method	Comprehensive weight
D1	0.0289	0.0784	0.0537
D2	0.0478	0.0791	0.0634
D3	0.0427	0.0055	0.0241
D4	0.0343	0.0441	0.0392
D5	0.032	0.0607	0.0464
D6	0.0383	0.0417	0.04
D7	0.0348	0.0803	0.0575
D8	0.0473	0.08	0.0637
D9	0.0406	0.0908	0.0657
D10	0.0506	0.0392	0.0449
D11	0.0395	0.0762	0.0579
D12	0.0329	0.0388	0.0359
D13	0.0396	0.0298	0.0347
D14	0.0437	0.0308	0.0373
D15	0.0499	0.0489	0.0494
D16	0.0441	0.072	0.0581
D17	0.0437	0.0177	0.0307
D18	0.0319	0.019	0.0254
D19	0.1009	0.0382	0.0696
D20	0.0457	0.003	0.0244
D21	0.0849	0.0177	0.0513
D22	0.0457	0.008	0.0268

Table 6: Weight of enterprise education system under entropy method.

Metric	Entropy value	1-E	Entropy right
D23	0.8057	0.1943	0.0387
D24	0.7804	0.2196	0.0437
D25	0.8054	0.1946	0.0388
D26	0.857	0.143	0.0285
D27	0.795	0.205	0.0408
D28	0.8018	0.1982	0.0395
D29	0.867	0.133	0.0265
D30	0.8775	0.1225	0.0244
D31	0.6854	0.3146	0.0627
D32	0.7492	0.2508	0.05
D33	0.7528	0.2472	0.0492
D34	0.8023	0.1977	0.0394
D35	0.6523	0.3477	0.0693
D36	0.8115	0.1885	0.0375
D37	0.7517	0.2483	0.0495
D38	0.8605	0.1395	0.0278
D39	0.8237	0.1763	0.0351
D40	0.7808	0.2192	0.0437
D41	0.6459	0.3541	0.0705
D42	0.7923	0.2077	0.0414
D43	0.7132	0.2868	0.0571
D44	0.8722	0.1278	0.0255
D45	0.8451	0.1549	0.0309
D46	0.852	0.148	0.0295

to 2018, means that the overall development level of the education system based on enterprise cooperation is faster than that of the school cooperative education system. After the overall development level improved steadily from 2013 to 2016, the overall development level of the joint venture training system improved rapidly in 2017, from 0.4561 in 2016 to 0.7462 in 2017 and then to 0.8485 in 2018, which is a great increase. From 2017 to 2018, the overall development level of coeducation is higher than that of coeducation in schools. The main reasons are as follows: First, from the perspective of industrial transformation and renewal, China's economy has been declining in recent years. Traditional industries are in urgent need of reform and modernization, and enterprises also urgently need to change traditional product production processes, improve product quality, and cooperate with schools to develop new products, which not only contributes to the reform and renewal of enterprise products, but also disappears China's human capital dividend from the perspective of human resource demand. At present, enterprises are in urgent need of high-quality technology and professional skills that can work at zero distance. Some universities are the main supply sources of technical capabilities, and enterprises can cooperate with them to meet their own needs. School-enterprise cooperation requires a certain degree of high-quality technology and technical ability; Finally, from the perspective of improving the competitiveness of enterprises, innovation is the motive force of enterprise development. In the past, many enterprises invested a lot of money in displaying innovative talents, developing new product patents and innovating products. In order to save the cost of innovation, more and more enterprises are setting up new product development centers in colleges and universities and implementing industrial education integration schools. Enterprises cooperate in educating people and jointly research and develop new processes, technologies, projects, and products with teachers and students, which significantly reduces the research and development costs of enterprises and improves the competitiveness of enterprises. Since 2017, the overall development level of enterprise collaborative education system has gradually exceeded the school level, and there is a negative gap in the development trend

4.3.2. Analysis on the Development Level of Collaborative Education Subsystem between Schools and Enterprises

(1) Analysis on the Development Level of Collaborative Education in Schools. From the analysis of Figure 2, it can be seen that the comprehensive development level of school

Table 7: Index weight of enterprise collaborative education system under coefficient of variation method.

Metric	Coefficient of variation	Weight
D23	0.0466	0.0591
D24	0.0434	0.055
D25	0.0093	0.0117
D26	0.0525	0.0666
D27	0.0436	0.0553
D28	0.0471	0.0597
D29	0.033	0.0419
D30	0.0347	0.044
D31	0.0234	0.0297
D32	0.0334	0.0424
D33	0.0434	0.0551
D34	0.001	0.0013
D35	0.0358	0.0454
D36	0.0424	0.0538
D37	0.0348	0.0442
D38	0.0316	0.0401
D39	0.0199	0.0253
D40	0.0382	0.0484
D41	0.0345	0.0438
D42	0.0465	0.059
D43	0.0251	0.0319
D44	0.0233	0.0295
D45	0.0205	0.026
D46	0.0244	0.031

collaborative education system has steadily improved from 2013 to 2018. From 0.1804 in 2013 to 0.8826 in 2018, the subsystems that constitute the coeducation system in schools show a mixed development trend, but the overall development level has improved. Among them, in 2015, the mechanism construction, teaching staff construction, curriculum construction, and teaching materials construction all exceeded the overall level of school collaborative education system development, and the talent curriculum construction exceeded the overall level of school development. School. In 2016, schools will jointly run schools. In 2013, the infrastructure construction also exceeded the overall development level of running schools together. This shows that compared with other subsystems, the first five subsystems contribute more to the overall development level of school collaborative education system. And the other five subsystems are education and apprenticeship system, education evaluation, work quality, social welfare and social satisfaction with schools, and the comprehensive development level of school-based education system. The contribution degree is slightly lower than the first five subsystems, and the influence of the system on the overall development level of the school can be ignored. On this basis, generally speaking, although the development level of each subsystem is different, it contributes to the overall development level of the school cooperative training system to varying degrees.

Table 8: Comprehensive weight of enterprise education system indicators.

Metric	Entropy weight method	Variability coefficient method	Comprehensive weight
D23	0.0387	0.0591	0.0489
D24	0.0437	0.055	0.0494
D25	0.0388	0.0117	0.0252
D26	0.0285	0.0666	0.0475
D27	0.0408	0.0553	0.0481
D28	0.0395	0.0597	0.0496
D29	0.0265	0.0419	0.0342
D30	0.0244	0.044	0.0342
D31	0.0627	0.0297	0.0462
D32	0.05	0.0424	0.0462
D33	0.0492	0.0551	0.0522
D34	0.0394	0.0013	0.0203
D35	0.0693	0.0454	0.0573
D36	0.0375	0.0538	0.0457
D37	0.0495	0.0442	0.0468
D38	0.0278	0.0401	0.0339
D39	0.0351	0.0253	0.0302
D40	0.0437	0.0484	0.046
D41	0.0705	0.0438	0.0572
D42	0.0414	0.059	0.0502
D43	0.0571	0.0319	0.0445
D44	0.0255	0.0295	0.0275
D45	0.0309	0.026	0.0284
D46	0.0295	0.031	0.0302

(2) Analysis on the Development Level of Enterprise Collaborative Education Subsystem. From the analysis of Figure 3, it can be seen that from 2013 to 2018, the overall development level of enterprise cooperative training system has been rapidly improved. From 0.1257 in 2013 to 0.8485 in 2018, the overall development level has been improved to varying degrees in different periods. In its subsystem, the participation of enterprises in the construction of curriculum materials and the development of personnel training projects exceeds the overall level of collaborative business training system development in 2014, while the mechanism construction does not exceed the overall development level. In 2015, the overall development level of the collaborative training system is basically at the same level, which indicates that compared with other subsystems and schools, the contribution of enterprises participating in the construction of teacher training bases to the overall development level of the joint training system is slightly lower than the share of the overall development level of the joint training system of schools. Therefore, by increasing the participation of enterprises in the construction of school teachers and training centers, the overall development level of enterprise collaborative training system can be effectively improved. The development level of the other six subsystems is as follows: participation in education and training programs,

Table 9: Weight table of index system of collaborative education system between schools and enterprises.

System level	Functional layer	Index layer	Index layer weight	Function layer weight
School collaborative education system	Mechanism construction	The government supervises the number of cooperative education mechanisms in schools	0.0537	0.1171
		Number of school assessment and management collaborative education system	0.0634	
	Teacher construction	The proportion of double-qualified teachers are full-time teachers	0.0241	0.1097
		The proportion of part-time teachers are full-time teachers	0.0392	
		The proportion of temporary teachers in enterprises are full-time teachers	0.0464	
	Curriculum and teaching material construction	Introduce enterprises or jointly develop the number of courses	0.04	0.1612
		Introduce enterprises or jointly develop the number of textbooks	0.0575	
		The proportion of part-time teachers teaching in the total professional class hours	0.0637	
	Talent training plan formulation	Organize the number of revisions of the talent training plan	0.0657	0.1156
		Organize the demonstration times of talent training program	0.0449	
	Construction of training base	The number of on-campus practical training bases jointly built by schools and enterprises	0.0579	0.0938
		Number of off-campus training bases jointly built by schools and enterprises	0.0359	
	Training internship arrangement	Number of cooperative enterprises per specialty	0.0347	0.072
		Arrange the number of practical training instructors	0.0373	
	Teaching evaluation	Number of courses inviting companies to participate in the evaluation	0.0494	0.1075
		The number of courses unilaterally evaluated by the entrusted enterprises	0.0581	
	Quality of employment	First-time employment ratio of graduates	0.0307	0.0561
		Corresponding employment ratio of graduates	0.0254	
	Social effect results benefit	Get the enterprise collaborative research and development project funds	0.0696	0.094
		Train the number of employees for enterprises	0.0244	
	Social satisfaction with schools	Student satisfaction with the school	0.0513	0.0781
		Enterprise satisfaction with students	0.0268	
Enterprise collaborative education system	Participate in mechanism construction	The government supervises the number of cooperative education mechanism conducted by enterprises	0.0489	0.983
		Number of enterprise assessment and management collaborative education system	0.0494	
	Participate in the construction of teachers	The proportion of employees participating in teaching employees in the enterprise	0.0252	0.0727
		The total number of teachers temporarily employed in the school	0.0475	
	Participate in the construction of courses and teaching materials	Number of participation in professional course development	0.0481	0.1319
		Number of participants in the development of professional textbooks	0.0496	
		Number of courses taught by part-time teachers	0.0342	
	Participate in the formulation of talent training plan	Participated in the formulation and revision of the talent training program for times	0.0342	0.0804
		Participate in the demonstration times of the talent training program	0.0462	
		The number of on-campus practical training bases donated	0.0462	0.0984

Table 9: Continued.

System level	Functional layer	Index layer	Index layer weight	Function layer weight
	Participate in the construction of the practical training base	Number of practical training bases for donated equipment	0.0522	
	Participate in the practical training and practice arrangement	Number of students receiving practical practice	0.0203	
		Arrange the number of practical training instructors	0.0573	0.1233
		Pay the average monthly salary of graduate interns	0.0457	
	Participate in teaching evaluation	The number of courses assessed by unilateral evaluation	0.0468	
		Number of courses participating in the assessment and evaluation	0.0339	0.0807
	Student retention rate	The percentage of students in interns	0.0302	
		Pay per capita monthly salary for first employment	0.046	0.0762
	Collaborative research and development innovation	Number of enterprise-university collaborative innovation projects	0.0572	
		The number of benefit projects generated by enterprise-school collaborative innovation	0.0502	0.1074
	Enterprise investment funds	Invest in the practical training and practice funds	0.0445	
		Investment in the project research and development funds	0.0275	0.072
	School satisfaction with the enterprise	Student satisfaction with enterprises	0.0284	
		School satisfaction with the enterprise	0.0302	0.0568

Table 10: Development level of school-enterprise collaborative education department.

A particular year	Comprehensive development level of school collaborative education (PT)	The comprehensive development level of enterprise collaborative education (PE)	PT-PE
2013	0.1804	0.1257	0.0547
2014	0.2913	0.2271	0.0642
2015	0.3667	0.3294	0.0373
2016	0.5412	0.4561	0.0851
2017	0.6033	0.7462	-0.1429
2018	0.8286	0.8485	-0.0199

participation in education evaluation, student retention, R&D innovation, enterprise financial investment, and school satisfaction with enterprises that do not exceed the overall level of school development. Training system based on business cooperation shows that the contribution of cooperative education system to the overall development level is relatively low. Companies can improve the efficiency of the common education system by increasing students' participation in education and practical arrangements and teaching evaluation and by increasing investment in coeducation in schools. The overall development level has improved the participation and synergy of enterprises in coeducation. Improve. Generally speaking, although each subsystem has different contributions to the overall development level of collaborative training system, the situation of enterprises participating in collaborative training shows an increasing trend year by year, and the synergy between them is constantly enhanced. The combination of production and training will also be realized by improving synergy.

(3) Analysis of the Collaborative Development Level of Cooperation between Schools and Enterprises and Collaborative Education. According to the above evaluation model, we can calculate the overall development level of the cooperative training system between schools and enterprises from 2013 to 2018, the degree of coordination between the two systems, and the development level of cooperation, as shown in Table 11.

As shown in Figure 4, the development level of cooperation between schools and enterprises has steadily improved and has experienced an upgrading process from subversion to subversion-difficult coordination-priority coordination.

The in-depth analysis of the synergy and development level of schools and enterprises that cooperate to educate

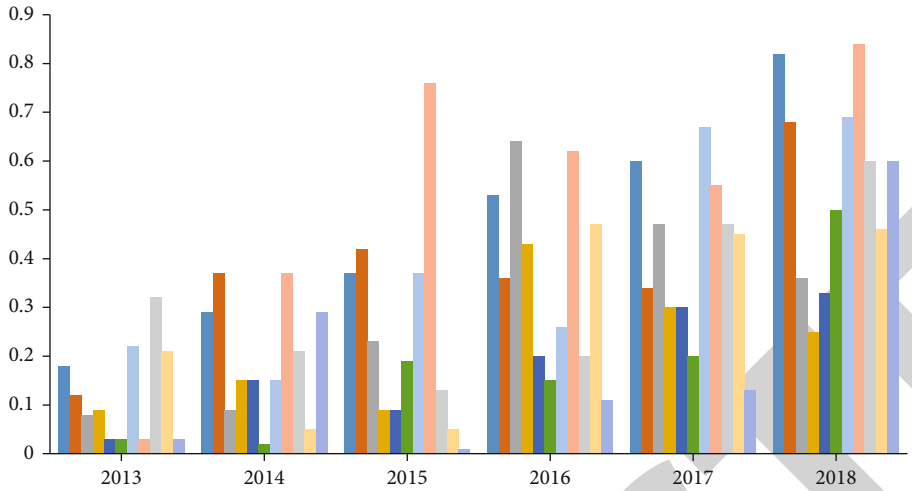

Figure 2: Development level of school collaborative education subsystem.

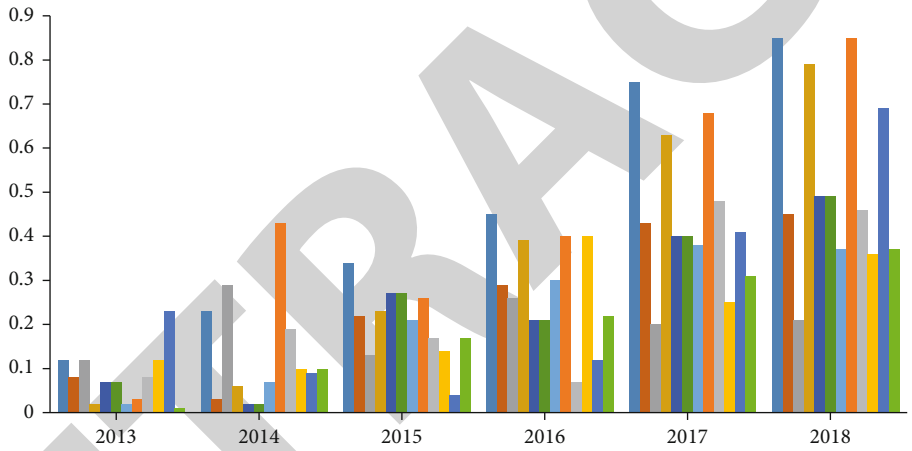

Figure 3: Development level of enterprise collaborative education subsystem.

Table 11: Collaborative development level of collaborative education between schools and enterprises from 2013 to 2018.

A particular year	Comprehensive development level of school collaborative education	Comprehensive development level of enterprise cooperative education	Collaborative degree	Coordinated development level
2013	0.1804	0.1257	0.484	0.2722
2014	0.2913	0.2271	0.4923	0.3572
2015	0.3667	0.3294	0.4986	0.4166
2016	0.5412	0.4561	0.4964	0.4975
2017	0.6033	0.7462	0.4944	0.5776
2018	0.8286	0.8485	0.4999	0.6475

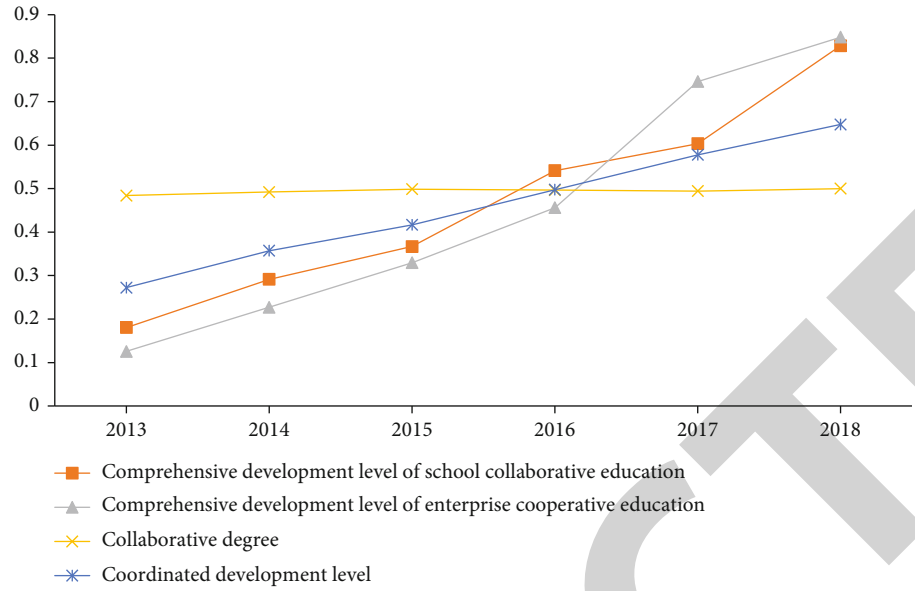

Figure 4: Collaborative development level.

students shows that the synergy of school-enterprise collaborative education fluctuates slightly, but the overall level has been improved. The level of coordinated development has been generally improved, showing a steady growth trend. The functional coordinated development of collaborative education between schools and enterprises is insufficient. The synergy between schools and enterprises in educating people is not well coordinated in time dimension. The coordinated state of collaborative education between schools and enterprises is not sustainable.

5. Concluding Remarks

As a part of the national policy of combining production with education and coconstruction between schools and enterprises, this paper investigates the degree and countermeasures of cooperation between schools and enterprises in tourism professional management. To clear the research ideas as a starting point, review the existing comprehensive evaluation of the integration of production and education and cooperation between schools and enterprises training, demonstrate the feasibility of this study, and seek the breakthrough of this research. Taking the interactive mechanism of S Tourism Vocational School as an example, this paper analyzes the current situation of cooperation between schools and enterprises training. The comprehensive evaluation index system and evaluation model of school-enterprise cooperation need to be tested in tourism secondary vocational education. Finally, this paper analyzes the factors that affect the cooperative training level between tourism colleges and tourism enterprises, puts forward effective countermeasures for the influencing factors, and finally forms a clear research idea and detailed analysis and research route.

Data Availability

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

Conflicts of Interest

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

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