

Retraction

Retracted: Exploration and Research on the Idea of Ecological Civilization Quality Education for College Students under the Background of “Internet +”

Advances in Multimedia

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Peer-review manipulation

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] G. Chen, “Exploration and Research on the Idea of Ecological Civilization Quality Education for College Students under the Background of “Internet +”,” *Advances in Multimedia*, vol. 2022, Article ID 9997385, 12 pages, 2022.

Research Article

Exploration and Research on the Idea of Ecological Civilization Quality Education for College Students under the Background of “Internet +”

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In order to improve the effect of ecological civilization quality education (ECQE) for college students under the background of “Internet +,” this paper combines the AHP method to construct an intelligent analysis model. Moreover, this paper introduces the improved analytic hierarchy process and database technology into the ECQE system and uses the AHP algorithm to make the system produce more objective and scientific results. At the same time, the system overcomes the individual subjectivity of decision-makers, improves the effectiveness of decision-making, and makes the entire decision-making process easier to implement. In addition, this paper combines the improved algorithm to construct an ECQE model for college students under the background of “Internet +.” Based on the experimental research results, it can be seen that the ECQE model for college students proposed in this paper has a good effect under the background of “Internet +.”

1. Introduction

Universities and their competent departments lack scientific norms for ecological civilization education. At present, universities and their competent departments generally do not pay enough attention to the ecological civilization education of college students and have not formulated a unified plan, let alone a scientific plan. To strengthen and improve ecological civilization education in colleges and universities, colleges and their competent departments must make scientific plans for ecological civilization education [1]. The current situation in ecological civilization education planning is not optimistic. The specific manifestations are as follows: First, the ecological civilization education for college students is not listed on the agenda of higher education but only as a temporary task without forming a long-term strategic plan. Second, ecological civilization education is not included in the moral education system of colleges and universities. The fact that ecological civilization education for college students is an important part of moral education in colleges and

universities is not recognized. Third, the competent education department and the environmental protection department have not formed a cooperative mechanism to formulate a unified plan for college students’ ecological civilization education. Without the support and cooperation of the environmental protection department [2], it is difficult to formulate an actual ecological civilization quality training program for college students. Therefore, the education department and the environmental protection department must cooperate closely to study and formulate the ecological civilization education plan in colleges and universities, plan the content of ecological civilization education in a unified way, reasonably formulate the syllabus of various related courses in colleges and universities, and give full play to the main role of ideological and political theory courses in the ecological civilization education of college students. The role of channels is to infiltrate the knowledge and concepts of ecological civilization in the elective courses of humanistic quality and related professional courses in a planned way, “to make the education of ecological civilization in colleges

and universities more organized, systematic, and scientific” [3]. Second is the education of ecological civilization in colleges and universities. The construction of the teaching staff is seriously lagging behind. The key to carrying out ecological civilization education for college students lies in teachers. Teachers are the engineers of the human soul. The quality of teachers’ ecological civilization directly affects the quality and effect of ecological civilization education for college students. At present, the quality of ecological civilization of most teachers in colleges and universities is not high enough, there is a lack of systematic understanding of ecological civilization knowledge, and the consciousness of building ecological civilization is not strong enough [4]. There are even some teachers who do not even understand the connotation of ecological civilization, let alone the understanding of the laws of ecological civilization education. Due to the lack of deep understanding of ecological civilization and the lack of awareness of the importance of ecological civilization education, the development of ecological civilization education is only verbal, but it cannot be implemented into concrete actions, let alone teaching by example and deeds [5]. Due to the late start of ecological civilization discipline construction, there is a serious shortage of ecological civilization-related professionals, and there is a shortage of ecological science teachers in colleges and universities, especially in junior colleges. The serious lag in the construction of teaching staff is also an important reason for the lag in ecological civilization education [6]. Finally, college students’ awareness of building ecological civilization is generally not strong. At present, most colleges and universities only focus on the education of professional knowledge, so that college students who are not majoring in ecological environment only pay attention to the study of professional knowledge, while ignoring the study of ecological civilization knowledge. Some people think that ecological civilization is simply green and environmental protection. Usually, it is enough to pay more attention to saving resources and protecting the environment, and there is no need to start a special class to learn the knowledge of ecological civilization [7]. Ecological civilization education only stays on perception and does not go deep into the rational level, resulting in the generally low quality of ecological civilization of college students. The survey found that, except for college students majoring in ecological and environmental protection, the vast majority of college students who are not majoring in environmental protection lack a deep understanding of ecological and environmental protection. They do not understand concepts such as beautiful China and sustainable development. Due to the lack of deep understanding of ecological civilization, the value orientation and firm will of ecological civilization cannot be formed, and it cannot be externalized into conscious ecological civilization behavior [8]. The low quality of ecological civilization of college students will inevitably affect the consciousness, initiative, and creativity of ecological civilization construction. It is precisely because the consciousness of college students in building ecological civilization is generally not strong, which results in the poor effect of ecological civilization education [9].

The key to the quality education of ecological civilization for college students is whether an effective implementation path can be formed, which is directly related to the effect of ecological civilization education in colleges from the perspective of the Internet [10]. According to their shortcomings in ecological cognition, ecological concept, ecological emotion, and so forth, combined with the shortcomings of the questionnaire, strengthening the implementation of ecological civilization education from the aspects of effective model selection and effective guarantee mechanism is proposed. The mode selection of the effectiveness of ECQE can be achieved in the following ways: First, from the perspective of the Internet, through situational education, we will combine interesting, authentic, and targeted ECQE content. Photography, animation, and literature are embedded in the relevant sections of the campus network that students often have to click and update in time, especially on Arbor Day, Energy Saving Awareness Week, Bird Love Week, World Water Day, World Earth Day, World Meteorological Day, and World Environment Day. The theme education activities closely related to ecology are carried out daily and in other seasons to continuously attract college students to browse these webpages and deepen their understanding of ecological cognition and ecological concepts [11]; through the establishment of ECQE website, using the network resources of the Student Office, Youth League Committee, Propaganda Department, Logistics Department, Colleges, Research Institutes, and other departments in colleges and universities enables students to access these network resources for their study and life needs and invisibly makes the concept of ecological civilization internalized by college students [12]. At the same time, set up compulsory courses for ECQE and conduct online teaching, and carry out interactive special inquiry education; finally, through the construction of ecological civilization education practice bases outside the school, cultivate the ecological emotions of college students. In terms of the effective guarantee mechanism, schools should incorporate ecological civilization education into national education, formulate and improve teaching plans, carry out reasonable teaching evaluations, and formulate short-term, long-term, and mid-term teaching staff construction plans [13]. Although the proposed approach to the effectiveness of ECQE for engineering college students from the perspective of the Internet may have an idealized color, the effective design of ECQE is still unavoidable and must face the important topic of building a beautiful China. Education such as ecological nature, ecological equality, ecological consumption, ecological morality, and ecological legal system cannot be on the road forever [14].

The objective environment of social development is the deep background of quality education for college students. The characteristics of the era of ecological civilization should be fully demonstrated in the quality education of colleges and universities. This objectively requires that the practical orientation of quality education for college students should reflect the theoretical connotation of ecological civilization. Therefore, in the context of ecological civilization construction, the importance of the cultivation of college students’ ecological civilization quality is prominent. As college students live in the

era of knowledge economy, they shoulder the important task of building socialist modernization. Their ecological civilization quality and concept directly affect the process of sustainable economic and social development [15]. However, what is not optimistic is the fact that ecological education has been vacant before college students entered the university. At the same time, the ecological education in colleges and universities is also lagging behind the rapid development of the times, and the popular education of environmental protection knowledge and ecological awareness is weak, which makes some college students have weak ecological awareness and insufficient understanding of ecological civilization which makes some college students have weak ecological awareness and insufficient understanding of ecological civilization. The knowledge of ecological civilization is insufficient [16]. Therefore, strengthening the cultivation of college students' ecological civilization quality has become an urgent problem faced by higher education. Strengthening the education of ecological civilization in colleges and universities and improving the quality of ecological civilization of college students are not only the requirements for implementing the spirit of the 18th National Congress of the Communist Party of China but also the requirements for the all-round development of college students from the people-oriented scientific development concept. Under the guidance of schools and teachers, through study, education, and their own practice, college students need to establish ecological civilization awareness, develop ecological civilization habits, improve their ecological personality, and then continuously improve their ecological civilization quality [17].

In order to improve the effect of ECQE for college students under the background of "Internet +," this paper combines the AHP method to construct an intelligent analysis model to further improve the quality of college students' ECQE.

2. Key Technical Analysis

2.1. AHP Hierarchical Model. AHP (analytic hierarchy process) is characterized by dividing various factors in complex problems into orderly levels of interconnectedness to make them organized. Moreover, it decomposes a complex problem into different elements and forms a hierarchical mathematical model according to the dominating relationship of these elements.

The first category is the target layer. There is only one element in this layer, which is the expected goal of the talent assessment system and the desired result to be achieved.

The second category is the middle layer. The middle layer includes at least one sublayer. Each sublayer can have many elements. They include all the middle links involved in realizing the target layer, and the middle links mainly involve some criteria and subcriteria.

The third category is the bottom layer. As the name implies, the elements of this layer are various measures, decisions, or programs that can be selected in order to achieve the goal.

Figure 1 shows a typical hierarchical model.

The model shown in the figure above is a structure diagram with a top-down dominance relationship, also

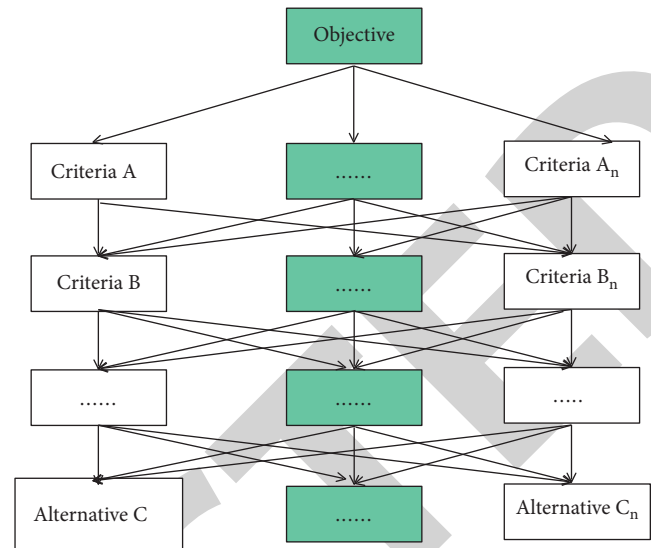


FIGURE 1: Hierarchical model diagram.

known as a hierarchical structure diagram. In the practical modeling process, the relationship is as follows:

- (1) Except for the target layer and the bottom layer, other elements are dominated by an element or some elements of the previous layer, and, at the same time, they also dominate some elements belonging to the lower layer.
- (2) The dominance relationship of elements can be complete or incomplete; that is, an element can completely dominate the elements belonging to its lower layers, or it can only dominate some elements and also allows the interlayer to dominate.
- (3) The number of layers of the hierarchical model is not limited.
- (4) The hierarchical model defines the maximum number of elements in each layer according to the scaling method in the steps. The actual data shows that the 1–9 scale method (or the 10/10 scale method) generally recommends that the maximum number of elements should not exceed 9 (or 10). If there are more than 9 (or 10) governing elements, the layer can be decomposed into several sublayers.

The relative weight $w^{(k)} = (w_1, w_2, \dots, w_n)^t$ of the first-level elements of the criterion relative to criterion 1 is obtained, and the consistency check is performed. We determine the weights of the judgment matrix by the power method. The reason is that the power method can use the iterative method in the calculation to find the maximum eigenvalue. The calculation is as follows:

- (1) For the judgment matrix A , its eigenvalues are $\delta_1, \delta_2, \delta_3, \dots, \delta_n$, and these eigenvalues satisfy $|\delta_1| > |\delta_2| \geq |\delta_3| \geq \dots \geq |\delta_n|$.
- (2) Using the iterative formula $x^{(k+1)} = AX^k$, $K=0,1,2, \dots$, the point column $\neq 0\{x^{(0)}, x^{(1)}, mx^{(2)} \dots\}$ can be obtained. According to the operation properties of the matrix, the following can be obtained:

$$X^{(k+1)} = AX^{(K)} = A^k x^0 = A^k \sum_{j=1}^N a_j u_j = \sum_{j=1}^N a_j A^k u_j = \sum_{j=1}^N a_j \delta_1^k u_j = \delta_1^k \left[a_1 u_1 + \sum_{j=2}^n a_j \left(\frac{\delta_j}{\delta_1} \right)^k u_j \right]. \quad (1)$$

We assume that $|\delta_j/\delta_1| < 1, 2, 3, \dots, n$. When K is sufficiently large, $\sum_{j=2}^n a_j (\delta_j/\delta_1)^k u_j$ in the above formula will be sufficiently small. It can be deduced that when $a_1 \neq 0$, there is $A^k x^0 \approx \delta_1^k a_1 u_1$, and when K is sufficiently large, for the nonzero components of $x^{(k)}, x^{(k+1)}$, the i th component has $x_i^{(k+1)}/x_i^{(k)} = (AKx^{(0)})_i / (AK - 1x^{(0)})_i \approx \delta_1$. $(A^k x^0)_i / (A^{k-1} x^0)_i$ and $x^{(k)}$ are an approximate estimate of $\partial 1$ and its corresponding eigenvectors.

- (3) If $|\partial_1| > 1$, when K tends to infinity, $|\partial_1^k|$ also tends to infinity, so the effect of calculation is meaningless. If $|\partial_1| < 1$, when k is sufficiently large, $|\partial_1^k|$ tends to zero, and the effect of the calculation is meaningless. To deal with this problem, the maximum component of the vector produced by each iteration is changed to 1, and the following method is used:

$$\begin{aligned} \text{order } a &= \max(x_i^{(k)} | i = 1, 2, \dots, n) \\ y^{(k)} &= \frac{1}{a} x^{(k)} \\ x_i^{(k+1)} &= A y^{(k)}. \end{aligned} \quad (2)$$

According to this method, if the absolute value of a difference generated by two adjacent steps is sufficiently small, then a is an approximate value of the largest eigenvalue, and $x^{(k)}$ is the corresponding eigenvector.

- (4) The test method of sorting weight and consistency. In step 3, we have obtained the corresponding eigenvectors, and then the eigenvectors are normalized. That is, by calculating $\omega_i = u_i / \sum_{i=1}^n u_j$ for $i = 1, 2, \dots, n$, the relative weight of the vector $\omega = (\omega_1, \omega_2, \omega_3, \dots, \omega_n)^T$ under the standard criterion 1 can be obtained. The consistency test of the judgment matrix is mainly to judge whether the consistency index is within the acceptable range.

Consistency $C.I. = \delta_{\max} - n/n - 1$: Since the deviation of consistency may be caused by randomness, the corresponding N average random consistency index table must be checked for verification.

2.2. Improvement of Analytic Hierarchy Process. The values of the elements in the judgment matrix reflect the decision-makers' subjective understanding. In the practical application of AHP, the common scaling methods are three-scale method, 0.5–0.9 scale method, 9/9–9/1 scale method, and 10/10–18/2 scale method.

In the three-scale method, each element in the judgment matrix can only take three values, namely, $-1, 0$, and 1 .

$$a_{ij} \begin{cases} -1 & \text{That means } I \text{ is less important than } j \\ 0 & \text{Means that } I \text{ and } j \text{ are equally important} \\ 1 & \text{That means } I \text{ is more important than } j. \end{cases} \quad (3)$$

a_{ij} represents the relative weight of the i th element compared with the j th element, and $A = (a_{ij})_{nm}$ is the pairwise judgment matrix. Among them, a_{ij} has the following properties: $a_{ij} > 0$, $a_{ij} = 1/a_{ji}$, and $a_{ii} = 1$.

The pairwise comparison judgment matrix constructed according to this definition is as follows:

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix}, \quad (4)$$

and then the optimal transfer matrix B of the judgment matrix A is

$$B = \begin{pmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{pmatrix}, \text{ among, } b_{ij} = \sum_{k=1}^n (a_{ik} + a_{jk}). \quad (5)$$

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

The matrix $A = (a_{ij})_{nm}$ is an n -order positive and inverse matrix. If there is $a_{ij} * a_{ji} = 1$ for any $i, j, k = 1, 2, \dots, n$, then A is the consistency matrix.

$C = \begin{pmatrix} c_{11} & \cdots & c_{1n} \\ \vdots & \ddots & \vdots \\ c_{n1} & \cdots & c_{nn} \end{pmatrix}$, where $c_{ij} = \exp(b_{ij})$; the consistency matrix C is the judgment matrix required in the AHP.

In the 9/9–9/1 scaling method, $1, 2, \dots, 9$ and its reciprocal scaling method are used to judge the value of matrix elements. The specific value is investigated by Delphi method.

In the 0.5–0.9 scale method, if A_i is considered to be equally important as A_j , then $a_{ij} = 0.5$; if A_i is extremely important compared to A_j , then $a_{ij} = 0.9$. Others are between the two: 0.5–0.9. The pairwise comparison judgment matrix created by the 0.5–0.9 scaling method is $A = (a_{ij})_{nm}$, which has the following properties: $a_{ij} > 0$, $a_{ij} = 1 - a_{ji}$, and $a_{ii} = 0.5$. The matrix created by the 0.5–0.9 scaling method is a complementary matrix.

If there is a criterion C , then the relative weights of n elements $u_1, u_2, u_3, \dots, u_n$ in a certain layer of the judgment matrix A under the criterion C are $w_1, w_2, w_3, \dots, w_n$.

$$\omega^{(k-1)} = (\omega_1^{(k-1)}, \omega_2^{(k-1)}, \dots, \omega_{k-1}^{(k-1)}). \quad (6)$$

The sorted vector of the k th element in the k th layer relative to the j th element in the $k-1$ layer is

$$\begin{aligned} P_j^{(k)} &= (P_{1j}^{(k)}, P_{2j}^{(k)}, P_{3j}^{(k)}, \dots, P_{kj}^{(k)}), \\ P^{(k)} &= (P_{1j}^{(k)}, P_{2j}^{(k)}, P_{3j}^{(k)}, \dots, P_{kj}^{(k)}). \end{aligned} \quad (7)$$

Then, the calculation formula weight is

$$\omega^{(k)} = (\omega_1^{(k)}, \omega_2^{(k)}, \dots, \omega_k^{(k)})^T = P^{(k)} * \omega^{(k-1)}. \quad (8)$$

Alternatively, the following summation method is used to obtain the ranking weight vector:

$$\omega_i^{(k)} = \sum_{j=1}^{k-1} P_{ij}^{(k)} * \omega_k^{(k-1)}, \quad i = 1, 2, \dots, n. \quad (9)$$

Each layer element is similar to the calculation of the relative weight of the total target; this paper only lists the specific methods for calculating the weight of each layer: the characteristic root method, the power method, the product method, the square root method, and the least squares method. Based on the comparison of five methods, this paper analyzes the advantages and disadvantages of each method and proposes the algorithm of least squares method and iterative power method.

2.2.1. Characteristic Root Method. If the elements of the judgment matrix obtained by the hierarchical model satisfy $a_{ij} > 0$, $a_{ij} = 1/a_{ji}$, and $a_{ii} = 1$ and the consistency $a_{ik} * a_{kj} = a_{ij}$ is satisfied, $A\omega = \lambda\omega$ can be normalized to obtain a relative weight vector. The processing method is as follows.

Under a single criterion between levels, the judgment matrix $A = (a_{ij})_{n * n}$ is constructed, where $a_{ij} = \mu_i/\mu_j$; then, according to the knowledge of linear algebra,

$$\begin{pmatrix} a_{11} & \dots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \dots & a_{nn} \end{pmatrix} \begin{pmatrix} \mu_1 \\ \mu_2 \\ \dots \\ \mu_n \end{pmatrix} = \begin{pmatrix} \frac{\mu_1}{\mu_1} & \dots & \frac{\mu_1}{\mu_n} \\ \vdots & \ddots & \vdots \\ \frac{\mu_n}{\mu_1} & \dots & \frac{\mu_n}{\mu_n} \end{pmatrix} \begin{pmatrix} \mu_1 \\ \mu_2 \\ \dots \\ \mu_n \end{pmatrix} = n \begin{pmatrix} \mu_1 \\ \mu_2 \\ \dots \\ \mu_n \end{pmatrix}. \quad (10)$$

Then, there are $A\mu = n\mu$, where $\mu = \begin{pmatrix} \mu_1 \\ \mu_2 \\ \dots \\ \mu_n \end{pmatrix}$. Then, n is a

characteristic root of the characteristic equation $A\omega = \lambda\omega$, and its corresponding characteristic vector is $\mu = \begin{pmatrix} \mu_1 \\ \mu_2 \\ \dots \\ \mu_n \end{pmatrix}$.

Then, the feature vector is normalized, namely, $i = 1, 2, \dots, n$, to get $\omega_i = \mu_i / \sum_{i=1}^n \mu_j$; the obtained $\omega = (\omega_1, \omega_2, \dots, \omega_n)^T$ is the relative weight vector. The above is in the ideal case where the rank of the judgment matrix A is 1; that is, the pairwise judgment matrix just meets the requirements of positive and negative properties and consistency. However, if $a_{ik} * a_{kj} = a_{ij}$ does not hold, the largest characteristic root is not equal to n . In this case, as long as the matrix does not seriously violate the transitivity law of the matrix, the consistency within this limit is called satisfaction-consistency. In order to obtain satisfactory consistency of the matrix, the consistency check and adjustment of the matrix are required.

2.2.2. Power Method. In the actual implementation process of this paper, it is found that, with the increase of the order of the judgment matrix, the amount of calculation becomes very large. Therefore, when dealing with complex situations, the calculation of the square root method becomes more and more limited. Under the premise of obtaining the satisfactory consistency of the matrix, the power method effectively reduces the computational complexity.

The eigenvalues of the judgment matrix A are $\lambda_1, \lambda_2, \dots, \lambda_n$, and the corresponding eigenvectors are $\mu_1, \mu_2, \dots, \mu_n$, respectively. For any nonzero $x^{(0)}$, there must be $\alpha_1, \alpha_2, \dots, \alpha_n$ such that $\alpha_1 = \sum_{j=1}^n \alpha_j \mu_j$. The point column $\{x^{(0)}, x^{(1)}, \dots\}$ is obtained. Then $x^{(k+1)} = Ax^{(k)} = A^k x^{(0)} = A^k * \sum_{j=1}^n \alpha_j \mu_j = \sum_{j=1}^n \alpha_j A^k \mu_j = \sum_{j=1}^n \alpha_j \lambda_j^k \mu_j$ can be obtained according to the knowledge of linear algebra. When k is sufficiently large and $\sum_{j=2}^n \alpha_j (\lambda_1/\lambda_j)^k \mu_j$ is sufficiently small, we can obtain $x_i^{(k+1)}/x_i^{(k)} = (A^k x^{(0)})_1 / (A^{k-1} x^{(0)})_1 \approx \lambda_1$. Therefore, $x_i^{(k+1)}/x_i^{(k)}$ is an approximate estimate of 1.

This paper adopts the maximum component generated by each iteration to be 1; namely, $\alpha = \max\{x_i^{(k)} | i = 1, 2, \dots, n\}$. Then $x^{(k+1)} = A * 1/\alpha x^{(k)}$, $j = 1, 2, \dots$, and α is obtained as an approximation of the largest eigenvalue. $X^{(k)}$ is the corresponding feature vector, that is, the relative weight vector under the criterion.

2.2.3. Square Root Method. The process to obtain the sorting weight vector is to first perform a geometric mean on each row vector and then perform normalization processing. First, the elements of each row are multiplied; namely,

$$M_i = \left(\prod_{j=1}^n a_{ij} \right)^{1/n}. \quad (11)$$

Among them, $i = 1, 2, \dots, n$. Then, it is normalized:

$$\omega_i = \frac{M_i}{\sum_{j=1}^n M_j}, \quad i = 1, 2, \dots, n, \quad (12)$$

$$\lambda_{\max} = \frac{1}{n} \left(\sum_{j=1}^n \frac{(Aw)_i}{\omega_i} \right).$$

In the above formula, $(Aw)_i$ is the i th component of Aw ; $\omega = (\omega_1, \omega_2, \dots, \omega_n)^T$.

2.2.4. The Least Squares Method. The judgment matrix $A = \begin{pmatrix} a_{11} & \dots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \dots & a_{nn} \end{pmatrix} = \begin{pmatrix} \mu_1/\mu_1 & \dots & \mu_1/\mu_n \\ \vdots & \ddots & \vdots \\ \mu_n/\mu_1 & \dots & \mu_n/\mu_n \end{pmatrix}$ is not established; that is, the estimated relative weight $a_{ij} = \mu_i/\mu_j$ is not completely established for all $I, j (I, j = 1, 2, \dots, n)$.

In this case, the value of $a_{ij}\mu_j - \mu_i$ is not all 0, and a set of weights are selected to minimize the error of the sum of squares; namely,

$$\begin{aligned} \min Z &= \sum_{i=1}^n \sum_{j=1}^n (a_{ij}\mu_j - \mu_i)^2, \\ \text{S.t. } \sum_{j=1}^n \mu_j &= 1. \end{aligned} \quad (13)$$

The resulting program is a typical nonlinear program. We use Lagrangian multipliers to make nonlinear programming a purely quantitative programming problem and construct Lagrangian functions:

$$L = \sum_{i=1}^n \sum_{j=1}^n (a_{ij}\mu_j - \mu_i)^2 + 2\lambda \left(\sum_{j=1}^n \mu_j - 1 \right). \quad (14)$$

The Lagrangian function performs a first-order partial derivative operation:

$$\frac{\partial L}{\partial \mu_i} = 2 \sum_{j=1}^n (a_{ij}\mu_j - \mu_i) a_{ij} - 2 \sum_{j=1}^n (a_{ij}\mu_j - \mu_i) + 2\lambda = 0. \quad (15)$$

Among them, we have $-1, 2, \dots, n$.

$$\frac{\partial L}{\partial \lambda} = 2 \left(\sum_{j=1}^n \mu_j - 1 \right) = 0. \quad (16)$$

Combining the above two equations can get a system of inhomogeneous linear equations containing $n + 1$ unknowns, and this system of equations has one and only one unique solution vector. The solution vector is the relative weight vector in the sense of the least squares method.

Through the comparison of the above algorithms, the method of obtaining the relative weight vector by the least squares method has strong adaptability, and the calculation amount has been effectively reduced. On the basis of synthesizing the above algorithms, an algorithm combining the least squares method and the iterative power method is proposed.

This paper first lists the steps of the algorithm theoretically:

- (1) The algorithm constructs the judgment matrix A.
- (2) The algorithm uses the least squares method to obtain the largest eigenroot λ_{\max} and obtains the corresponding eigenvector.
- (3) The algorithm normalizes the feature vector.
- (4) The calculation algorithm calculates the consistency index C.L. (0) and consults the random consistency index R.L. and obtains C.R.(0). If $C.R.(0) < 0.1$, no

iteration is required. The resulting relative weight vector is

$$\omega^{(0)} = (\omega_1^{(0)}, \omega_2^{(0)}, \dots, \omega_n^{(0)})^T. \quad (17)$$

A. Otherwise, the full consistency matrix needs to be constructed:

$$B^{(0)} = \begin{pmatrix} \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & \dots & \frac{\omega_1^{(0)}}{\omega_n^{(0)}} \\ \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & & \frac{\omega_1^{(0)}}{\omega_n^{(0)}} \\ \vdots & \ddots & \vdots \\ \frac{\omega_n^{(0)}}{\omega_1^{(0)}} & \dots & \frac{\omega_n^{(0)}}{\omega_n^{(0)}} \end{pmatrix}. \quad (18)$$

B. The algorithm uses the iterative equation $A^{(1)} = tA^{(0)} + (1-t)B^{(0)}$ to perform iterative operations.

After the algorithm is iterated, the consistency check is carried out on the largest eigenvalue. If the consistency requirements are met, it is the final sorting weight. If the consistency requirements are not met, then it is necessary to continue to iterate until it is met.

This paper only takes the evaluation system of ‘‘comprehensive quality’’ for demonstration (Figure 2), and the demonstration methods of other evaluation systems of the system are familiar, and this paper will not list them one by one.

Through the least squares method (see the introduction of the least squares method for details), the maximum eigenvalue of the judgment matrix is obtained as $\lambda_{\max}^{(0)} = 6.6357$.

The corresponding eigenvectors are normalized to be

$$\begin{aligned} \omega^{(0)} &= (\omega_1^{(0)}, \omega_2^{(0)}, \dots, \omega_n^{(0)})^T \\ &= (0.1377, 0.1998, 0.2348, 0.2138, 0.2138)^T, \end{aligned}$$

$$C.I. = \frac{\lambda_{\max} - n}{n - 1} = \frac{6.6357 - 5}{5 - 1} = 0.4089, \quad (19)$$

$$R.I. = 1.12,$$

$$C.I. = \frac{C.L.}{R.I.} = \frac{0.4089}{1.12} = 0.3650 > 0.1.$$

It can be seen that the requirement of consistency is not met. Consistency is achieved through an iterative approach.

A full consistency matrix is constructed:

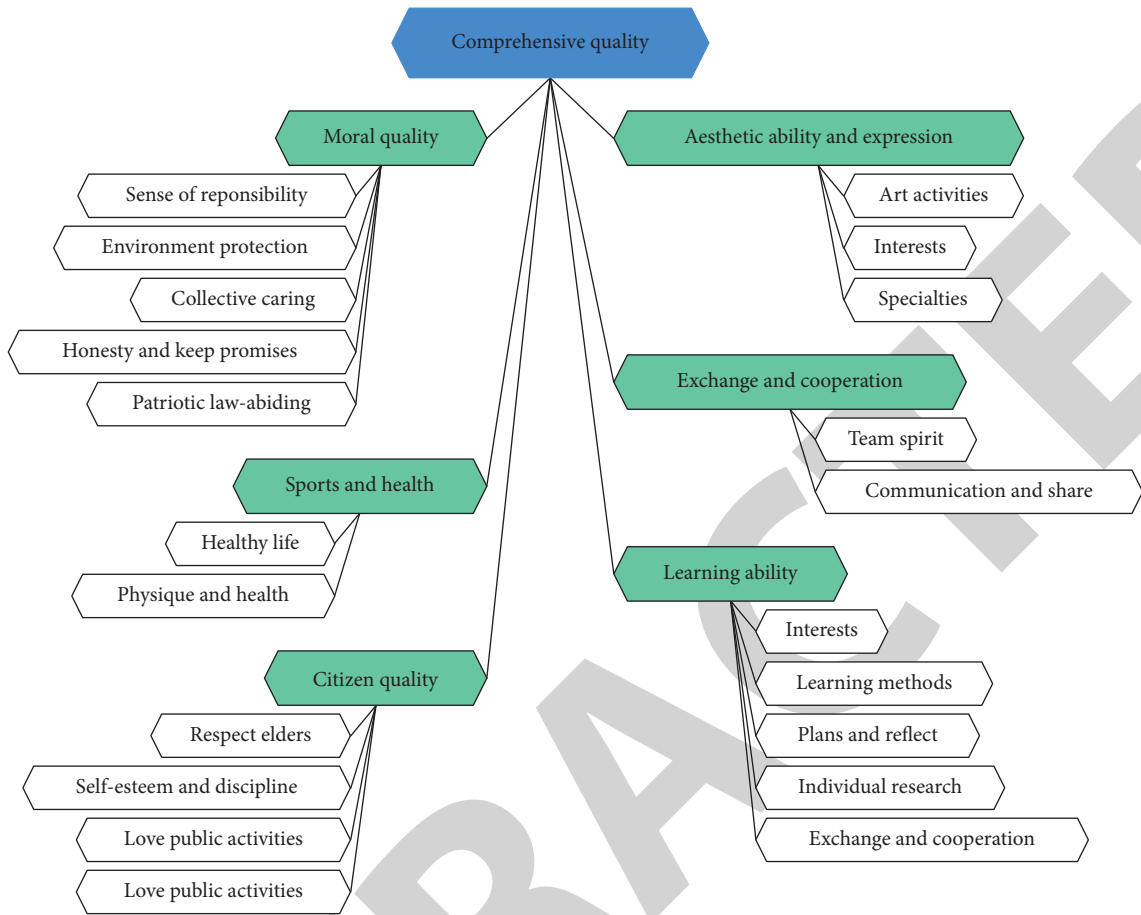


FIGURE 2: Comprehensive quality level model.

$$B^{(0)} = \begin{pmatrix} \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & \dots & \frac{\omega_1^{(0)}}{\omega_n^{(0)}} \\ \frac{\omega_1^{(0)}}{\omega_1^{(0)}} & & \frac{\omega_n^{(0)}}{\omega_n^{(0)}} \\ \vdots & \ddots & \vdots \\ \frac{\omega_n^{(0)}}{\omega_1^{(0)}} & \dots & \frac{\omega_n^{(0)}}{\omega_n^{(0)}} \end{pmatrix} = \begin{pmatrix} 1 & 0.6892 & 0.5694 & 0.624 & 0.624 \\ 1.4621 & 1 & 0.8418 & 0.9541 & 0.9541 \\ 1.7265 & 1.7265 & 1 & 1.1018 & 1.1018 \\ 1.5521 & 1.5521 & 0.9823 & 1 & 1 \\ 1.6567 & 1.0989 & 0.9811 & 1 & 1 \end{pmatrix}. \tag{20}$$

The iteration equation $A^{(1)} = tA^{(0)} + (1-t)B^{(0)}$ takes $t = 0.9$ to iterate:

$$A^{(1)} = 0.9A^{(0)} + 0.1B^{(0)} = \begin{pmatrix} 1 & 1.323 & 1.3581 & 1.6224 & 1.5618 \\ 0.8934 & 1 & 3.9821 & 3.9321 & 0.8721 \\ 4.5622 & 0.3299 & 1 & 5.2217 & 3.9809 \\ 3.0098 & 2.9832 & 0.9721 & 1 & 0.3750 \\ 0.9023 & 2.3255 & 3.9227 & 3.0445 & 1 \end{pmatrix}. \tag{21}$$

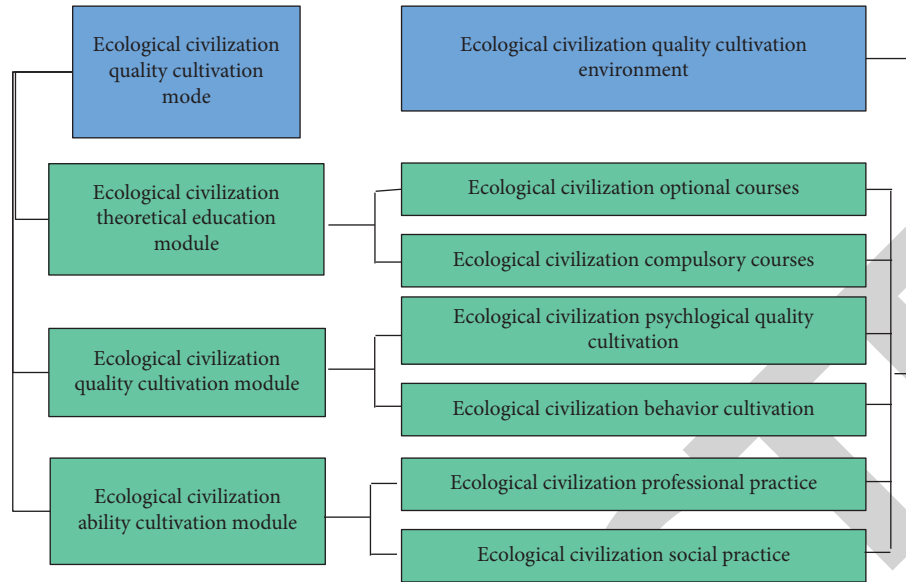


FIGURE 3: A new model for the cultivation of ecological civilization quality of college students.

The maximum eigenvalue $\lambda_{\max} = 6.672$ of $A^{(1)}$ is calculated, and the corresponding eigenvector is

$$\begin{aligned}\omega^{(0)} &= (\omega_1^{(0)}, \omega_2^{(0)}, \dots, \omega_n^{(0)})^T \\ &= (0.3987, 0.5171, 0.7689, 0.8093, 0.5609)^T,\end{aligned}$$

$$C.I. = \frac{\lambda_{\max} - n}{n - 1} = \frac{6.672 - 5}{5 - 1} = 0.418, \quad (22)$$

$$R.I. = 1.12,$$

$$C.R. = \frac{C.I.}{R.I.} = \frac{0.418}{1.12} = 0.3732 > 0.1.$$

The algorithm needs to continue to iterate.

After 4 iterations, the maximum eigenvalues are

$$\lambda_{\max}^{(1)} = 5.579, \lambda_{\max}^{(2)} = 5.498, \lambda_{\max}^{(3)} = 5.4623, \lambda_{\max}^{(4)} = 5.41,$$

$$C.I. = \frac{\lambda_{\max} - n}{n - 1} = \frac{5.41 - 5}{5 - 1} = 0.1025, \quad (23)$$

$$R.I. = 1.12,$$

$$C.R. = \frac{C.I.}{R.I.} = \frac{0.1025}{1.12} = 0.0915 < 0.1.$$

That is, a satisfactory conformance requirement is obtained. Then, the corresponding eigenvectors are normalized to obtain the final ranking weight.

3. ECQE Model for College Students

The key to promoting ecological design is to build a team of designers with ecological civilization quality. Moreover, design art college students are the new force and reserve army of ecological design. Figure 3 shows a new model for

the cultivation of college students' ecological civilization quality.

This paper reconstructs the talent training plan including the cultivation of ecological civilization quality of college students, develops a school-based curriculum to improve the cultivation of ecological civilization quality of college students, and strengthens the three-dimensional theoretical teaching system of the curriculum content for the cultivation of ecological civilization quality of college students. At the same time, this paper constructs an open practical teaching system for carrying out ecological civilization social practice, carrying out ecological civilization quality personal experience, carrying out ecological civilization quality social activities, and carrying out ecological civilization quality media interaction (Figure 4).

In the fuzzy comprehensive teaching evaluation system based on AHP, the object of the whole system operation is the data table, view, and so on in the database. In order to facilitate mutual transfer in each layer, the entity and method of the data object are also separated in the design and abstracted into a common entity class module. The system architecture diagram is shown in Figure 5.

The whole system should be composed of campus network, server, management machine, evaluation workstation, and so forth. Before conducting the assessment, the administrator shall first perform the necessary settings for the assessment items and weights after authentication. At the beginning of the evaluation, the evaluators must also be authenticated before they can enter the evaluation system, as shown in Figure 6.

The technical route is shown in Figure 7.

Based on the above analysis, a cluster analysis is carried out on the ECQE model for college students under the background of "Internet +" proposed in this paper, and the results shown in Figure 8 are obtained.

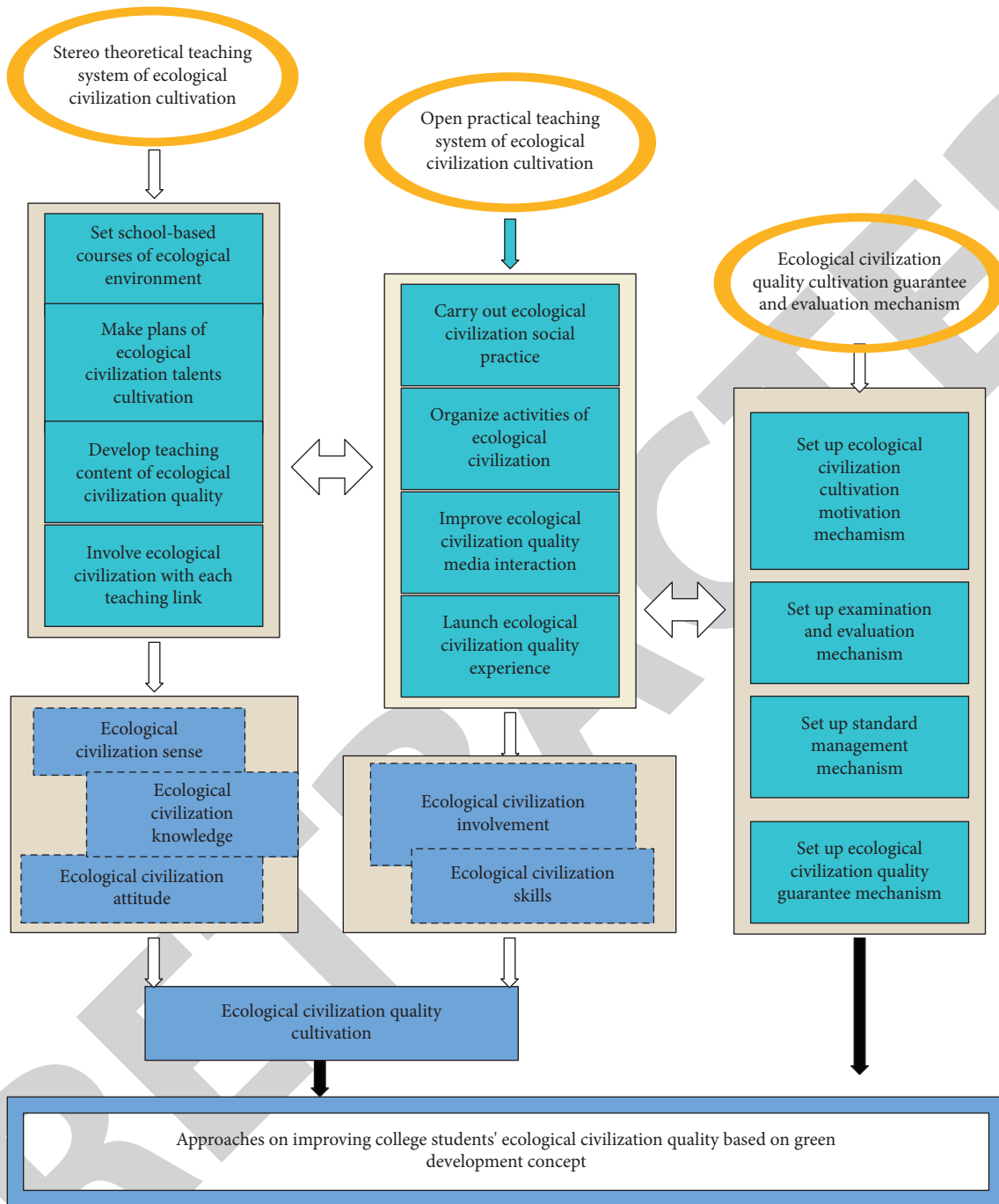


FIGURE 4: The implementation path for improving the quality of ecological civilization of college students.

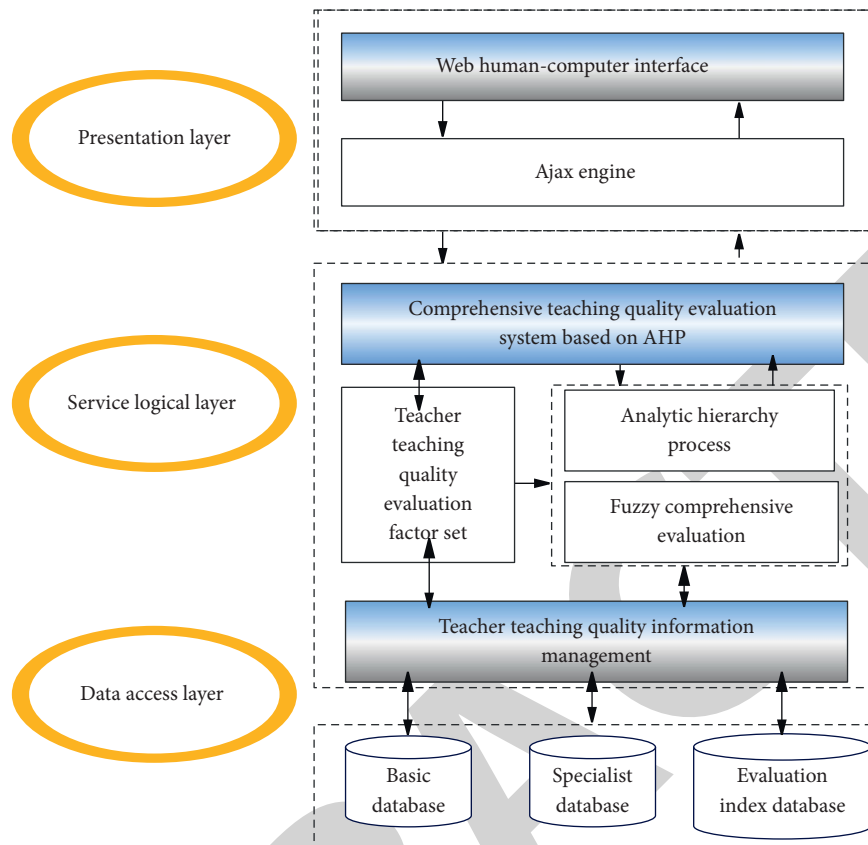


FIGURE 5: System architecture diagram of the comprehensive evaluation teaching quality evaluation system based on AHP.

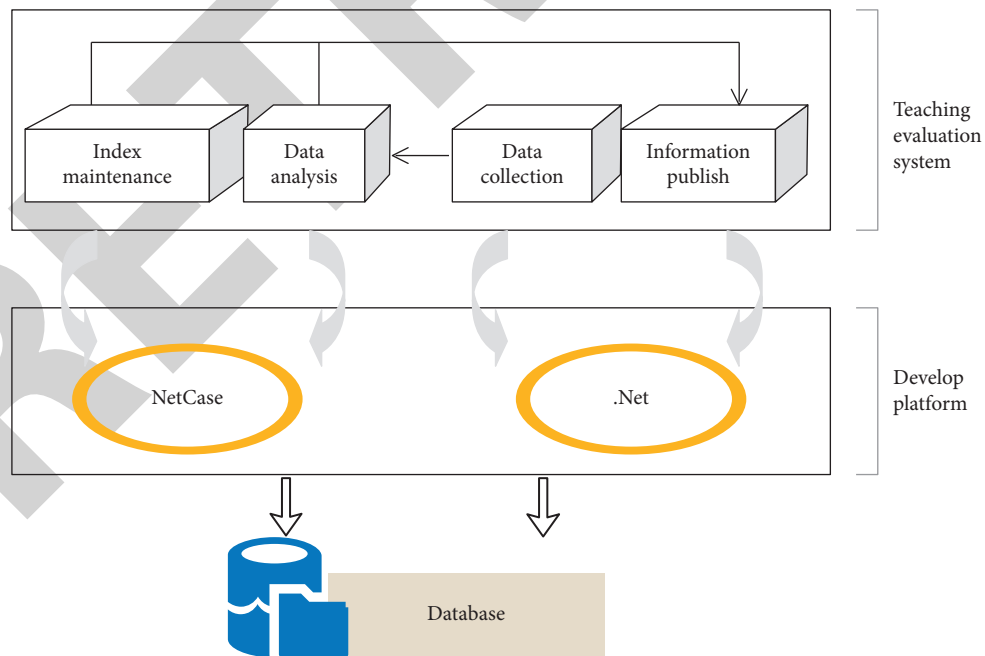


FIGURE 6: The overall framework of the system.

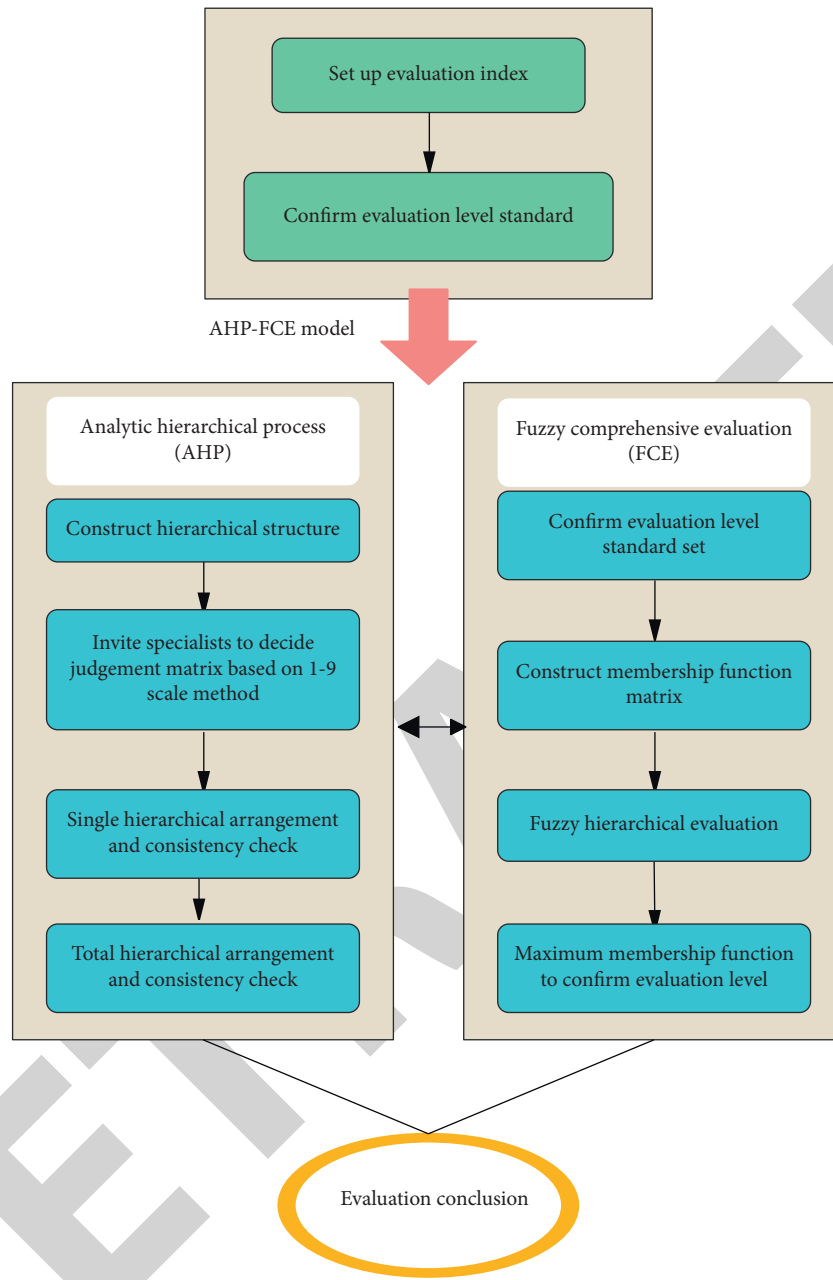


FIGURE 7: AHP-FCE model.

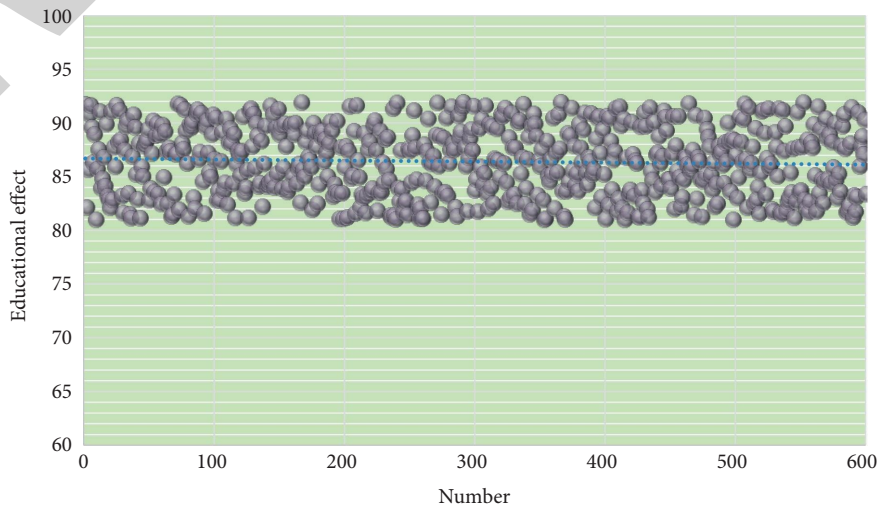


FIGURE 8: Cluster analysis of the ECQE model for college students under the background of “Internet +.”

Based on the above analysis, it can be seen that the ECQE model for college students proposed in this paper under the background of "Internet +" has a good effect.

4. Conclusion

The research believes that strengthening the ecological civilization education of college students is of great significance for the improvement of college students' comprehensive quality and the all-round development of their personal abilities. We must strengthen ecological civilization education, construct ecological morality, and form ethical concepts. College students are the future of the country and the hope of the nation, as well as the builders and successors of modernization. Therefore, their ideological, moral, and political consciousness are directly related to the overall quality of the Chinese nation and whether the goal of building an ecologically civilized society can be achieved. This paper combines the AHP method to construct an intelligent analysis model. Based on the experimental research, it can be seen that the ECQE model for college students under the background of "Internet +" proposed in this paper has a good effect.

Data Availability

The labeled datasets used to support the findings of this study are available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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