Hindawi
Scientific Programming
Volume 2022, Article ID 3529311, 10 pages
https://doi.org/10.1155/2022/3529311

Research Article

Evaluating Teaching Quality in Colleges and Universities of Public Art Education Using the AHP Fuzzy Comprehensive Method

Yan Yu

Wuxi Vocational Institute of Arts & Technology, Yixing, Jiangsu 214200, China

Correspondence should be addressed to Yan Yu; yuy@wxgyxy.cn

Received 5 June 2022; Revised 10 July 2022; Accepted 15 July 2022; Published 9 August 2022

Academic Editor: Abid Yahya

The effectiveness of classroom teaching has emerged as the determining factor in whether a school will endure as higher education in China develops. Currently, all schools and institutions have established public art education classes that offer art education to students who do not study art. With the establishment of public art education, students of other subjects can learn art, film and television, music, calligraphy, dance, and drama and master basic practical skills that fundamentally improve their aesthetic capacity and qualities that promote the emergence of morality, intelligence, physique, and glamour among college students. However, colleges and universities should assess the teaching abilities of teachers after establishing public art education programs and then improve their own teaching abilities by fully altering the public art education model in accordance with the results of the teaching evaluation quality score. This study establishes a method for evaluating the effectiveness of teaching in public art education courses at colleges and institutions. The fuzzy comprehensive is based on the analytic hierarchy process (AHP). The system for evaluating the quality of teaching is established, which builds the teacher's teaching evaluation factor set, decides how much weight each teacher's teaching quality evaluation factor should have, establishes the teaching quality evaluation grade, and decides the comprehensive teaching quality evaluation method. The teaching quality evaluation is finally computed using the fuzzy comprehensive evaluation formula and the AHP approach in accordance with the evaluation results provided by five different types of experts. The results indicate that department leaders awarded teachers a 94.11 rating for their ability to teach.

1. Introduction

Education is the process of facilitating learning, which includes the acquisition of knowledge, skills, values, morals, beliefs, habits, and personal growth. Education is the development of knowledge and change in a logical, optimistic, and polite manner, with the premise that everyone should be able to engage in life. Education should place a strong emphasis on developing and directing students' artistic education, in addition to developing and directing students personal abilities. Every individual needs a comprehensive education that is both competitive and rich in the arts. Students that would not ordinarily be interested in classwork may benefit from the integration of art with other subjects. Learning through the arts promotes the growth of innovative problem-solving abilities. Teaching through the arts can help students understand complex ideas by graphically presenting them. Training in the arts would help children improve their motor, verbal, social, judgment, risk-taking, and creative abilities.

Assessment of public art education programs at colleges and universities is now a significant metric for assessing and comparing instructors' competence and effectiveness as teachers. To ensure high teaching quality, the evaluation of teaching quality can determine whether teachers follow the outline, better understand and adjust teachers' teaching processes and team outcomes, fully grasp teachers' overall quality, and examine the challenges and drawbacks of college teachers' training [1].

In this study, the AHP fuzzy comprehensive assessment approach is used to evaluate the standard of instruction for college and university public art education programs. This method establishes a comprehensive evaluation teaching quality system based on the AHP by combining the AHP and

fuzzy comprehensive evaluation methods. A fuzzy comprehensive assessment model based on this method is created, and it is utilized to assess college professors' teaching abilities and provide a complete score. This model can effectively save human resources in colleges and universities, improve the level of teaching management, store a large amount of data, share resources, diversify evaluation indicators, and reduce the inconsistency between the evaluation results and the situation caused by the fuzziness and diversity of teaching quality [2].

The following are the novelties of this study:

(1) The algorithms required for this research are introduced, including the analytic AHP. The operational process and fuzzy comprehensive evaluation technique of the algorithm are analyzed to build a comprehensive evaluation model [3].

(2) Using the AHP fuzzy comprehensive evaluation method, the teaching effectiveness assessment model of public art education programs at colleges and universities is built, and the strength of the teachers' teaching effectiveness assessment factors is determined by building the factor set of teachers' teaching quality evaluation.

The remainder of the article's components is as follows: The related work is covered in Section 2. Section 3 of the article contains the AHP-based fuzzy comprehensive evaluation method, which is further divided into three sections. Section 4 is composed of the Building Fuzzy Comprehensive Evaluation Model for Teaching Quality of Public Art Education in Higher Institutions, which is further divided into three sections. Section 5 is composed of the evaluation results for public art education teaching quality at colleges and universities, which is further divided into two sections, and finally, the concluding portion of the proposed strategy is presented in Section 6.

2. Related Work

In the 1980s, in the area of evaluating education, the United States proposed a novel assessment concept, which focuses on the key decision-making process. At that time, Britain placed a comparable focus on assessing teachers' instruction and developed an AHP-based standard [4]. Deng *X* et al. created a model for evaluating the teaching quality of colleges based on the upgraded back propagation (BP) neural network approach, which can be used to gauge student interest in the subject matter and improve the course [5]. Guo *J* et al. employed big data analysis to solve challenges in the English instruction of college students. It can be seen from the built-in model that the college English teaching quality track can better control students' learning accounts. By creating a huge data analysis model for college students, this study can produce more accurate results for our English teaching quality assessment [6]. Sun *Q* presented a knowledge recommendation system and an enhanced Relevance Vector Machine (RVM) algorithm-based evaluation model for classroom instruction quality. The input data are taken to judge the reliability and accuracy of the results for verification of the model. The results show that RVM can be better applied in the construction of classroom teaching [7]. Lu C. et al. presented the Radial basis function (RBF) neural network teaching quality assessment approach based on genetic algorithm optimization for teaching improvement evaluation to address the declining accuracy of English interpretation. The RBF neural network teaching assessment model is built using the principal component analysis approach, which is used to determine the indicators for evaluating teaching quality [8]. Wang *Y* et al. studied the issues related to determining the effectiveness of physical education instruction in colleges and institutions. A multi-attribute fuzzy assessment model of physical education teaching quality in colleges and universities was developed to address this issue, and it has since become a crucial foundation for addressing issues with physical education teaching and systemic issues [9]. Lin *M* et al., to reform the teaching ability of art courses in higher vocational colleges, built an evaluation teaching index system and a reform ability evaluation model that can successfully enhance the quality of art education in colleges and universities [10]. Ayaneh et al. emphasized that a key instrument for evaluating teaching performance and accountability is teacher effectiveness evaluation. The thinking structure of the teacher evaluation scale is presented, and a range of goodness of fit indexes are used to gauge judgment, for evaluating the efficacy of the higher education school effect scale and the student evaluation structure [11]. Chaeruman et al. focused on the study and development of teaching system models with the aim of creating the Instructional System Design (ISD) model to create curriculum guidelines for instructors using a range of formative data-collection technologies and the ISD model to assess the quality of the curriculum [12].

3. AHP-Based Fuzzy Comprehension

Based on the AHP, a fuzzy comprehensive assessment technique is presented in this section. This section is divided into the following three sections.

3.1. Analytic Hierarchy Process (AHP). The AHP is a decision analysis method combining quantitative and qualitative analysis. This method can break down difficult and time-consuming issues into several distinct variables and levels as well as quantify and model a complex system decision idea, as shown in Figure 1 [13]. Through comparison and calculation of different factors, the weights of various schemes can be obtained in which the ideal scheme can be selected.

According to the AHP methodology, the scheme is evaluated based on its sub-objectives, objectives, departments, constraints and other aspects of the hierarchical structure. The judgment matrix is then obtained using two pairs of methods, and the eigenvector component corresponding to the judgment matrix's maximum eigenvalue is selected as the coefficient to determine the scheme's weight.

3.2. Fuzzy Comprehensive Evaluation Method. When evaluating a system, the multi-index element set U can be used to represent it if the system being evaluated contains evaluation indexes. V comment components can be used to evaluate

comments on several levels. If the evaluation is weighted, a fuzzy vector with a weight distribution should be created. The fuzzy comprehensive evaluation approach works as follows:

(1) Building a U indicator element set in the evaluation system

The system's contents for various assessment indicators together comprise aspects at several levels. The element set is represented by $U = \{u_1, u_2, \ldots, u_m\}$. The evaluation elements in the system are $u_i = (i = 1, 2, \ldots, m)$.

(2) Building a set of V comments

A range of potential result items are included in the comment set's constituent parts. There is a single comment set, regardless of how many result components are categorized. The aspects of the evaluation index should be examined before creating the evaluation grade. If $V = \{v_1, v_2, \ldots, v_n\}$ is the comment set, $v_i = (i = 1, 2, \ldots, n)$ represents comments of different grades.

(3) Defining weight set A

Each U element is reasonably assigned the corresponding weight $a_i = (i = 1, \ldots, m)$, which can reflect the importance of different elements. At the same time, $a_i \geq 0$, $\sum_{i=1}^{m} a_i = 1$, all weights are constructed into a fuzzy set, and $A = \{a_1, u_2, \ldots, u_m\}$ is called the weight set.

(4) Constructing an R-fuzzy relation matrix

The evaluated system is quantified by the elements in $u_i = (i = 1, 2, \ldots, n)$, and a sample table indicating the grade and indicators of the evaluation system is sent to each evaluation team. After recycling, the number of rating comments r_{ij} corresponding to different evaluation indicators can be obtained. The calculation formula is as follows:

$$r_{ij} = \frac{\text{Number of evaluators selecting the } j-\text{th evaluation in the } i-\text{th index}}{\text{Total number of judges}}. \tag{1}$$

The R-fuzzy connection matrix is created using (1), r_{ij} is the u_i system evaluation index to evaluate the degree of membership of the V_j evaluation set, and (2) is the fuzzy relationship matrix:

$$R = \begin{pmatrix} R(u_1) \\ R(u_2) \\ \cdots \\ R(u_n) \end{pmatrix} = \begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{pmatrix}. \tag{2}$$

(5) Selection of the evaluation model

Equation (3) is a weighted average model:

$$\begin{aligned} bj &= \sum_{i=1}^{m} a_i \cdot r_{ij} \, (j = 1, 2, \ldots, n) = A \cdot R, \\ B &= (b_1, b_2, \ldots, b_n). \end{aligned} \tag{3}$$

(6) Computing comprehensive evaluation

Commentary judgments can be quantitatively expressed by assigning rank components. Assuming that the E-matrix is obtained after assignment, $E = (p_1, p_2, \ldots, p_n)^T$ can obtain the comprehensive evaluation result of $S = B \cdot E$, which is the comprehensive evaluation score of the evaluated system [14].

3.3. Comprehensive Fuzzy System for Evaluating Teaching Quality Based on the AHP. This study develops an AHP-based fuzzy comprehensive teaching quality rating system using browser/server (B/S) architecture. Users can use the Internet to assess the effectiveness of teaching at any time and from anywhere due to the employment of this architecture within Internet and campus network [15]. The evaluation system consists of three levels, each of which is broken down into three layers under the application logic: data access, business logic, and presentation. During the design and development of the system, some auxiliary methods and types are needed, such as transaction class and database access class [16]. When creating the system architecture, each module is divided into a separate portion to increase the usage rate across modules. Views and data tables in the database are the objects in the fuzzy comprehensive teaching evaluation system based on the AHP, which can be transferred between different layers. Methods and object entities can be efficiently separated throughout the design phase, as a public entity class module, and this entity has been abstracted [17]. The system's overall structure is shown in Figure 2.

4. Building a Fuzzy Comprehensive Evaluation Model for Teaching Quality of Public Art Education in Higher Institutions

The process for the model establishment of fuzzy comprehensive evaluation for the teaching of public art education quality in higher education is divided into three sections, which are as follows.

4.1. Establishing a Teacher Teaching Quality Evaluation Factor Set. The creation of the teacher's teaching evaluation factor set is the first step in the process of developing a teaching quality assessment model for public art instruction at colleges and universities built on the AHP fuzzy comprehensive evaluation approach. The hierarchical structure of the model

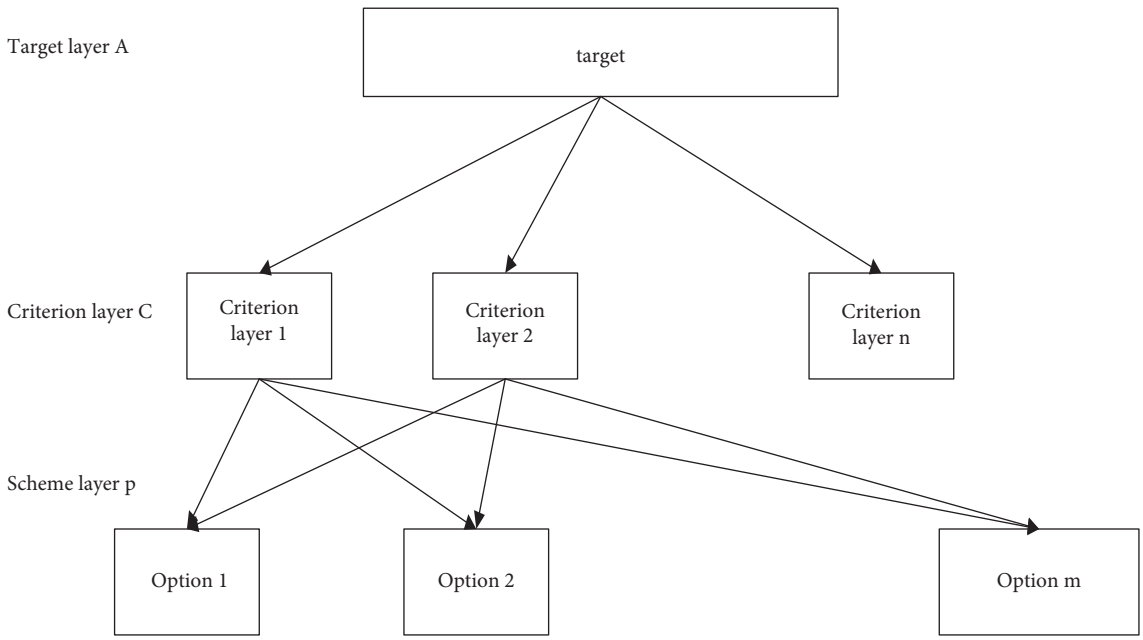

Figure 1: The structure of AHP.

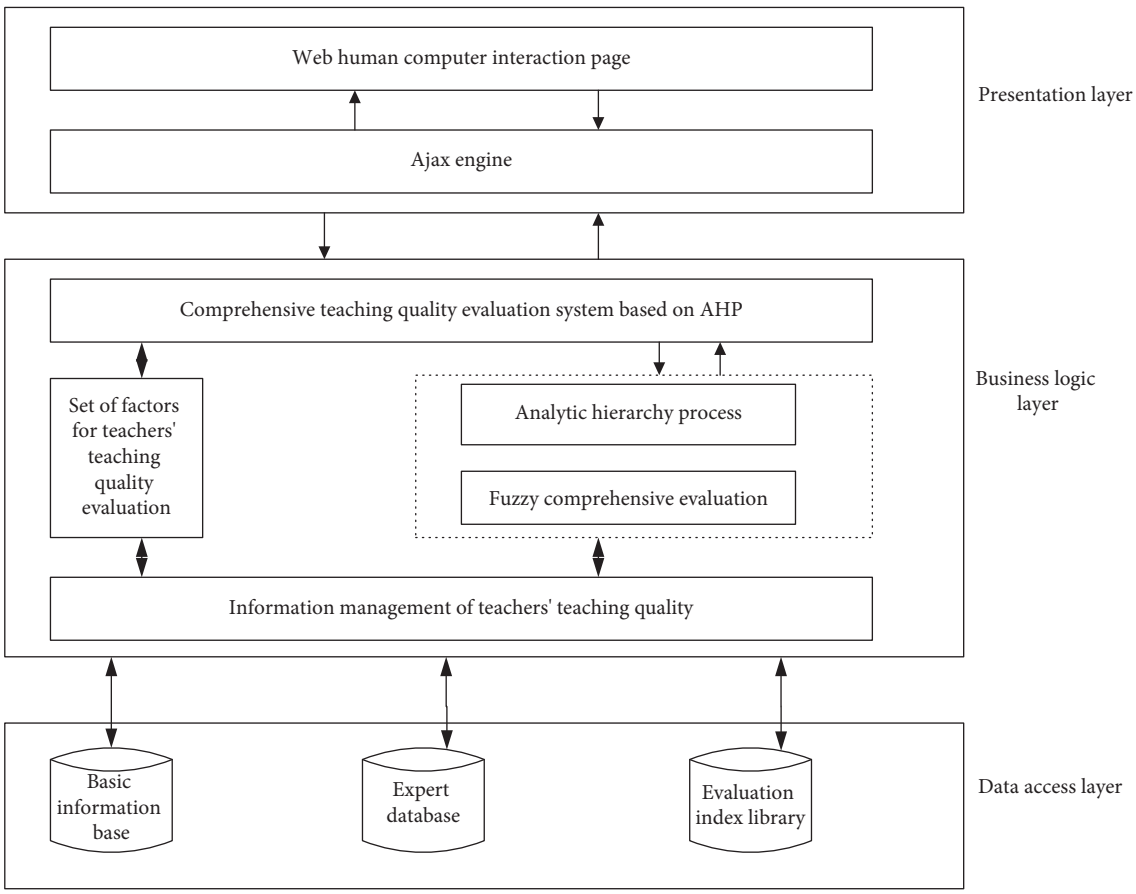

Figure 2: AHP-based system architecture for comprehensive teaching effectiveness evaluation.

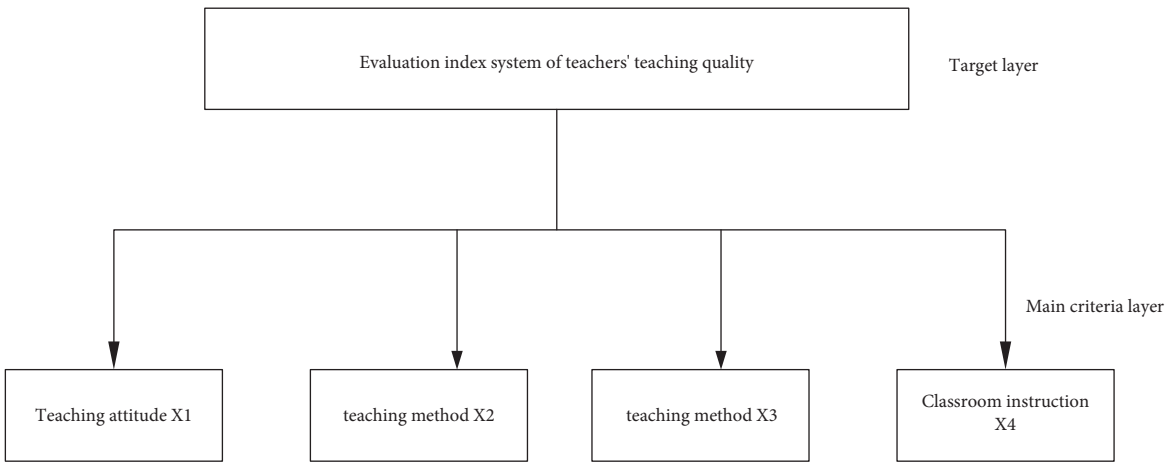

Figure 3: Assessment of teaching effectiveness index for teachers.

Table 1: relative significance.

Scale	Meaning
1	The importance of comparing X_i and X_j is the same
3	The former is slightly more important when comparing X_i and X_j
5	Comparing X_i and X_j, the former is significant than the latter
7	Comparing X_i and X_j, the former is significant than the latter
9	Comparing X_i and X_j, the former is significant than the latter
2,4,6,8	Median value of parallel judgments 1–3, 3–5, 5–7, 7–9
Reciprocal	The comparison judgment between X_i and X_j is represented by X_{ij}, and X_{ji} is the comparison judgment between X_j and $X_iX_{ji} = 1/X_{ij}$

is shown in Figure 3; $X = X_1, X_2, X_3, X_4$ is the set of evaluation factors defined for the alignment side layer $X_k = X_{k1}, X_{k2}, \ldots, X_{knk}$, in which k is 1, 2, 3, and 4. The factor of class i on the criteria level is represented by nk, among which there are n single factors. Figure 3 shows the assessment index system of teaching effectiveness for teachers.

4.2. Weighting the Evaluation Criteria for Teachers' Teaching Quality. The weighting factor should be calculated in accordance with the relationship between the relative weights of the various elements affecting the teaching quality evaluation since each component's value in a teacher's evaluation of their teaching effectiveness varies. The weight set of various aspects in the primary and sub-criteria layers is clarified using the AHP approach. The principal techniques are as follows [18].

4.2.1. Constructing a Judgment Matrix. In the 9-level scaling approach, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are used to indicate the relevance of the results for various components in the pairwise comparison factor set. For example, X_1 is the teaching attitude, X_2 is the teaching content, X_{12} is the comparison result of the importance of the teaching attitude compared with the teaching content, and X_{21} is the importance of the teaching content compared with the teaching attitude. Therefore, different evaluation factors can be compared to establish a comparison matrix. The following is the A judgment matrix:

$$A = \begin{bmatrix} x_{11} & x_{12} & \ldots & x_{1n} \\ x_{21} & x_{22} & \ldots & x_{2n} \\ \ldots & \ldots & \ldots & \ldots \\ x_{n1} & x_{n2} & \ldots & x_{nn} \end{bmatrix}. \quad (4)$$

The importance of the judgment matrix X_i compared with X_j is expressed by X_{ij}, and the expert evaluation team calculates the importance values of elements in different criteria layers.

The experts compare the various criteria level factors of the same type for teaching quality evaluation at the same criteria level and measure and judge them in accordance with Table 1, based on how many different teaching quality assessment elements make up the total evaluation factors.

A fourth-order judgment matrix is constructed into a primary criterion layer according to the construction of the judgment matrix, which is represented by (5). There are four different types of univariate sets in the criteria layer, which

can construct four different orders expressed by the following formulas:

$$A = \begin{bmatrix} 1 & \frac{1}{3} & \frac{1}{4} & 2 \\ 3 & 1 & \frac{1}{2} & 7 \\ 4 & 2 & 1 & 8 \\ \frac{1}{2} & \frac{1}{7} & \frac{1}{8} & 1 \end{bmatrix}. \tag{5}$$

$$A_1 = \begin{bmatrix} 1 & 4 & 3 & 3 & 2 \\ \frac{1}{4} & 1 & 1 & \frac{1}{2} & \frac{1}{3} \\ \frac{1}{3} & 1 & 1 & \frac{1}{2} & \frac{1}{3} \\ \frac{1}{3} & 2 & 2 & 1 & \frac{1}{2} \\ \frac{1}{2} & 3 & 3 & 2 & 1 \end{bmatrix},$$

$$A_2 = \begin{bmatrix} 1 & \frac{1}{2} & \frac{1}{3} & 2 & 1 \\ 2 & 1 & \frac{1}{2} & 5 & 4 \\ 3 & 2 & 1 & \frac{1}{2} & 3 \\ \frac{1}{2} & \frac{1}{5} & 2 & 1 & \frac{1}{2} \\ 1 & \frac{1}{4} & \frac{1}{3} & 2 & 1 \end{bmatrix},$$

$$A_3 = \begin{bmatrix} 1 & 4 & 1 & 4 & 2 & 4 & 2 & 1 \\ \frac{1}{4} & 1 & \frac{1}{3} & 1 & \frac{1}{3} & 1 & \frac{1}{2} & \frac{1}{3} \\ 1 & 3 & 3 & 4 & 1 & 4 & 2 & 1 \\ \frac{1}{4} & 1 & \frac{1}{4} & 1 & \frac{1}{3} & 1 & \frac{1}{2} & \frac{1}{3} \\ \frac{1}{2} & 3 & 1 & 3 & 1 & 3 & 2 & 1 \\ \frac{1}{4} & 1 & \frac{1}{4} & 1 & \frac{1}{3} & 1 & \frac{1}{2} & \frac{1}{3} \\ \frac{1}{2} & 2 & \frac{1}{2} & 2 & \frac{1}{3} & 1 & 2 & 2 \\ 3 & 1 & 1 & 2 & 3 & 1 & 3 & 1 \end{bmatrix},$$

$$A_4 = \begin{bmatrix} \frac{1}{2} & 1 & 1 & \frac{1}{4} \\ 1 & 2 & \frac{1}{2} & 3 \\ 2 & 4 & 5 & 1 \\ \frac{1}{3} & 1 & 1 & \frac{1}{5} \end{bmatrix}. \tag{6}$$

Each row vector of the A judgment matrix is calculated. If $\overline{W} = [\overline{w_1}, \overline{w_2} \ldots \overline{w_n}]$ vector is obtained, then (7) can be obtained by standardizing it and the approximation $\widetilde{W}_i = [\widetilde{w}_1, \widetilde{w}_2 \ldots \widetilde{w}_n]$ of W can be obtained. $A\widetilde{W} = \lambda_{\max}\widetilde{W}$ and (8) can be obtained.

$$\widetilde{W}_i = \frac{\overline{w_i}}{\sum_{j=1}^{n} \overline{W}_j}. \tag{7}$$

$$\lambda_{\max} \approx \frac{1/n \sum_{i=1}^{n} (AW)_i}{\widetilde{w}_i}. \tag{8}$$

The A judgment matrix is calculated as follows:

$$\begin{aligned} W &= [\,0.892 \;\; 2.883 \;\; 0.76 \;\; 0.452\,], \\ \widetilde{W} &= [\,0.113 \;\; 0.354 \;\; 0.482 \;\; 0.057\,], \\ \lambda_{\max} &\approx 4.032. \end{aligned} \tag{9}$$

The values of $A1$, $A2$, $A3$, and $A4$ judgment matrices and the values of k are 1, 2, 3, and 4. Then, the approximation values are calculated from the weight of different evaluation factors in the corresponding criterion layer.

$$\begin{aligned} \widetilde{W}_1 &= [\,0.377 \;\; 0.090 \;\; 0.093 \;\; 0.171 \;\; 0.275\,], \\ \widetilde{W}_2 &= [\,0.137 \;\; 0.352 \;\; 0.268 \;\; 0.118 \;\; 0.132\,], \\ \widetilde{W}_3 &= [\,0.217 \;\; 0.055 \;\; 0.194 \;\; 0.054 \;\; 0.165 \;\; 0.054 \;\; 0.109 \;\; 0.162\,], \\ \widetilde{W}_4 &= [\,0.117 \;\; 0.274 \;\; 0.512 \;\; 0.108\,]. \end{aligned} \tag{10}$$

4.2.2. Consistency Check. According to the judgment matrix created, the maximum eigenvector is calculated, and the weights among the factors of teaching quality evaluation in different criteria layers are obtained. Experts combine their personal knowledge and accumulated experience to get the value. Therefore, the X_i/X_j value cannot be accurately judged. It can only be evaluated from a scientific perspective. The consistency of the judgment matrix should be checked, and the compatibility between errors and data should be reduced.

This study uses the CR = CI/RI to test the judgment matrix's consistency. The judgment matrix's general consistency index is called CI. The following is the calculation equation:

$$\mathrm{CI} = \frac{1}{n-1}(\lambda_{\max} - n). \tag{11}$$

Table 2: RI judgment matrix values.

N	1	2	3	4	5	6	7	8	9
RI	0.00	0.00	0.59	0.91	1.13	1.24	1.33	1.42	1.46

An average random consistency test is called RI in the judgment matrix. The RI values of the judgment matrix are listed in Table 2. If the weight factor of the classification is appropriate and the CR value in the 1–9 matrix of order judgment is less than 0.1, consistency requirements are satisfied by the judgment matrix; otherwise, it should be readjusted until it is fulfilled and then halted.

A judgment matrix needs to be included in (11); $\lambda_{\max} = 4.0413$, and the calculated CI value is 0.0107. Since the CR value is less than 0.1, a judgment matrix's evaluation outcomes are consistent, indicating that the weight factor allocated is reasonable. The importance of the assessment criteria for teaching material, teaching attitudes, classroom instruction, and teaching techniques can be determined from the given computation.

4.3. Constructing the Teaching Quality Evaluation Matrix. The weight of the evaluation factors in the various criteria layers can be determined in this work by utilizing the AHP analytic hierarchy method after identifying the various components in the criterion layer of the teaching quality evaluation factors. After that, the fuzzy membership relationship, also known as the membership relationship, is calculated using the fuzzy comprehensive evaluation method using the associated weight coefficients of various components. Then, the following procedure is used [19]:

(1) Assessment level set

On the premise of the same evaluation criteria, the evaluation objects are divided into g grades, which are classified by V= (v_1, v_2,..., v_g). Based on the experience accumulated in the previous division of teachers 'teaching levels, the value of g is 5. The set of evaluation levels V = {Good, Good, Normal, Bad} is recorded. The best and worst scores are 100 and 20, while the difference between each level is 20.

(2) Implementing teaching quality evaluation based on statistical interface

In this examination, there are five categories of experts: supervising teachers, department leaders, managers of scientific research, students, and teachers. The trust levels of several experts are calculated in this research using the AHP approach, among which the trust values of department leaders are 0.275, teaching supervisors are 0.174, scientific research managers and students are 0.90, and teachers are 0.376. All experts evaluating the effectiveness of public art education teachers at colleges and institutions specify several levels of assessment factors at the hierarchical criterion level and choose corresponding evaluation levels of teaching quality, which are depicted using Figure 4.

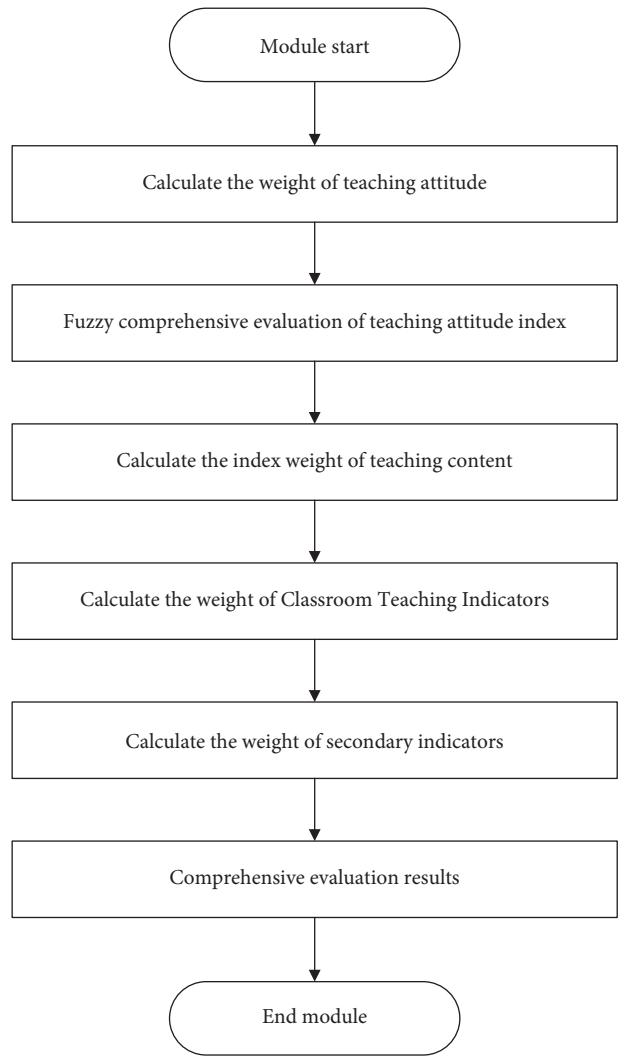

Figure 4: Flow chart for evaluating the grade of teaching quality.

(3) Constructing the fuzzy relation matrix

The number of experts with the same pixel level is randomly chosen from a set of criteria for evaluating the effectiveness of public art instruction at colleges and universities, and the number of experts that took part in this evaluation divides the results. In order to incorporate multiple elements and levels into the criterion level to build a fuzzy relationship matrix, it is possible to calculate the membership degree of different factors on the criteria level, also known as the membership degree of different levels:

$$R_k = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{15} \\ r_{21} & r_{22} & \cdots & r_{25} \\ \cdots & \cdots & \cdots & \cdots \\ r_{nk1} & r_{nk2} & \cdots & r_{nk5} \end{bmatrix}. \quad (12)$$

$$r_{ij} = \frac{y_{ij}}{N}. \quad (13)$$

Table 3: Evaluation results of teaching effectiveness for the education of public art at institutions.

Expert category	X_1	X_2	X_3	X_4	Comprehensive evaluation
Department leader	89.86	93.24	100.00	83.35	94.11
Instructional supervision	88.13	80.07	76.36	77.2	80.44
Teaching manager	83.54	89.95	96.82	91.24	90.39
Teacher	83.68	89.95	96.83	90.98	90.36
Student	97.47	92.36	89.32	92.35	92.88

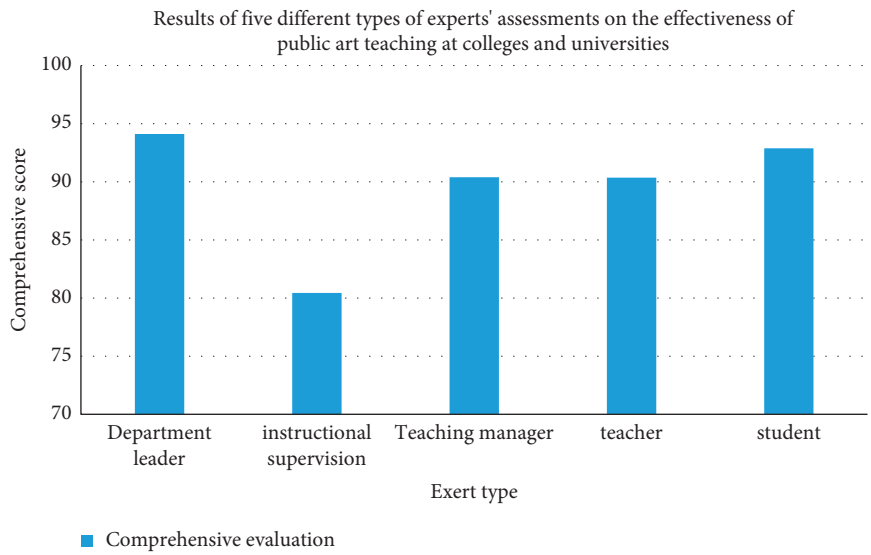

Figure 5: Results of five different types of experts' evaluations of the effectiveness of public art teaching at colleges and universities.

In (13), y_{ij} is the quantity of experts for the z-th evaluation factor of teaching quality and N is the quantity of all experts participating in this teaching quality evaluation.

(5) Evaluation results for public art education teaching quality at colleges and universities

Two aspects of the results for the effectiveness of public art education instruction at colleges and universities are described in the following.

4.4. Analysis of Public Art Education Course Evaluation Results for Teaching Quality. In accordance with the fuzzy comprehensive teaching quality evaluation's maximum membership principle, assuming $b_{\max} = [b_1, b_2, b_3, b_4, b_5]$, the b_1, b_2, b_3, b_4, b_5 teaching quality evaluation levels are the corresponding maximum component b in the V evaluation level set.

The weights of various evaluation elements are determined using the fuzzy comprehensive evaluation formula combined with the AHP approach, and then, the primary and secondary fuzzy comprehensive evaluation results are generated. Based on the results of the primary and secondary evaluations, the teaching quality assessment results for public art teaching programs at colleges and universities are computed and shown in Table 3. The results of a thorough examination of teaching quality conducted by five different categories of experts are shown in Figure 5.

Figure 5 displays the results of a proper review of teaching quality conducted by five experts using the fuzzy comprehensive evaluation formula and AHP technique in conjunction with the four criteria levels of teaching attitude, teaching material, teaching methods, and classroom teaching. The department leader received a score of 94.11 from the five experts, followed by scores of 90.36 from other teachers, 92.88 from students, 90.39 from teaching managers, and 80.44 from teaching supervisors. The department leader received the highest overall score for teaching quality from the five experts.

4.5. Fuzzy Comprehensive Test Evaluation Results. The effectiveness of college and university teachers' instruction is evaluated using this system. Teaching supervisors and educational administrators can evaluate all teachers in the college, but each student and leader can only review the teaching circumstances of public art teachers in the department [20]. The fuzzy comprehensive system for evaluating teaching quality will calculate the weights of various indicators according to the constructed evaluation fuzzy model and generate the corresponding fuzzy comprehensive evaluation results after other teachers, students, administrators of the academic affairs office, teaching supervisors, department leaders, and other teachers of public art courses have been evaluated. In this study, 10 public art education instructors from colleges and universities were chosen at

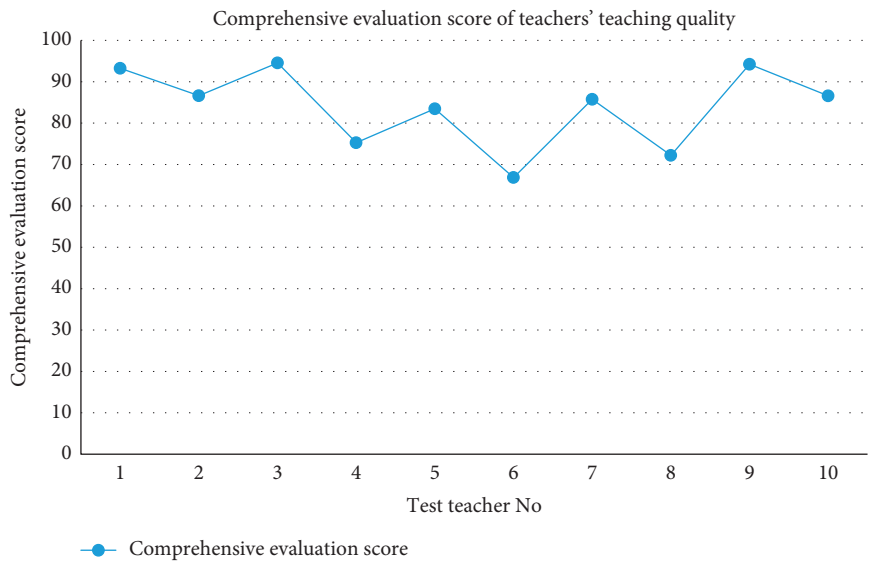

Figure 6: Final grade of teaching effectiveness assessment for teachers.

random for evaluation, and each teacher's overall evaluation score was computed. The results are displayed in Figure 6.

According to the thorough assessment ratings of the teaching quality of the 10 teachers of public art education courses displayed in Figure 6, one of the ten teachers is thought to have low teaching quality; the other nine teachers all received more than 70 points, meeting the minimal standards for teaching public art education courses. The use of this teaching quality evaluation can significantly enhance the effectiveness and quality of college and university teaching as well as increase the fairness, effectiveness, and accuracy of the evaluation results.

5. Conclusions

In recent years, China's colleges and universities have seen daily growth in enrolment and a rise in the value placed on higher education. The public art education course is intended for students who are not specializing in art, and the quality of the teachers is inconsistent. Colleges and universities are unable to evaluate teachers' ability to teach with accuracy. Due to this, some teachers that lack classroom experience teach in colleges and universities using ineffective teaching strategies. Long-term teaching degrades the standard of college and university public art education courses, making it challenging for students to absorb pertinent course material in the classroom. Therefore, this study creates an education course assessment model by fusing the AHP fuzzy comprehensive evaluation technique with the comprehensive evaluation method to assess the teaching quality of public art education courses offered at colleges and universities. This strategy incorporates effective public art teachers to determine a comprehensive score of each teacher's instructional quality and to assess each teacher's effectiveness based on that score. The system can concurrently save the teaching quality evaluation scores of all instructors in colleges and universities as well as query the teacher evaluation results on the network to improve the efficacy of teaching quality assessment inquiries. Five different types of specialists provide complete evaluation findings based on the four categories of teaching attitude, teaching material, teaching methods, and classroom instruction, with department leaders awarding the highest score of 94.11 out of 100. [15–17].

Data Availability

The corresponding author can be reached for a reasonable request for the datasets used and/or analyzed in the current work.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

The author acknowledges the major research project of the 2020 Research Conference on Party Construction and Ideological and Political Education of Wuxi Vocational Institute of Arts and Technology: the philosophy of "foster virtue through education" in art institutes in the new era: What and How (No. Djsz202001).

References

[1] H. Tang, "Research on teaching quality evaluation method of network course based on intelligent learning," *International Journal of Continuing Engineering Education and Life Long Learning*, vol. 30, no. 4, pp. 415–427, 2020.

[2] M. Z. Haron, M. M. M. Zalli, M. K. Othman, and M. I. Awang, "Examining the teachers' pedagogical knowledge and learning facilities towards teaching quality," *International Journal of Evaluation and Research in Education*, vol. 10, no. 1, pp. 1–7, 2021.

[3] D. Zhang, R. Chen, and Y. Yuan, "Construction and application of comprehensive evaluation model of "Golden

Classroom"" in *Journal of Physics: Conference Series*vol. 1880, no. 1, IOP Publishing, Article ID 12032, 2021.

[4] Z. Han, "A Fuzzy Logic and Multilevel Analysis-Based Evaluation Algorithm for Digital Teaching Quality in Colleges and Universities," *Scientific Programming*, vol. 2021, Article ID 7026531, 7 pages, 2021.

[5] X. Deng, Y. Gu, F. Li, X. Liu, and G. Zeng, "Evaluation of teaching quality of computing method course based on improved BP neural network," in *Journal of Physics: Conference Series*vol. 1774, no. 1, IOP Publishing, Article ID 12026, 2021.

[6] J. Guo and S. Yu, "Evaluation model of college English teaching quality based on big data analysis," *IOP Conference Series: Materials Science and Engineering*, IOP Publishing, vol. 750, no. 1, , Article ID 12077, 2020.

[7] S. Qianna, "Evaluation model of classroom teaching quality based on improved RVM algorithm and knowledge recommendation," *Journal of Intelligent and Fuzzy Systems*, vol. 40, no. 2, pp. 2457–2467, 2021.

[8] C. Lu, B. He, and R. Zhang, "Evaluation of English interpretation teaching quality based on GA optimized RBF neural network," *Journal of Intelligent and Fuzzy Systems*, vol. 40, no. 2, pp. 3185–3192, 2021.

[9] Y. Wang, C. Sun, and Y. Guo, "A multi-attribute fuzzy evaluation model for the teaching quality of physical education in colleges and its implementation strategies," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 16, no. 02, pp. 159–172, 2021.

[10] L. Miao, "Evaluation model and enhancement strategies for teaching reform capacity of art courses in higher vocational colleges," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 15, no. 18, pp. 124–138, 2020.

[11] M. G. Ayaneh, A. A. Dessie, and D. M. Fetene, "Psychometric Properties of Student Evaluation of Teachers' Performance Scale: Evidence from Debre Markos University Students' Evaluation Dataset," *Education Research International*, vol. 2021, Article ID 5543317, 21 pages, 2021.

[12] U. Chaeruman, B. Wibawa, and Z. Syahrial, "Development of an Instructional System Design Model as a Guideline for Lecturers in Creating a Course Using Blended Learning Approach," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 14, no. 14, pp. 164–181, 2020.

[13] A. B. Barcelona, "An analytic hierarchy process for quality action researches in education," *International Journal of Evaluation and Research in Education*, vol. 9, no. 3, pp. 517–523, 2020.

[14] Y. Zhang, Y. Guo, J. Hu et al., "A teaching evaluation system based on visual recognition Technology," *IOP Conference Series: Materials Science and Engineering*, IOP Publishing, vol. 782, no. 3, , Article ID 32101, 2020.

[15] R. Chen, "Research on teaching quality evaluation in applied undergraduate universities," *Creative Education*, vol. 12, no. 10, pp. 2322–2327, 2021.

[16] R. Liu and M. Wu, "Forecast and Evaluation of Educational Economic Contribution Based on Fuzzy Neural Network," *Complexity*, vol. 2021, Article ID 1056295, 11 pages, 2021.

[17] L. Lin, "Smart teaching evaluation model using weighted naive Bayes algorithm," *Journal of Intelligent and Fuzzy Systems*, vol. 40, no. 2, pp. 2791–2801, 2021.

[18] K. Yuan, H. Li, and M. Jiang, "Research on AHP-fuzzy comprehensive evaluation method and application," *Journal of Physics: Conference Series*, vol. 1592, no. 1, Article ID 12045, 2020.

[19] F. Hong, "Discussion on the performance evaluation index system of basic course teaching team in colleges and universities," *Asian Agricultural Research*, vol. 12, no. 3, pp. 72–74, 2020.

[20] S. Mohamed, "An evaluation of culture teaching and learning in a Uniwide Language Program: teachers and students' perspectives," *Language Learning in Higher Education*, vol. 10, no. 2, pp. 357–380, 2020.