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Article

Optimization of Teaching Resource Allocation in Music Civics Courses under Multi-Attribute Decision Modeling

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Abstract: The optimization of the allocation of teaching resources in music civics and politics courses helps to implement the fundamental task of cultivating morality, enhance the moral education function of music education, and cultivate students' critical thinking and innovation ability. Based on the scientific and operable evaluation index system of teaching resources allocation efficiency of music civics and politics courses, the article combines the hierarchical analysis method and entropy weight method to assign weights to the first and second level indexes in the index system respectively. Taking 8 music courses in school A as an example, a multi-attribute decision-making model based on the VIKOR method is introduced to realize the evaluation of the efficiency of teaching resource allocation for music civics courses, and the decision-making mechanism of the VIKOR method in the model is further sensitized to dig out the optimization strategy of teaching resource allocation for music civics courses. The results of the comprehensive quality assessment of course resource allocation based on the multi-attribute decision-making model can be obtained, and the values of the ratio of interests of teaching resource allocation for music Civics and Politics courses of the eight courses in School A are mainly concentrated between 0.3-0.4. Therefore, in-depth integration of music education and civic education can be realized through in-depth excavation of civic elements, close integration of course content and civic education, and rational allocation of teaching resources.

Keywords: hierarchical analysis method; entropy weight method; multi-attribute decision-making model; teaching resource allocation; music and civic politics course

1. Introduction

In the context of the new era, establishing moral education has become the fundamental task of Chinese education, and the music curriculum, as an important link in aesthetic education, not only bears the responsibility of cultivating students' aesthetic interests and inheriting the excellent traditional Chinese culture, but also shoulders the important mission of shaping students' sound personality and cultivating socialist core values [1]. Teaching resources of music curriculum on ideology and politics refer to the music works, cultural background, historical stories and other elements with ideological and political education function integrated in the teaching of music curriculum [2-3], which are rich in connotations, covering the traditional resources of ideological and political education such as the red classic music, folk music, etc., as well as the in-depth interpretation of the contemporary music works, and their backgrounds. Promoting the in-depth integration of music education and curriculum civic politics is not only an inherent requirement for the development of education in the new era, but also an important direction for the reform of music education.

In the process of music and art course ideological education, the subject matter of music and art works and the ideological and political education elements contained in them are always the focus of teaching [4]. Teachers can widely absorb the profound Chinese excellent traditional culture from many excellent national music works, especially national vocal works. These works after the precipitation

and baptism of time, condensed with the deepest spiritual connotation and pursuit, has a very deep cultural heritage and ideological connotation, the course of ideological and political education has a significant effect [5-7]. For example, in the teaching process of music and art class, teachers can choose "Yellow River Cantata", leading students to understand the musical and cultural knowledge of the song and the anti-Japanese history behind it, so as to sing emotionally [8]. The most significant feature and advantage of music is that it expresses objective things even more than human language. Music carries profound emotions, spirit and power that go deep into people's hearts [9]. In the teaching process of music and art classes, teachers should be good at choosing vocal works that highlight the characteristics of the times and mainstream value orientation, mining and refining the ideological and political education resources contained therein to play the role of songs to cultivate sentiment, cultivate the national spirit and feelings, and enhance the sense of national identity and cultural self-confidence of contemporary college students [10-13].

In addition, in the process of mining the ideological and political resources of music and art courses, there is no excessive restriction on the scope of musical works [14]. Teachers can select Chinese and foreign classic music works, lead students to listen to classic melodies, explain to students the musical culture, historical background, cultural connotations behind the works, so that students feel the spirit and characteristics of different types of music, feel the folk beauty of music art works, regional beauty, feel the music artists in the creation of the sentiments of the family and the true feelings, to truly realize the beauty of educating people, so that contemporary college students to form It really realizes the education of people by beauty, makes contemporary college students form lofty ideals and good moral qualities, and gives full play to the function and value of political education in music and art courses [15].

The article firstly screens six first-level evaluation indexes to construct the evaluation index system of teaching resource allocation efficiency of music civics courses. Then, it elaborates the calculation process of determining the weights by hierarchical analysis method and entropy weight method, and at the same time, it elaborates the related theory of multi-attribute decision-making and VIKOR method. Eight representative music civics teaching courses in School A are selected as the research objects to be studied, and the mixed evaluation model of hierarchical analysis-entropy weight method is applied to evaluate the evaluation indexes and give the opinions of each evaluation dimension. The VIKOR method was also applied to calculate the interest ratio value of teaching resource allocation for each course to realize the comprehensive quality assessment of the courses. Finally, the optimization strategy of teaching resource allocation for music civics courses is explored from three aspects, namely, in-depth excavation of civic elements, integration of course content and civic education, and reasonable allocation of teaching resources.

2. Resource allocation model for teaching music civics courses

2.1. Evaluation index system of teaching resources allocation efficiency

The key to improve the utilization efficiency of teaching resources and input-output efficiency of music civics and politics course is to improve the quality monitoring link of practical teaching, therefore, we actively explore and construct a set of evaluation index system of teaching resources allocation efficiency of music civics and politics course which is in line with the law of practical teaching and takes into account the characteristics of art disciplines, and is both scientific and operable. The evaluation index system of teaching resources allocation efficiency of music civics and politics courses is shown in Table 1. The index system includes six first-level indexes: content integration efficiency, teacher allocation efficiency, time and space utilization efficiency, technology empowerment efficiency, process transformation efficiency and cost constraint efficiency.

Table 1. The evaluation index system of the teaching resource allocation efficiency

Primary indicator	Code	Secondary indicator	Code
Content integration efficiency	X1	The compatibility between ideological and political education and music	X11
		Reuse rate of teaching materials	X12
		Content update timeliness rate	X13
Efficiency of teacher allocation	X2	Teacher-student interaction equivalent	X21
		Interdisciplinary faculty collaboration	X22
		The marginal contribution rate of expert resources	X23
Efficiency of space and time utilization	X3	Site-content fit rate	X31
		Effective utilization rate of class hours	X32
		Online resource time coverage	X33
Technology empowers efficiency	X4	Effective utilization of digital resources	X41
		The coefficient of technology replacing human labor	X42
		Immersion device USES saturation	X43
Process transformation efficiency	X5	Student participation efficiency ratio	X51
		Emotional involvement index	X52
		Practice yield rate	X53
Cost-constrained efficiency	X6	Marginal cost	X61
		Resource idle rate	X62
		The results can be moved by the coefficient	X63

2.2. Hierarchical analysis-entropy weighting hybrid evaluation model

2.2.1. Hierarchical analysis to determine weights

Hierarchical analysis combines qualitative analysis and quantitative analysis, from the perspective of the decision maker's experience to comprehensively measure the relative importance of the indicators, so as to calculate the decision-making indicator weights of each program, which can effectively solve the problem of difficult to universally use quantitative methods of evaluation. The steps of the hierarchical analysis method are as follows:

(1) Establishment of a hierarchical structure system. Evaluation objectives, decision-making guidelines and selected indicators are divided into objective layer, guideline layer and factor layer according to subordination. The objective layer is the purpose of evaluation and the problem to be solved, i.e., U . The criterion layer is the evaluation criteria, i.e. $\{U_1,U_2,U_3\}$. The factor layer is the actual indicators to be considered in the evaluation i.e. $\{U_{11},U_{12},\cdots,U_{mn}\}$.

(2) Constructing the judgment matrix. Hierarchical analysis is widely used in the consistent matrix method to construct the judgment matrix, that is, to avoid comparing the overall factors together, and choose different two two factors to compare each other. The use of a unified relative scale 1-9 scale method to reflect the importance of each, minimizing the difficulty of comparison between indicators of different nature.

(3) Hierarchical single sorting and its consistency test. Calculate the maximum eigenvalue of the two-by-two judgment matrix $\lambda_{\max}$ and its normalized (so that the sum of the elements in the vector is 1) eigenvector W , the elements in W represent the weights of the indicators in the same level on the relative degree of the indicators in the previous level. Define the consistency indicator CI .

$$CI=\frac{\lambda_{\max}-n}{n-1} \tag{1}$$

When CI is calculated to be 0, it represents perfect consistency between indicators. When CI is close to 0, there is a more satisfactory consistency between the indicators. And the larger CI is, the more serious the inconsistency is.

In order to measure the size of the specific value of CI , the stochastic consistency indicator RI is defined:

$$RI=\frac{CI_1+CI_2+\cdots+CI_{500}}{500} \tag{2}$$

Define the hierarchical single ordering consistency ratio CR :

$$CR = \frac{CI}{RI} \tag{3}$$

It is generally believed that when $CR < 0.1$, the inconsistency of the constructed judgment matrix is within tolerable range and has good consistency, so it passes the consistency test, and its normalized eigenvector W can be used as the indicator weight vector. Otherwise, it is necessary to readjust the values of each element to construct a new judgment matrix.

(4) Hierarchical total ranking and its consistency test. Calculate and sort all the indicators of a certain level on the previous level of the importance of the indicator weight value size, from the highest level to the lowest level, all the results of the previous step will be combined to get the total hierarchical ranking. Assume that m indicator factors $U_1, U_2, \cdots, U_m$ in the criterion level rank $a_1, a_2, \cdots, a_m$ in the target level. The single sorting of A_n indicator factors in the factor hierarchy passes the consistency test to obtain the single sort consistency indicator CI_n and its random consistency indicator is RI_n . Define the hierarchical total ordering consistency ratio CR :

$$CR = \frac{\sum_{n=1}^{m} CI_n a_n}{\sum_{n=1}^{m} RI_n a_n} \tag{4}$$

When $CR < 0.1$, it can be considered that the hierarchical total ordering has good consistency and passes the consistency test.

2.2.2. Entropy weighting method to determine weights

Entropy is a physical concept, mainly used to measure the chaos of the system, the larger the entropy value represents the more chaotic system, the smaller the entropy value represents the more organized system. Information entropy summarizes the theory of partial entropy, and describes the size of the information of the system in the micro state from the macro level. According to the principle of information entropy to evaluate the indicators, the entropy value can be used to judge the size of the weight and the degree of dispersion, the larger the entropy value, the more obvious the degree of dispersion of the factors, the greater the impact of the evaluation of the total target allocation weight. If the entropy value of an indicator is equal, it means that the factor has no influence in the whole evaluation mechanism. The steps of entropy weight method are as follows:

(1) Indicator forwarding. Due to the existence of different qualitative and quantitative data of indicators, and positive and negative indicators represent different meanings: the larger the positive indicators, the better, the lower the negative indicators, the better. Therefore, homogenization is needed to transform all indicators into very large ones. The positive normalization matrix consisting of n evaluation objects m evaluation indicators is as follows:

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{bmatrix} \tag{5}$$

(2) Data normalization. Indicators still exist between the outline of the different and can not be mixed operation, the need for normalization will be different indicators with the same outline, due to the above has been indicators of positive, here the standardization formula is:

$$x'_{ij} = \frac{x_{ij} - \min\left\{x_{1j}, x_{2j}, \cdots, x_{nj}\right\}}{\max\left\{x_{1j}, x_{2j}, \cdots, x_{nj}\right\} - \min\left\{x_{1j}, x_{2j}, \cdots, x_{nj}\right\}} \tag{6}$$

(3) Calculate the weight of each indicator. The weight occupied by the i th object in the j th indicator is regarded as the probability value in the information entropy calculation. On this basis the overall calculation yields a probability matrix P , and the formula for each indicator element in the matrix is as follows:

$$p_{ij} = \frac{x'_{ij}}{\sum_{i=1}^{n} x'_{ij}} \left(j = 1, 2, \cdots, m \right) \tag{7}$$

(4) Calculate information entropy. Calculate the corresponding information entropy of each indicator, i.e. uncertainty, and standardize to get the specific entropy weight value of each indicator, the calculation formula is as follows:

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^{n} p_{ij} \ln(p_{ij}) \tag{8}$$

where $k = \frac{1}{\ln n} > 0$ and $e_j > 0$. The larger e_j is, the larger the information entropy is, which means the less information is contained.

(5) Calculate the weight coefficient. Introduce the information utility value d_j:

$$d_j = 1 - e_j \tag{9}$$

If the information utility value is smaller, it indicates that the indicator is more important.

The overall information utility value is normalized to get the specific entropy weight of each indicator:

$$w_j = \frac{d_j}{\sum_{j=1}^{m} d_j} \tag{10}$$

(6) Calculate the integrated score. The entropy weight size weight integration formula is as follows:

$$s_i = \sum_{j=1}^{m} w_j \cdot p_{ij} \tag{11}$$

2.3. Multi-attribute decision modeling

2.3.1. Overview of Multi-Attribute Decision Making

Decision making refers to the behavior of making decisions when people are faced with different choices, and multi-attribute decision making (MCDM) is an extension of the concept of, decision making, which refers to making the best choices in a decision-making environment with multiple dimensions and attributes. Traditional multi-, attribute decision making is categorized into multi-criteria decision making and multi-objective decision making based on the size of the range of decisions available, where multi-criteria decision making refers to ranking and selecting the optimal solution in which the number of decisions available has been determined. Multi-objective decision-making is to design the best and most perfect decision as the goal, the decision-making scheme is continuous, infinite and gradually optimized. It can be seen that multi-attribute decision making is an important research area.

2.3.2. Elements, Attributes and Methods of Multi-Attribute Decision Making

(1) Components

Multi-attribute decision-making includes six elements: decision maker, solution set, decision criterion, attribute set, attribute weight and decision situation, in which the decision maker is the demander of the decision result and the main body of the decision. The program set is an ensemble of available decisions. Decision criterion is the criteria and principles on which the decision maker makes decisions. Attribute set is the collection of attributes of each alternative decision, which is the embodiment of the program set under the decision criteria. Attribute weights are the degree of importance of each attribute. Decision situation is the environment for decision making.

(2) Classification of attributes

Attributes are the specific embodiment of each alternative in the decision-making criteria, according to whether or not to quantify the specific data can be divided into quantitative and qualitative type. According to the direction of the impact on the decision can be divided into benefit-type and cost-type, usually benefit-type attributes have an optimization impact on the decision, and the opposite is true for

cost-type.

(3) Classical approach to multi-attribute decision making

Because the multi-attribute decision-making problem widely exists in daily economic life, scholars' research in this field is relatively mature, and there are many better solution methods, such as simple linear weighting method, ideal point (TOPSIS) method, hierarchical analysis method, and VIKOR method, which is more and more widely used nowadays.

2.3.3. VIKOR Method

This paper introduces the VIKOR method, a multi-attribute decision-making method, into the study of optimal assessment of teaching resource allocation for music civics courses.The VIKOR method determines the ranking scheme by maximizing group utility and minimizing individual regret for the compromise ranking of finite decision-making schemes, which is an effective tool for multi-criteria decision-making (MCDM), and it is mainly applied to the following situations:

(1) Decision makers cannot accurately express their preferences

(2) There are different scales between the evaluation criteria, and the criteria are not uniform.

The VIKOR method is a distance-based algorithm, the principle of which lies in defining the positive and negative ideal solutions, and assessing the proximity of alternatives to the ideal solution under the multi-dimensional evaluation criteria to quantify the degree of proximity, and according to the degree of proximity to rank the alternatives in the order of preference. For the comprehensive evaluation of proximity, the VIKOR method utilizes an aggregation function evolved from the LP-metric:

$$L_{pi} = \left\{ \sum_{i=1}^{n} \left[w_i \left(f_i^* - f_{ij} \right) \Big/ \left(f_i^* - f_i^- \right) \right] \right\}^{1/p} \tag{12}$$

where L_{pi} is the evaluated value of the distance between alternative a_i and the ideal solution, and f_{ij} is the value of the i th evaluation metric of alternative a_i, where $1 \le p \le +\infty$ and $j = 1, 2 \cdots m$.

Taking a decision containing two evaluation indicators as an example, the compromise solution of VIKOR is shown in Fig. 1, where f_1^* and f_2^* represent the ideal (optimal) solution of the two evaluation indicators, $\Delta f_1 = f_1^* - f_1^c$ and $\Delta f_2 = f_2^* - f_2^c$ are the compromised quantities of the two indicators respectively, and F^c as the feasible solution (compromise solution) is the result of the mutual compromise of the two evaluation indexes, and it is the closest solution to the ideal solution F^* among all the solutions.

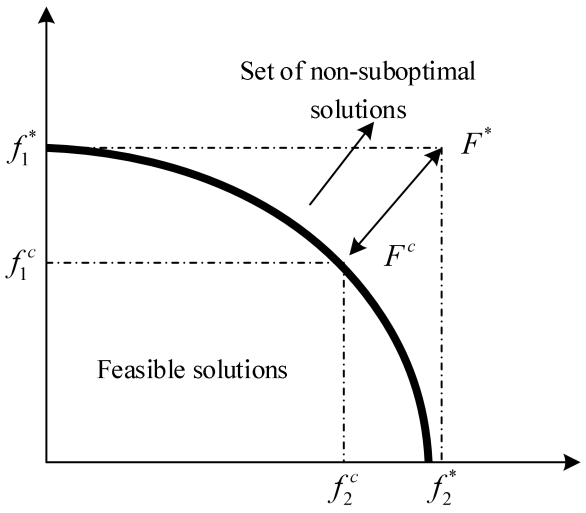

Figure 1. Schematic diagram of feasible solutions under VIKOR decision

2.3.4. VIKOR decision modeling

The theoretical idea of traditional TOPSIS method is to approximate the ideal value to the optimal solution, but the solution obtained by this method is not necessarily the closest to the ideal value of the program, and its computational process is cumbersome, while the VIKOR method is similar to its idea,

the same is the approximation of the ideal value, but the VIKOR method is based on the concessions of each attribute to get the optimal solution, so the method of the solution is closer to the optimal solution compared to the TOPSIS method. The solution obtained by this method is closer to the optimal program than the TOPSIS method.

(1) Construct the decision matrix $\left(a_{ij}\right)_{m\times n}\left(i=1,2,\cdots,m;j=1,2,\cdots,n\right)$, assuming that there are m solutions to be evaluated and n indicators.

The efficiency indicators are shown in equation (13):

$$r_{ij}=a_{ij}\Big/\sqrt{\sum_{i=1}^{m}a_{ij}^{2}} \tag{13}$$

The cost-based indicator is shown in equation (14):

$$r_{ij}=\frac{1}{a_{ij}}\Big/\sqrt{\sum_{i=1}^{m}\left(\frac{1}{a_{ij}}\right)^{2}} \tag{14}$$

(2) Determine the ideal and negative ideal solutions as shown in Eq. (15):

$$\begin{aligned} r^{+}&=\left\{\max(r_{i1}),\max(r_{i2}),\cdots,\max(r_{in})\right\}\\ r^{-}&=\left\{\min(r_{i1}),\min(r_{i2}),\cdots,\min(r_{in})\right\}\end{aligned} \tag{15}$$

where e_j denotes the information entropy of the j th evaluation index.

(3) Calculate the ratio of the distance between the ideal and negative ideal solutions, as shown in Equation (16) and Equation (17):

$$M_i=\sum w_{ij}\left(\frac{r_j^{+}-r_{ij}}{r_j^{+}-r_j^{-}}\right) \tag{16}$$

$$N_i=\max\left(w_{ij}\left(\frac{r_j^{+}-r_{ij}}{r_j^{+}-r_j^{-}}\right)\right) \tag{17}$$

(4) Calculate the benefit ratio Q_i as shown in equation (18):

$$Q_i=v\frac{M_i-M^{-}}{M^{+}-M^{-}}+(1-v)\frac{N_i-N^{-}}{N^{+}-N^{-}} \tag{18}$$

where v is the decision mechanism coefficient of most criterion strategies, v reflects the criterion importance or decision maker's preference and is taken as $v=0.5$. M_i represents the group benefit of the program, the smaller its value, the greater the group benefit. N_i represents the individual regret value, the smaller its value, the smaller the individual regret.

3. Empirical analysis

3.1. Empirical evidence of evaluation system based on hierarchical analysis-entropy weight method

This paper selects 8 representative music ideology teaching courses in school A to carry out the research. The 8 courses include: A Century of Party History in Music, Red Melody and the Road to Strengthening the Nation, Sentiments of the Family and the Country: Mountains and Rivers in Ethnic Music, National Memory in the Opera, Chinese Ritual Civilization and Contemporary Cultural Confidence, Non-Heritage Music: Hearing the Roots of the Nation, Echoes of the Era: Popular Music and Social Change, and Symphonic China: National Artisans and Strong Voices of the Times. Symphony of China: National Craftsmen and the Strong Voice of the Times", respectively, are recorded as A1~A8, and the 8 courses cover 4 major nurturing dimensions, with a certain degree of disciplinary representativeness. Through data statistics and in-depth interviews, the required basic data were collected, and the mixed evaluation model of hierarchical analysis-entropy weight method was used for empirical evidence.

(1) Adopt hierarchical analysis method to determine the weights of level 1 indicators

According to the constructed index system, determine the judgment matrix of the weight of each level 1 index. In this study, expert interviews (Delphi method) were used to collect questionnaires and practical suggestions from 10 directors and practice teaching experts on the judgment of indicator weights, and the judgment matrix was processed using the hierarchical analysis method. The judgment of one of the experts is illustrated as an example, and the judgment matrix of level 1 indicators for optimal evaluation of teaching resource allocation for music civics courses is derived based on the judgment of this expert's experience. The judgment matrix of one expert is shown in Table 2. The larger the number in the matrix, the more important the row elements are compared with the column elements, with the largest number being 9. The smallest number being 1, indicating equal importance. The inverse number indicates the relative unimportance, of which 1/9 indicates the least important.

After normalization of the matrix, the weights of level 1 are calculated as follows (0.033, 0.132, 0.253, 0.463, 0.065, 0.065)

Conduct consistency test

CR=0.003<0.1 passes the consistency test

All 10 experts' judgment matrices passed the consistency test, and finally the arithmetic mean of the indicator weight values of the selected 10 experts was used to calculate the level 1 weights.

Table 2. The judgment matrix of a certain expert

	X1	**X2**	**X3**	**X4**	**X5**	**X6**
X1	1	1/6	1/8	1/9	1/4	1/5
X2	6	1	1/3	1/6	3	3
X3	8	3	1	1/3	1/6	1/6
X4	9	6	3	1	1/8	1/8
X5	4	1/3	6	8	1	1
X6	5	1/3	6	8	1	1

(2) Determine the weights of level 2 indicators by using the entropy weight method

According to the entropy weight method, calculate the entropy weight of a number of level 2 indicators under each level 1 indicators of the original data matrix, and then after standardized processing, standardized entropy weight matrix. Calculate the entropy weight matrix of three level 2 indicators under the level 1 indicators for the optimization of teaching resource allocation of music civics courses for eight evaluation objects. The entropy weight matrix of three level 2 indicators under the level 1 indicators is shown in Table 3.

Table 3. The entropy weight matrix of the three second-level indicators

	X11	**X12**	**X13**
A1	0.315	0.482	0.432
A2	0.037	0.01	0.14
A3	0.054	0.004	0.126
A4	1.000	0.028	0.036
A5	0.067	0.23	0.294
A6	0.063	1.000	0.378
A7	0.000	0.403	0.000
A8	0.033	0.152	0.087

The information entropy E of the three level 2 indicators under the level 1 indicator of the experimental environment was calculated as (0.572,0.775,0.768).

Finally, the weights (0.479,0.263,0.245) of each level 2 indicator under this level 1 indicator are calculated. Similarly, the weights of each level 2 evaluation indicator under the other five level 1 indicators can be obtained.

(3) Calculate the evaluation score by synthesizing the weights of level 1 indicators and level 2 indicators

Combining the weights of level 1 indicators and level 2 indicators, the total weights of the indicators for optimizing the allocation of teaching resources for music civics courses are obtained. The indicator system and weights of teaching resource allocation for music civics and politics courses are shown in Table 4.

Table 4. The index system and weights for the allocation of teaching resources

Primary indicator	Weight	Secondary indicator	Weight
		X11	0.485
X1	0.182	X12	0.26
		X13	0.255
		X21	0.335
X2	0.209	X22	0.295
		X23	0.37
		X31	0.328
X3	0.11	X32	0.397
		X33	0.275
		X41	0.192
X4	0.313	X42	0.315
		X43	0.493
		X51	0.268
X5	0.103	X52	0.213
		X53	0.519
		X61	0.367
X6	0.083	X62	0.404
		X63	0.229

(4) Evaluation and analysis of level 1 indicators

According to the evaluation and weight distribution of level 1 indicators of hierarchical analysis method, it is found that experts are more concerned about the 3 dimensions of technology empowerment efficiency, faculty allocation efficiency, and time and space utilization efficiency, which constitute the guaranteed indicators of music civics course teaching.

(5) Evaluation and analysis of level 2 indicators

The 2-level indicator evaluation based on the entropy weighting method can give each evaluated object a diagnostic analysis and determine the way of subsequent quality improvement of each evaluated object. Taking "A Hundred Years of Party History in Music" as an example, which is the first evaluated subject in the overall ranking, it lags behind the efficiency of optimizing the allocation of teaching resources of other music and ideology courses in the level 1 indicator "efficiency of space and time utilization". By analyzing the scores of level 2 indicators, it is found that the course has greater deficiencies in the efficiency of time and space utilization and the efficiency of process transformation, which are also the "short board elements" restricting its further development.

3.2. Assessment of Resource Allocation Efficiency of Music Civics Programs

3.2.1. Integrated quality assessment results

(1) VIKOR evaluation model

VIKOR evaluation is carried out through the indicator data.Firstly, the data are normalized. Secondly, maximize the group benefit and minimize the individual regret of the opposition, choose the balanced compromise, set the decision-making mechanism coefficient of 0.5, according to the evaluation of the object respectively with the positive and negative ideal solution of the distance calculation to get the benefit ratio Q value, the use of the benefit ratio value to indicate that the evaluation of the object and the degree of closeness to the reasonable scheme, the smaller the value indicates that the evaluation of the object is better, so as to carry out the evaluation of the relative advantages and disadvantages. Finally, the test shows that the results satisfy the two constraints of the VIKOR method, so the comprehensive quality of the teaching resources allocation for music and civics courses can be ranked according to the size of the ratio of interest, and the ranking of the ratio of interest Q is shown in Table 5.

Table 5. The interest ratio Q is ranked

Evaluation object	Group benefit value	Individual regret value	Benefit ratio value	Q value ranking
A1	0.4258	0.0784	0.2057	1
A3	0.6338	0.0742	0.218	2
A8	0.5661	0.0762	0.3001	3
A6	0.5636	0.0762	0.3492	4
A5	0.5884	0.0767	0.3669	5
A4	0.6195	0.0788	0.3751	6
A7	0.651	0.0763	0.3906	7
A2	0.5432	0.0794	0.4126	8

(2) Parameter sensitivity analysis

In the VIKOR method, the decision mechanism coefficient is very critical to the results of alternative solution ranking, which can make the decision maker make more aggressive or more conservative decisions. Therefore, in order to examine the degree of influence of different value changes of the decision mechanism coefficients on the compromise solutions, the parameters are taken in the range of interval [0,1] with a step size of 0.1, and the decision maker's preference for all the S-values and R-values are considered to better reflect the stability of the decision-making results and the reliability of the program choices.

In order to compare and analyze the influence of the coefficients of decision-making mechanism on the evaluation results, the ranking results of the Q value of interest ratio obtained by different coefficients of decision-making mechanism are calculated. The ranking results of different decision-making mechanism coefficients are shown in Table 6, and it can be found that the value of decision-making mechanism coefficients varies from 0.3 to 0.7. Meanwhile, for different compromise preference coefficients, the courses with the highest comprehensive quality level rankings are one of the courses of A3 and A1, which indicates that the method has a better stability when considering decision-making preferences at the same time. Through the parameter sensitivity analysis, it can be concluded that the results of compromise program selection have strong stability, which further confirms that the method proposed in this paper is effective.

Table 6. The ranking results of coefficients for different decision-making mechanisms

Decision-making mechanism coefficient	The interest ratio Q is ranked in the top 5
0	A3, A4, A6, A7, A5
0.1	A3, A8, A7, A4, A2
0.2	A3, A8, A1, A7, A2
0.3	A3, A1, A8, A7, A6
0.4	A3, A1, A8, A6, A5
0.5	A1, A3, A8, A6, A5
0.6	A1, A3, A8, A6, A5
0.7	A1, A8, A6, A2, A5
0.8	A1, A8, A6, A2, A5
0.9	A1, A2, A8, A6, A5
1	A1, A2, A6, A8, A5

3.2.2. Analysis of assessment results

Evaluate the efficiency level of teaching resources allocation for music civics courses of 8 courses, from the point size, the highest ranked is A1 course (0.2057), the lowest ranked is A2 course (0.4126), the extreme deviation is 0.7511, the standard deviation is 0.1201, and the coefficient of dispersion is 0.2107, the standard deviation and coefficient of discretization is smaller, and the distribution of the ratio of interest value is shown in Fig. 2. As can be seen from the distribution chart, the values of interest ratio of course resource allocation are mostly concentrated between 0.2-0.45, mainly between 0.3-0.4. Therefore, resources should be rationally allocated to reduce the gap between course teaching resource allocation.

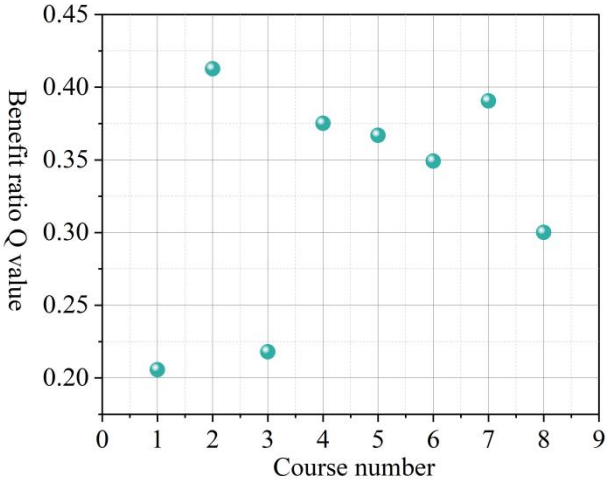

Figure 2. Interest ratio distribution

4. Strategies for optimizing the allocation of teaching resources for music civics courses

(1) Digging deep into the elements of ideology and politics to enrich the content of music courses

In the process of enriching the content of music courses by digging into the elements of Civics and Politics, teachers should focus on analyzing the historical and cultural values of music works, and closely integrate the concept of Civics and Politics education with the appreciation of music art. On the one hand, teachers should reveal the inner value of political education through the detailed interpretation of national emotions, social concepts, historical memories and other elements in musical works, so that students can realize the values conveyed by the works while enjoying the music. On the other hand, the content of the course should cover a variety of musical works, including but not limited to traditional folk music, red classics, modern pop music, etc., so as to broaden students' cultural horizons and enhance the sense of the times and the significance of the course. At the same time, teachers should adopt diversified teaching strategies. Teachers should also combine the background and artistic characteristics of the music works to design targeted teaching activities, so as to deepen students' understanding of the connection between music and Civic Education. Through this comprehensive integration of resources, the music curriculum will be richer and deeper, and more effective in promoting the overall development of students.

(2) Closely integrate the content of the curriculum with the Civic and Political Education to realize organic unity.

Closely integrate the music course content with the Civic and political education to achieve organic unity, teachers need to adhere to the orientation of the Civic and political education in the course design, combining the professional knowledge of “music appreciation” with the value of Civic and political education. This requires the realization of the deep integration of music artistry and political education in the course structure, and the natural integration of socialist core values, Chinese excellent traditional culture, social responsibility and other political elements through the analysis, interpretation and evaluation of musical works. At the same time, teachers should pay attention to the logic of the course content and the coherence of the ideological education, to build a cognitive chain from the music form to the cultural connotation, and then to the ideological concept, to ensure that "the teaching process and the goal of ideological education complement each other. This in-depth integration not only enhances the ideology of music education, but also enhances the artistry of Civic Education, thus realizing the organic unity of knowledge imparting and value shaping.

(3) Rational allocation of teaching resources, fully explore the resources of regional characteristics

Reasonable allocation of teaching resources and fully exploring the resources of regional characteristics mean that in the high school music curriculum, teachers should fully consider the regional cultural differences and integrate the local music resources into the teaching system, so as to enhance the local characteristics and sense of the times of the curriculum. This requires teachers to systematically sort out regional music culture, identify and screen music materials with educational value and cultural representativeness, and turn them into teaching resources. Teachers should optimize the allocation of teaching resources to ensure the effective use of resources with regional characteristics, including but not limited to music equipment, venues, digital resources and other aspects.

Schools should establish inter-school cooperation and resource sharing mechanisms, encourage

cross-regional cultural exchanges, and allow students to experience the music cultures of different regions through field trips, workshops, concerts and other forms, so as to broaden their musical horizons and deepen the practical connotation of Civic Education. In addition, the school should combine the resources of regional characteristics to develop targeted teaching cases and teaching materials, so as to make the music appreciation course closer to the actual life of students and enhance the relevance and effectiveness of teaching activities. Through such integration and innovation of teaching resources, schools can cultivate music appreciation talents with both local cultural heritage and international vision, contributing to the inheritance and development of China's rich and colorful music culture.

5. Conclusion

This paper takes eight representative music civics teaching courses in school A as examples, and empirically demonstrates the proposed teaching resource allocation efficiency assessment method for music civics courses based on the portfolio assignment VIKOR method to dig out the optimization strategy of teaching resource allocation for music civics courses. The article draws the following conclusions:

(1) In the analysis of the ranking results of different decision-making mechanism coefficients, it can be seen that the value of decision-making mechanism coefficients varies from 0.3 to 0.7, and the courses with the highest ranked comprehensive quality level are A3 or A1, which indicates that the method of this paper has a better stability at the same time in the consideration of the decision-making preference, and verifies the feasibility of the model of this paper.

(2) By assessing the level of teaching resource allocation efficiency of the 8 courses Music Civics Program, the result can be obtained that “100 years of party history in music” has the highest score ranking, and the ratio value of resource allocation benefits of the 8 courses is mostly concentrated in the range of 0.2-0.45. Therefore, it is necessary to optimize the teaching allocation resources and reduce the gap between resource allocation.

(3) By deeply excavating the elements of ideology and politics, closely integrating the course content with ideology and politics education, reasonably allocating teaching resources and improving the evaluation system, the effect of ideology and politics education in music courses can be effectively enhanced to realize the fundamental task of establishing morality and educating people. At the same time, this process not only promotes the in-depth integration of music education and civic education, but also provides a strong support for the overall development of students.

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