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Analysis of the Evaluation Data of College Classroom Teaching Quality based on Fuzzy Mathematics Model

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Abstract: This paper mainly studies the problem of teaching quality evaluation. According to the data in the annex, the transformation of quantitative indicators and the evaluation of teaching quality are realized by establishing fuzzy mathematical model, grey correlation degree and other methods. For problem 1: according to the quantitative values of the eight evaluation indexes, a fuzzy mathematical model is established, and the comprehensive evaluation is transformed into a quantitative index to evaluate the teaching level of teachers. See the appendix for the sequence of serial numbers 4450-4469 in Annex 1. For question 2: considering the large amount of data in Annex 1, the courses that have participated in the evaluation more than 50 times are selected as the research object. Using hierarchical clustering processing, it is concluded that there are some differences in the teaching quality of each course in the school. According to the overall teaching quality, the seven teaching teams are: course 0097, course 0057, course 0322, course 0320, course 0486, course 0058, course 0138. For question 3: the grey correlation model is established according to the factors that affect the professionalism and objectivity of evaluation experts, such as teachers' professional titles, the number of evaluation sessions and the average number of sessions. The evaluation conclusions of the evaluation experts are given in the appendix. For question 4: the data in Annex 1 are sorted out in chronological order to obtain 46 evaluation objects and three evaluation indexes, namely, the number of evaluation sections, the average number of sections and the quantification of professional titles, for analysis. Then through the fitting of data processing, it is concluded that the teaching quality of the school has declined with the growth of time in the past three years. In response to question 5: according to the data in the annex, this paper puts forward the question "what is the relationship between the scores of teachers' comprehensive evaluation of teaching and students' comprehensive evaluation of learning in the evaluation of classroom teaching quality in Colleges and universities?" by fitting the fitting image with MATLAB, it is concluded that the scores of teachers' comprehensive evaluation of teaching and students' comprehensive evaluation of learning in the evaluation of classroom teaching quality in Colleges and universities are very similar.

Keywords: Fuzzy Mathematical Model; Grey Correlation; Hierarchical Clustering; TOPSIS.

1. Model Assumptions

(1) The data of hypothesis analysis are accurate.
(2) Ignore the impact of individual extreme data on the analysis results.
(3) It is believed that all data in the annex are true and reliable.
(4) Assume that the errors are within a reasonable range.

2. Symbol Explanation and Noun Explanation

Table 1. Symbol explanation and noun explanation

Symbol	description
C1	Teaching quality
D1	Teaching attitude
Y1	Teaching attitude
J	Distortion degree
d	Euclidean distance
p	Confidence interval
a	Two stage minimum difference
b	Maximum difference between two levels
SSE	Sum of squares of errors
RMSE	Mean square error
R-square	Goodness of fit

3. Establishment and Solution of Problem 1

3.1. Analysis and Solution of Problem 1

3.1.1. Analysis Ideas of Problem 1

The classroom in colleges and universities can be divided into theoretical courses and experimental courses. According to the content of Appendix 1 and Appendix 2 given in the title and the information inquired in the application, it is concluded that the classroom teaching quality (C_1) of theoretical courses in Colleges and universities is evaluated by four modules: teaching attitude (D_1), teaching content (D_2), methods and means (D_3) and teaching effectiveness (D_4). Similarly, the classroom teaching quality (X_1) of experimental courses in colleges and universities is evaluated by four modules: teaching attitude (Y_1), teaching content (Y_2), methods and means (Y_3) and teaching effectiveness (Y_4). Through the in-depth analysis of the evaluation experts according to the teachers' teaching situation and their understanding of the quality standards of classroom teaching, and according to the students' classroom performance, the data conclusions obtained from them are sorted and summarized. See Table 2 and table 3 below.

Table 2. Structural analysis

Primary index	secondary index	tertiary index
Theory course (C_1)	Teaching attitude (D_1)	Energetic, upright and disciplined (E_1)
		Prepare well before class and start and finish classes on time (E_2)
	Teaching content (D_2)	Proficient in teaching, rich in information, outstanding key and difficult points, and strong logic (E_3)
		Combine the characteristics of the course, reasonably supplement the frontier of the subject, and organically combine the application (E_4)
	Methods and means (D_3)	Flexible teaching methods, encouraging students to question, focusing on enlightening thinking, and mastering the classroom (E_5)
		Proper use of information-based teaching methods, clear and neat courseware and blackboard writing, and flexible classroom organization (E_6)
	Teaching effectiveness (D_4)	Students' concentration and active thinking can effectively promote the internalization of knowledge (E_7)
		The teaching interaction is active and effective, the classroom atmosphere is active and harmonious, and gives students innovative Enlightenment (E_8))

3.1.2. Model Preparation and Establishment

1. Establishment of evaluation theory classroom model

Considering the objectivity of evaluating the quality of classroom teaching in colleges and universities, and the number of indicators involved is less. In view of the problem that the number of indicators is small, the first level fuzzy comprehensive evaluation is used.

(1) The factors that determine the quality of classroom teaching constitute the set of evaluation index system.

Factor set u= {E_1, E_2, E_3, E_4, E_5, E_6, E_7, E_8}

Table 3. structural analysis 2

Primary index	secondary index	tertiary index
Experimental class (X_1)	Teaching attitude (Y_1)	Energetic, upright and disciplined (Z_1)
		Fully prepared before class, on and off class on time, no teaching accidents (Z_2)
	Teaching content (Y_2)	Pay attention to the innovation and comprehensiveness of the experimental content, and meet the requirements of the curriculum standard (Z_3)
		Familiar with operation essentials, clear explanation and accurate demonstration (Z_4)
	Methods and means (Y_3)	Flexible teaching methods, reasonable teaching demonstration and student practice time arrangement (Z_5)
		Pay attention to the inspection of students' experiments, find problems in time and give guidance (Z_6)
	Teaching effectiveness (Y_4)	Students' operation is standardized, rigorous and careful, and cultivate practical ability and rigorous style (Z_7)
		Good teaching interaction, harmonious experimental atmosphere, and innovative inspiration for students (Z_8)

(2) Because the evaluation value of each indicator is different, it usually forms different grades. It forms a collection of different levels to judge the quality of classroom teaching.

Take the comment set V= {excellent b_1, good b_2, medium b_3, qualified b_4, unqualified b_5}

(3) In general, each factor in the factor set plays a different role in the comprehensive evaluation, and the comprehensive evaluation is closely linked to the common role of each factor to a large extent, which constitutes the weight between the factors and is used as a fuzzy vector on the factor set. Appendix 2 gives the weights of the factors for evaluating the quality of classroom teaching.

That is, the weight of each factor a={0.2, 0.3, 0.3, 0.2}

(4) Finally, the fuzzy comprehensive evaluation matrix is determined to evaluate each factor EI.

V={excellent b_1, good b_2, medium b_3, qualified b_4, unqualified b_5}={5, 4, 3, 2, 1}

Take partial membership function of large Cauchy distribution

$$f(x)=\begin{cases}\left[1+\alpha(x-\beta)^{-2}\right]^{-1}, 1\le x\le 3\\ a\ln x+b, 3<x\le 5\end{cases} \quad (1)$$

Wherein, a, b is the undetermined constant. To determine the undetermined constant, take

f(5)=1, f(3)=0.8, f(1)=0.01

From this calculation

$$f(x)=\begin{cases}\left[1+1.108(x-0.8942)^{-2}\right]^{-1}, 1\le x\le 3\\ 0.3915\ln x+0.3699, 3<x\le 5\end{cases}$$

Membership=[1, 0.9126, 0.8, 0.5245, 0.01]

Thus, the quantized values of {b_1, b_2, b_3, b_4, b_5} are {1, 0.9126, 0.8, 0.5245, 0.01}

The classroom quality of No. 4450-4469 is determined by scoring by the evaluation experts:

R1=[0.9126, 1, 1, 0.8, 0.9126, 0.8, 0.8, 0.9126]

The above formula shows the respective quantitative values of the classroom quality of No. 4450 scored by eight indicators. Use the same method to evaluate the quality of the classroom by using other factors.

To sum up, v= {excellent b_1, good b_2, medium b_3, qualified b_4, unqualified b_5} ={5, 4, 3, 2, 1}={1, 0.9126, 0.8, 0.5245, 0.01} to get the quantitative data of theory course, as shown in Table 4 below.

Table 4. The quantitative data of theory course

Theory Course	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
4450	0.9126	1.0000	1.0000	0.8000	0.9126	0.8000	0.8000	0.9126
4451	0.9126	0.9126	0.8000	0.8000	0.9126	1.0000	0.8000	0.8000
4452	0.8000	0.9126	0.8000	0.5245	0.5245	0.5245	0.0100	0.8000
4453	0.9126	0.8000	0.8000	0.5245	0.0100	0.8000	0.5245	0.5245
4454	0.9126	0.8000	0.9126	1.0000	0.9126	0.9126	0.8000	0.8000
4455	0.8000	1.0000	0.9126	0.9126	0.8000	0.5245	0.0100	0.5245
4456	0.0100	0.8000	0.9126	0.5245	0.9126	0.0100	0.5245	0.9126
4459	0.8000	0.9126	1.0000	0.0100	0.9126	0.9126	0.8000	0.9126
4460	0.0100	0.5245	0.0100	0.0100	0.5245	0.5245	0.5245	0.5245
4461	1.0000	1.0000	0.9126	0.9126	0.9126	0.9126	1.0000	0.9126
4463	0.9126	1.0000	0.8000	0.8000	0.9126	0.8000	0.9126	0.8000
4464	1.0000	1.0000	0.8000	0.8000	0.9126	0.5245	1.0000	0.9126
4465	1.0000	1.0000	1.0000	1.0000	0.9126	1.0000	0.9126	1.0000
4466	1.0000	0.9126	0.9126	0.9126	0.8000	0.9126	0.8000	0.9126
4467	1.0000	0.9126	0.9126	0.9126	0.8000	1.0000	0.9126	0.8000
4468	0.8000	1.0000	0.9126	0.9126	0.8000	0.8000	0.9126	0.9126
4469	0.9126	0.9126	0.8000	0.8000	0.9126	0.5245	0.9126	0.9126

Take Ri as line i to form the evaluation matrix

$$R=\begin{bmatrix}0.9126 & 1 & 1 & 0.8 & 0.9126 & 0.8 & 0.8 & 0.9126\\ 0.9126 & 0.9126 & 0.8 & 0.8 & 0.9126 & 1 & 0.8 & 0.8\\ 0.8 & 0.9126 & 0.8 & 0.5245 & 0.5245 & 0.5245 & 0.01 & 0.8\\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots\\ 0.9126 & 0.9126 & 0.8 & 0.8 & 0.9126 & 0.5245 & 0.9126 & 0.9126\end{bmatrix}$$

It is a fuzzy relation matrix from factor set U to comment set V.

Using fuzzy comprehensive evaluation. Perform matrix synthesis calculation:

According to the weights given in the "key contents and reference standards of classroom teaching evaluation" implemented by the University in Annex 2, and the membership function obtained from the fuzzy comprehensive evaluation, the comments are quantified

$$B = A \cdot R[0.2,0.3,0.3,0.2] \cdot \begin{bmatrix} 0.9126 & 1 & 1 & 0.8 & 0.9126 & 0.8 & 0.8 & 0.9126 \\ 0.9126 & 0.9126 & 0.8 & 0.8 & 0.9126 & 1 & 0.8 & 0.8 \\ 0.8 & 0.9126 & 0.8 & 0.5245 & 0.5245 & 0.5245 & 0.01 & 0.8 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 0.9126 & 0.9126 & 0.8 & 0.8 & 0.9126 & 0.5245 & 0.9126 & 0.9126 \end{bmatrix}$$

Table 5. Evaluation quantification (a)

Theory Course	Teaching attitude	teaching content	Methods and means	teaching achievements
	0.2	0.3	0.3	0.2
Practice class	Teaching attitude	teaching content	Teaching organization	teaching achievements
	0.2	0.3	0.3	0.2

(b)

	Quantitative results				
4450-4454	0.8894	0.7000	0.6083	0.5963	0.8919
4455-4459	0.7059	0.5787	0.7678	0.3187	0.9388
4460-4464	0.8594	0.8468	0.9782	0.8932	0.9063
4465-4469	0.8763	0.8206	0.9825	0.8375	0.9188

Use TOPSIS model to normalize the quantified results and calculate the final score

Table 6. Normalize the quantified results and calculate the final score

4450-4454	0.0696	0.0691	0.0650	0.0629	0.0616
	18	13	10	20	15
4455-4459	0.0602	0.0601	0.0598	0.0584	0.0567
	14	5	1	16	11
4460-4464	0.0554	0.0544	0.0526	0.0471	0.0406
	12	19	17	8	6
4465-4469	0.0400	0.0304	0.0291	0.0272	0.0584
	2	3	4	7	9

4. Establishment and Solution of Problem 2

4.1. Establishment and Solution of Problem 2

4.1.1. Thinking Analysis of Problem 2

Considering that there are a lot of course data provided in Appendix 1, and the evaluation of classroom teaching quality is objective and authentic, those who have attended less than 50 courses and 50 courses are screened out to ensure the stability of the data and avoid inaccurate data caused by accidental circumstances. The state of teachers' classroom, their own cultural level and students' enthusiasm in the classroom are the key reasons that affect the quality of classroom. Therefore, the evaluation of teachers' teaching level, the evaluation of students' learning situation and teachers' professional title are the standards used to evaluate the differences in teaching quality between different courses.

For exploring the main differences between such huge data, clustering model is undoubtedly the best choice. First, each course is regarded as a separate class, and then the minimum distance Si between each course is calculated. The calculated distance Si is defined as the minimum distance SJ between the two classes, and then the two classes of distance SJ are merged to form a new class. Then the minimum distance between the new class and other remaining classes is recalculated and merged, and so on, until all data belong to a large class.

4.1.2. Modeling

1. step analysis

(1) The selected courses will be evaluated and scored by the evaluation expert group in terms of three indicators: the teaching grade of teachers, the learning situation of students and the professional title of teachers. The quantitative value obtained in the first question is used to quantify the data to ensure that the conclusion is more objective, and then the quantitative data of the same course are averaged to simplify the calculation. The following table 7 is obtained

(2) There are 23 groups of data, and the minimum distance between each two data is calculated $d\left(\overrightarrow{X_i}, \overrightarrow{X_j}\right)$

Euclidean distance

$$d(\overrightarrow{X_i}, \overrightarrow{X_j}) = \sqrt{\sum_{k=1}^{p} \left(X_{ik} - X_{jk}\right)^2} \quad (2)$$

Where i , j are used to represent class X_i, X_j, Use to indicate the distance between X_i and X_j.

(3) Establish 23 classes, each class contains only one set of data, and the platform height of each class is 0;

(4) The nearest two classes are reasonably merged into a new class, and the platform height of the clustering graph is selected as the minimum distance between the two classes;

(5) Then calculate the distance value between the new class and all classes. As with the above method, go to the next step until there is only one class left. Otherwise, go back to step 4;

(6) Draw a cluster diagram;

(7) The number and class of classification are determined by clustering graph, and whether there are differences between them is obtained.

Draw a vertical line in the pedigree, and divide the data samples into four categories according to the needs, as shown in the above figure. The elbow rule is used to roughly estimate the optimal number of clusters through the pedigree. The distortion degree of each class is equal to the square sum of the distance from the midpoint of each variable to its center. The more compact the class centers are, the smaller the distortion degree of the class is, and the more scattered the class is.

Divide n samples into k classes (k ≤ n-1) and use T_k to represent the k-th class (k=1,2,..., k), and the center position of this class is marked as C_k

Table 7. Average value

	Average value of teacher evaluation	Average student evaluation	Average value of professional title
Course0034	0.7517	0.7402	0.5595
Course0044	0.7848	0.7815	0.6122
Course0053	0.7606	0.8152	0.5442
Course0057	0.7811	0.7837	0.5913
Course0058	0.7967	0.8038	0.5771
Course0059	0.7767	0.8040	0.4824
Course0076	0.8116	0.8131	0.5542
Course0088	0.7882	0.7601	0.5754
Course0092	0.7563	0.7878	0.5482
Course0109	0.8296	0.8400	0.5654
Course0138	0.7902	0.8144	0.5443
Course0206	0.7972	0.7875	0.5772
Course0251	0.7796	0.7908	0.4379
Course0258	0.7625	0.7780	0.4715
Course0263	0.8040	0.7946	0.4765
Course0319	0.7470	0.7618	0.4535
Course0320	0.7683	0.7842	0.5334
Course0322	0.7891	0.7702	0.6012
Course0354	0.8189	0.8189	0.5874
Course0385	0.7182	0.7346	0.3704
Course0453	0.7891	0.7735	0.5818
Course0486	0.7974	0.7974	0.5668
Course0580	0.7544	0.7301	0.6270

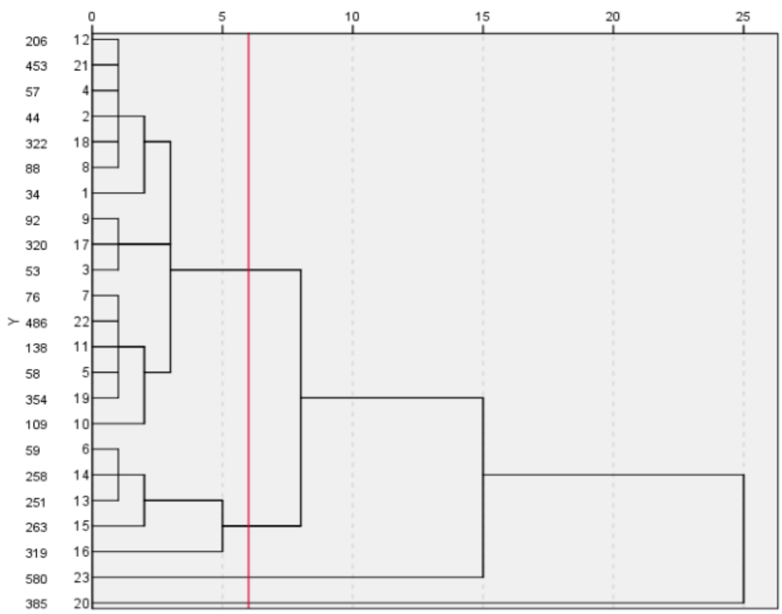

Figure 1. Pedigree using average join (between groups) Rescaled distance clustering combination

That is, the distortion degree of class k is: $\sum_{i \in T_k} |x_i - c_k|^2$

Where, the absolute value is used to represent the distance between X_i and C_k.

Total distortion of all classes: $J = \sum_{k=1}^{K} \sum_{i \in T_k} |x_i - c_k|^2$

Where j is called the polymerization coefficient.

Use the abscissa as the clustering category K and the ordinate as the aggregation coefficient J to draw the aggregation coefficient line graph.

Table 8. Centralized planning

stage	Combinatorial clustering		coefficient	The first stage of clustering		next stage
	Cluster 1	Cluster 2	coefficient	Cluster 1	Cluster 2	next stage
1	12	21	.005	0	0	5
2	2	18	.028	0	0	8
3	6	14	.031	0	0	13
4	7	22	.033	0	0	7
5	4	12	.035	0	1	8
6	9	17	.060	0	0	11
7	7	11	.062	4	0	12
8	2	4	.077	2	5	10
9	5	19	.093	0	0	12
10	2	8	.104	8	0	14
11	3	9	.156	0	6	17
12	5	7	.166	9	7	15
13	6	13	.196	3	0	16
14	1	2	.228	0	10	17
15	5	10	.231	12	0	18
16	6	15	.280	13	0	19
17	1	3	.477	14	11	18
18	1	5	.579	17	15	20
19	6	16	.870	16	0	20
20	1	6	1.624	18	19	21
21	1	23	2.998	20	0	22
22	1	20	5.219	21	0	0

Extract the coefficients in the table made in SPSS, and then make a line graph of aggregation coefficient (as shown in Figure 2 below)

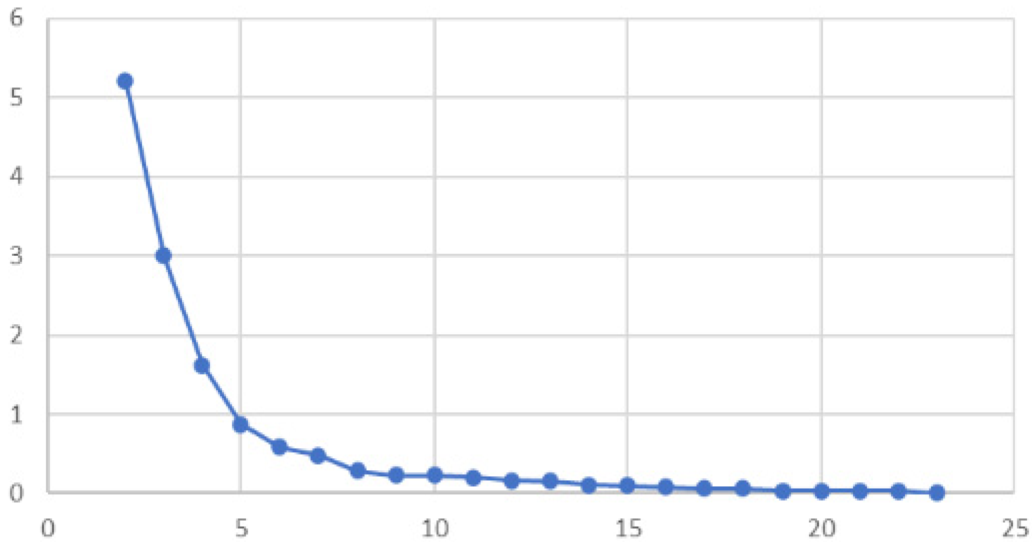

Figure 2. Aggregation coefficient line chart

According to the aggregation coefficient discount chart, when the number of categories is 4, the downward trend of discount is more and more slow, so the number of categories can be set to 4. And it can be seen from the figure that when the K value is from 1 to 4, the distortion degree changes the most. After more than 4, the distortion degree changes significantly reduced. Therefore, the elbow is k=4, so the number of categories can be set to 4.

After determining the K value, the clustering results are drawn by SPSS. Draw as shown in Figure 3 below.

It can be seen from the figure that there are differences between each class, that is, there must be differences in the teaching quality of different courses. This conclusion is reached, and then the TOPSIS method is used to rank the seven teaching teams of course 0057, course 0058, course 0097, course 0138, course 0320, course 0322 and course 0486 according to the overall teaching quality. There are 7 evaluation objects and 3 evaluation indexes sorted by

MATLAB.

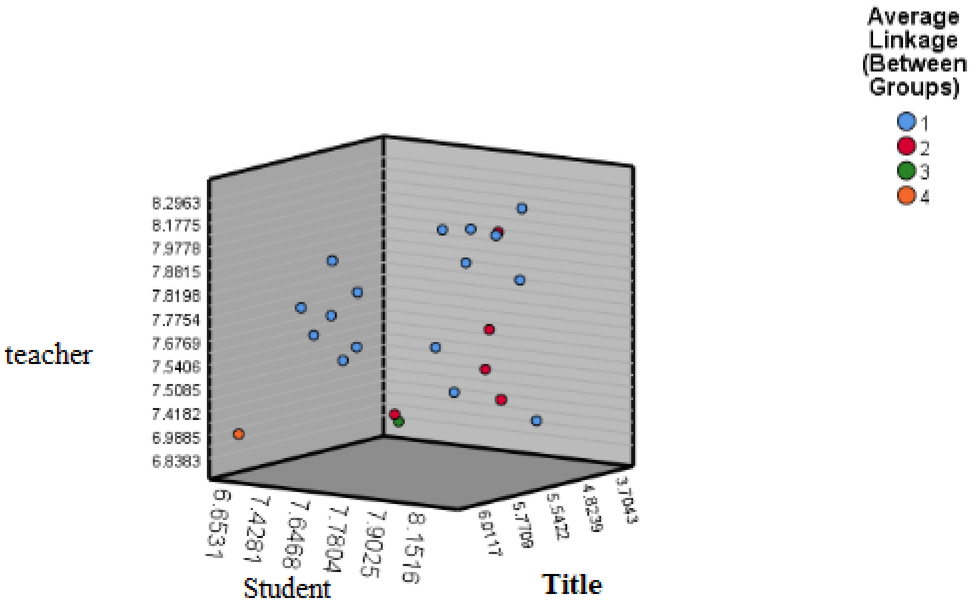

Figure 3. Group 3-D scatter diagram by teacher, student and professional title

Standardization matrix Z=

0.372592081	0.371856878	0.394513896
0.396888294	0.381492552	0.385019997
0.36206987	0.380314644	0.365711953
0.381561199	0.39185235	0.36314333
0.365976872	0.371736191	0.355864451
0.378469571	0.362786021	0.40108557
0.387031001	0.384963519	0.378141423

The weight determined by adding the weight vector using the entropy weight method is:

0.2776 0.1794 0.5430

Course	57	58	97	138	320	322	486
Score	0.195120388	0.211438326	0.073652321	0.111127918	0.030791486	0.207793867	0.170075694
Sort	2	6	1	7	4	3	5

5. Establishment and Solution of Problem 3

5.1. Analysis of Problem 3

Whether the evaluation work is scientific and effective depends on the professionalism and objectivity of evaluation experts. The professionalism of evaluation experts can start from the professional titles of teachers evaluated by evaluation experts. If the professional titles of teachers evaluated by evaluation experts are high, then the professional titles of evaluation experts will be high, which is more professional and senior. If the professional titles of the teachers evaluated by the evaluation experts are low, the professional titles of the evaluation experts are generally low, and the qualifications of the evaluation experts may be slightly insufficient.

The objectivity of evaluation experts can be evaluated from two aspects: the number of evaluation sections and the average number of sections. If the number of evaluation sections of the evaluation expert is relatively large, it can be concluded that the evaluation expert is more experienced and qualified. If the evaluation expert has more average sessions on a course evaluation, it can be concluded that the evaluation expert is familiar with the course and may be a teacher or expert in the field.

5.2. Model Establishment

5.2.1. Data Preprocessing

According to the classification of all evaluation experts in

Annex II, a total of 52 evaluation experts were selected as evaluation objects and three evaluation indicators. Because the number of samples is small, grey correlation analysis is used.

The matrix is obtained after preprocessing the data in Annex II with MATLAB.

Z=	0.4564	0.8759	1.0770
	2.9799	0.9192	1.1360
	3.7315	0.7029	1.0581
	0.4474	0.4686	1.0235
	4.1163	0.9841	1.0131
	4.3848	0.7029	1.0351
	…	…	…
	0.3669	1.2075	0.8788
	0.4295	1.8023	0.8953
	0.1163	1.4418	0.8568
	0.0805	0.6488	1.0035

Expand the data in Table 3 ten times, and then use SPSS to run the pedigree

5.2.2. Calculate | x0 Xi | Matrix

X=0.6206	0.2010	0
0	2.0607	1.8439
0	3.0286	2.6735
0.5761	0.5549	0
0	3.1323	3.1032
0	3.6819	3.3496
0	0.5648	0.4838
…	…	…
0.8407	0	0.3287
1.3728	0	0.9070
1.3255	0	0.5851
0.9230	0.3547	0

Get the minimum difference of two levels a=min (min (absx0_xi))=0,

Two stage maximum difference b=max (max (absx0_xi))=6.0548

5.3. Model Establishment

Calculate the correlation coefficient between each index in the subsequence and the parent series, and calculate the weight by using the grey correlation degree of each index in the subsequence.

Obtain w1=0.321361139348079

w2=0.340095238194890

w3=0.338543622457031

Then normalize the score of expert 001-expert 052:

0.0566, 0.0498, 0.0385, 0.0384, 0.0345, 0.0336, 0.0318, 0 .0248, 0.0227, 0.0220, 0.0209, 0.0207, 0.0204, 0.0203, 0.01 96, 0.0195, 0.0190, 0.0183, 0.0181, 0.0172, 0.0170, 0.0169, 0.0168, 0.0164, 0.0161, 0.0159, 0.0159, 0.0157, 0.0156, 0.0156, 0.0153, 0.0153, 0.0153, 0.0151, 0.0150, 0.0149, 0.0 149, 0.0145, 0.0141, 0.0141, 0.0138, 0.0136, 0.0134, 0.0130 , 0.0125, 0.0124, 0.0119, 0.0113, 0.0110, 0.0103, 0.0103, 0.0 095

Rank 52 experts from top to bottom:

Expert 028, expert 025, expert 005, expert 006, expert 003, expert 027, expert 002, expert 010, expert 023, expert 008, expert 007, expert 024, expert 013, expert 050, expert 031, expert 033, expert 040, expert 043, expert 012, expert 045, expert 018, expert 048, expert 030, expert 041, expert 046, expert 049, expert 026, expert 051, expert 019, expert 001, expert 038, expert 042, expert 022, expert 020, expert 032, expert 017, expert 029, expert 037, expert 016 expert 021, expert 047, expert 044, expert 009, expert 014, expert 004, expert 015, expert 011, expert 052, expert 039, expert 034, expert 036, expert 035

Table 9. Analysis form of 9 evaluation experts

Evaluation expert	Number of evaluation sections	Average section	Quantification of professional title
Expert 002	333	2.55	0.6140
Expert 003	417	1.95	0.5719
Expert 005	460	2.73	0.5476
Expert 006	490	1.95	0.5595
Expert 012	90	2.60	0.5845
Expert 025	675	2.51	0.5474
Expert 027	394	2.25	0.5371
Expert 028	787	2.74	0.5480

Table 10. 9 expert evaluation conclusions

Evaluation expert	Evaluation conclusion
Expert 002	have many times of class evaluation, rich experience in class evaluation and high professional title level
Expert 003	have a lot of class evaluation times, few class evaluation sessions, and average professional titles
Expert 005	have more times of class evaluation, more class evaluation sessions, and strong reserves of professional knowledge
Expert 006	have more class evaluation times, fewer class evaluation sessions, and average professional title level
Expert 012	have few times of class evaluation, many class evaluation sessions, and strong professional knowledge reserve
Expert 025	have many times of class evaluation, rich experience in class evaluation and strong reserves of professional knowledge
Expert 027	have moderate times of class evaluation, rich experience in class evaluation, and low professional title level
Expert 028	have a lot of times to evaluate the course, a lot of times to evaluate the course, and a strong reserve of professional knowledge

From the ranking of experts, it can be found that the more the number of evaluation sections, the higher the ranking of experts; The number of sections evaluated by expert 001 and expert 026 is the same, both of which are 51. The quantitative indicators of professional titles are also similar, but expert 026 ranks higher, and the average number of sections is higher than that of Expert 1. It can be concluded that the order that affects the ranking is also closely related to whether experts are familiar with a certain course.

Give evaluation conclusion

According to the analysis of the experts in table 9 and the ranking of the experts, the overall evaluation conclusion of the nine experts is shown in table 10.

6. Evaluation and Extension of the Model

6.1. Model Benefits

1. in the process of solving the model, gradually adjust the model to increase the accuracy of the results.

2. there are no strict restrictions on data distribution, sample size and indicators, which is flexible and convenient.

3. fuzzy evaluation deals with fuzzy evaluation objects through accurate digital means, and can make a scientific, reasonable and practical quantitative evaluation of the data containing fuzzy information.

4. because the established optimization model is closely related to real life, and the corresponding problems are solved and sorted out in combination with the actual data, the model is universal and popularized.

6.2. Model Shortcomings

1. there is inevitable correlation among the impact factors, and the interaction between the impact factors is not fully considered.

2. due to the small number of samples, it may bring some errors to the modeling results.

6.3. Model Promotion

This model can be extended to the impact of medicine, meteorology, geology, environment and biology on the research object.

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