International Journal of Multimedia and Ubiquitous Engineering
Vol.9, No.8 (2014), pp.181-192
http://dx.doi.org/10.14257/ijmue.2014.9.8.16

Research on the Gray Hierarchy Evaluation Model Based on Multimedia System and English Teaching Evaluation

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Abstract

Network technology and multimedia are gaining momentum. They accelerate the reform of the educational sector. Traditional educational mode is integrated with new technology and a multimedia network education system is taking shape. As a result, traditional English teaching system has experienced a progressed reform. The evaluation of English teaching system in multimedia network is for the purpose of measuring the level and efficacy of the integrated new multimedia technology. This paper studies the English teaching system in multimedia network, adopts Analytic Hierarchy Process (AHP) to conclude 1 first-class index, 5 second-class indexes and 21 three-class indexes. It employs the Grey Evaluation and Matlab software for the comprehensive evaluation of 30 teaching systems and classifies the results by gray classes. By studying the evaluation principle of English teaching system in multimedia network, this paper intends to provide the algorithm with theoretical foundations so that the system can better serve students.

Keywords: *AHP (Analytic Hierarchy Process); Gray Evaluation method; Matrix; Realization of MATLAB*

1. Introduction

In the foreseeable future, classroom teaching will still be a mainstream. But the class structure, materials, method and hardware will be different from those of traditional classroom teaching. Multimedia and tradition way of teaching will be complementary and lead the new trend of teaching [1]. Multimedia teaching aboard is derived from audio-visual instruction, or named audio-visual education programme domestically. This later developed into computer aided instruction and computer teaching. With the development of technology, there has emerged multimedia technology with computer at its core and multimedia-aided teaching.

In traditional way of teaching, knowledge in textbooks and coaching materials is developed in a linear way with a logic order. In the course of teaching, students are passive and dependent on teachers and lack the flexibility of self-study. In contrast, multimedia teaching is organized in a way that fits human perception. It can make up for the weaknesses in traditional teaching. This paper studies the English teaching system in multimedia network and provides a Gray Hierarchy Evaluation model based on Matlab to have an all-round evaluation on teaching systems. It hopes to provide scientific analytical method for the improvement of the new teaching system.

Many people pay efforts to study the teaching system in multimedia network and Gray Hierarchy Evaluation method that enables a successful combination of method and technology, laying a solid foundation for the development of multimedia English teaching. Xiao Dejun (2009) and some others from the Foundation Department of Changzhou Institute of Light Industry Technology, propose that the mode of English teaching and learning in multimedia network has charted the correct direction. And an

ISSN: 1975-0080 IJMUE
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integrated scientific evaluation system to measure its quality is necessary. They also discuss the theory and idea of the evaluation index system based on the "Task-based" English teaching theories and practices, and constructs a proper evaluation system that focuses on subject, interaction and development of English teaching [2].

Feng Lixia (2009), from College of Mathematics and Information Science of Northwest Normal University, targets at the lack of full-time teaching of the second-class evaluation index in the existing evaluation index system, constructs models by AHP and tests its consistency. She gives out reasonable references values to teaching evaluation index of all classes. Based on her effort, this paper constructs a teaching evaluation index model based on AHP and finds it useful [3]. Zhang Hui (2008) from China University of Petroleum combines fuzzy comprehensive evaluation method and the Gray theory, suggests a new quantitative comprehensive evaluation method, namely, Fuzzy Analytic Hierarchy Process of Gray Correlation Clustering Analysis. He applies it to oil and gas drilling technology and yields good results [4].

Wang Kai (2006) from Foreign Language Department of Huainan Normal University targets at how to use multimedia courseware for evaluation to promote the English teaching aided software. He bases his discussion from the position of English multimedia courseware, characteristics of courseware teaching, technique features and the economic utility of courseware [5]. Chai Zhengyi from College of Information Science and Technology of Henan University of Technology and Li Yalun from Zhengzhou Furun Foreign Language School (2006) analyze the poor quality of multimedia courseware teaching and problems of teachers blindly using multimedia technology. They provide reasonable advice and references for the use of multimedia technology in teaching [6]. Deng Xianglin and Luo Yan (2009), librarians of Hunan University of Science Technology adopts questionnaires and quantitative mathematical method based on system evaluation principle and Fuzzy Analytic Hierarchy Process, point out that performance management is available in the library. They have proved that the evaluation indexes are scientific, reasonable and accessible by empirical analysis on library performance management.

This paper stands on the shoulder of previous researches and uses Fuzzy Analytic Hierarchy Process to evaluate 27 indexes of 30 systems in multimedia network and gets the algorithm by Matlab software. It hopes to provide suggestions to the multimedia teaching system and theoretical foundations for the algorithm.

2. Establishment of the Evaluation Index System

With the rapid development of scientific technology, multimedia network classroom emerged in campuses of all levels. This paper studies the English teaching system in multimedia network, establishes the evaluation index system for multimedia teaching. By doing so, it hopes to evaluate the quality of the system in a proper and effective way.

The teaching system in multimedia network can be simplified as the following model in Figure 1.

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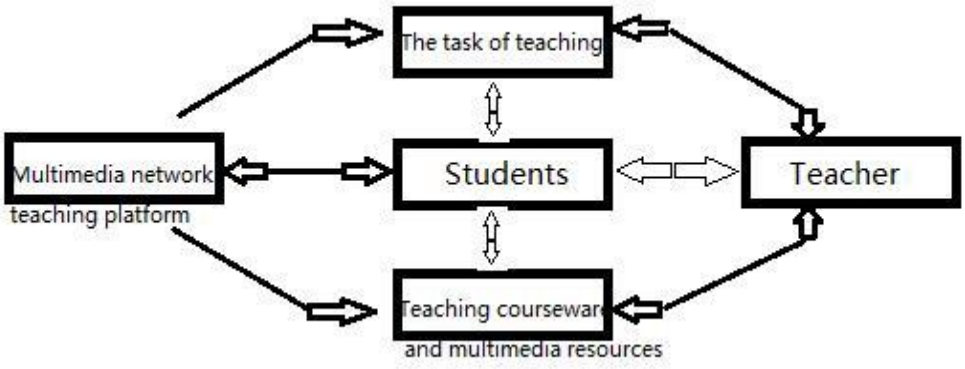

Figure 1. Framework Model of Teaching System in Multimedia Network

The indexes are divided into three categories, namely, first-class index, second-class index and third-class index. First-class index is referred to by A.

There are five second-class indexes: student B1, teacher B2, teaching task B3, teaching courseware and multimedia resources B4 and multimedia network teaching platform B5. There are three third-class indexes. Under the student index, there are studying condition C1, studying way C2, studying effect C3. Under the teacher index, there are role position C4, humanistic concern C5, environment building C6, technology application C7, habit concern C8 and teaching creativity C9. Under the teaching task, there are task design C10, task presentation C11, task completion and tactics C12, report and summary C13, task effect C14. Under the teaching courseware and multimedia resources index, there are content C15, effectiveness C16, interaction C17 and technological level C18. Under the multimedia network teaching platform index, there are openness C19, interaction C20, performance and effectiveness C21.

The hierarchy index system is shown in Figure 2.

A																			
B1			B2						B3					B4				B5		
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21

Figure 2. Index Hierarchy System

3. Mathematical model of Gray Hierarchy Evaluation

Based on the English teaching evaluation index system in multimedia network, we should also confirm the weight of indexes in order to learn about the proportion of every index. Many methods are available, including AHP, experience method, expert estimation method, weighted statistical method and statistical method of frequency. This paper adopts the Gray Hierarchy Evaluation that divides the results into five classes: Best, Better, Normal, Worse and Worst. This paper will start by illustrating the second-class indexes B1, B2, B3, B4 and B5. The set of the first-class evaluation index A is known as (1)

$$U_A = \{U_{B1}, U_{B2}, \cdots, U_{B5}\} \tag{1}$$

The corresponding weigh of indexes in (1) is shown as in (2)

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$$A = \{A_1, A_2, \cdots, A_5\} \tag{2}$$

The set consisted of the second-class indexes is expressed by (3)

$$U_{Bi} = \{U_{Bi1}, U_{Bi2}, \cdots, U_{Bim}\} \tag{3}$$

The corresponding weigh of indexes in (3) is expressed by (4)

$$A_i = \{A_{i1}, A_{i2}, \cdots, A_{im}\} \tag{4}$$

The process of Gray Hierarchy Evaluation includes confirming the gray class of evaluation, working out evaluation class, calculating sampling matrix, calculating gray evaluation coefficient, constructing gray evaluation weight matrix, checking results and indicating the gray class of indexes.

3.1. Confirming the Gray Class of Evaluation.

This paper classifies 5 gray classes, namely, $e = 1,2,3,4,5$, Best, Better, Normal, Worse and Worst. The gray and whitening weight functions are shown as follows.

For Best or $e = 1$, there is $x \in [x_1, x_2, x_3]$, the whitening weight function f_1 is expressed by (5).

$$f_1 = \begin{cases} 0 & x \notin [x_1, x_2] \\ \dfrac{x - x_1}{x_2 - x_1} & x \in [x_1, x_2] \\ 1 & x \in [x_2, x_3] \end{cases} \tag{5}$$

For Better or $e = 2$, there is $x \in [x_1, x_4, x_2, x_3]$, the whitening weight function f_2 is expressed by (6).

$$f_2 = \begin{cases} 0 & x \notin [x_1, x_3] \\ \dfrac{x - x_1}{x_4 - x_1} & x \in [x_1, x_4] \\ 1 & x \in [x_4, x_2] \\ \dfrac{x_3 - x}{x_3 - x_2} & x \in [x_2, x_3] \end{cases} \tag{6}$$

For Normal or $e = 3$, there is $x \in [x_1, x_5, x_4, x_3]$, the whitening weight function f_3 is expressed by (7).

$$f_2 = \begin{cases} 0 & x \notin [x_1, x_3] \\ \dfrac{x - x_1}{x_5 - x_1} & x \in [x_1, x_5] \\ 1 & x \in [x_5, x_4] \\ \dfrac{x_3 - x}{x_3 - x_4} & x \in [x_4, x_3] \end{cases} \tag{7}$$

For Worse or $e = 4$, there is $x \in [x_6, x_1, x_5, x_3]$, the whitening weight function f_4 is expressed by (8).

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$$f_2 = \begin{cases} 0 & x \notin [x_6, x_3] \\ \dfrac{x - x_6}{x_1 - x_6} & x \in [x_6, x_1] \\ 1 & x \in [x_1, x_5] \\ \dfrac{x_3 - x}{x_3 - x_5} & x \in [x_5, x_3] \end{cases} \tag{8}$$

For Worst or $e = 5$, there is $x \in [x_7, x_1, x_5]$, the whitening weight function f_5 is expressed by (9).

$$f_5 = \begin{cases} 0 & x \notin [x_7, x_5] \\ 1 & x \in [x_7, x_1] \\ \dfrac{x_5 - x}{x_5 - x_1} & x \in [x_1, x_5] \end{cases} \tag{9}$$

3.2. Calculating the Sampling Matrix

According to the evaluation D_{ij} by the first commentator based on evaluation index U_{ij}, we construct the sampling matrix D of the system to U_i. The sampling matrix is expressed by (10).

$$D = \begin{bmatrix} d_{111} & d_{112} & \cdots & d_{11p} \\ d_{121} & d_{122} & \cdots & d_{12p} \\ \cdots & \cdots & \cdots & \cdots \\ d_{in1} & d_{in2} & \cdots & d_{inp} \end{bmatrix} \begin{matrix} U_{11} \\ U_{12} \\ \vdots \\ U_{in} \end{matrix} \tag{10}$$

3.3 Calculating the Gray Evaluation Coefficient

For the evaluation index U_{ij}, the gray evaluation coefficient of the e gray class of the commented object is expressed by X_{ije} and the algorithm is expressed by (11).

$$X_{ije} = \sum_{l=1}^{p} f_e(d_{ijl}) \tag{11}$$

For the evaluation index U_{ij}, the overall gray evaluation coefficient of the commented object of all gray classes is expressed by X_{ij} and the algorithm is expressed by (12).

$$X_{ij} = \sum_{e=1}^{g} (X_{ije}) \tag{12}$$

3.4. Constructing Gray Evaluation Weight Matrix

For the evaluation index U_{ij}, the overall gray evaluation weight of the e gray class of the commented object is expressed by r_{ije} and the algorithm is expressed by (12).

$$r_{ije} = \frac{X_{ije}}{X_{ij}} \tag{13}$$

Suppose there are g evaluation gray classes, r_{ij} is used to refer to vector of U_{ij} of the commented object to gray evaluation weight vector of all gray classes. This vector is expressed by (14).

$$r_{ij} = (r_{ij1} \quad r_{ij2} \quad \cdots \quad r_{ijg}) \tag{14}$$

From al vectors, we can get the gray evaluation weight matrix R_i of U_i of the commented object, as is expressed by (15).

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$$R_i = \begin{bmatrix} r_{i1} \\ r_{i2} \\ \vdots \\ r_{in} \end{bmatrix} = \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1g} \\ r_{i21} & r_{i22} & \cdots & r_{i2g} \\ \cdots & \cdots & \cdots & \cdots \\ r_{in1} & r_{in2} & \cdots & r_{ing} \end{bmatrix} \tag{15}$$

3.5. Comprehensive Evaluation

For the evaluation of the first-class index, suppose the evaluation result of index U_i of the commented object is expressed by B_i, and the algorithm is known as (16).

$$B_i = A_i \cdot R_i = \begin{pmatrix} b_{i1} & b_{i2} & \cdots & b_{ig} \end{pmatrix} \tag{16}$$

For the evaluation of the second-class index, from the result B_i, we can get the index U_i of the commented object U, the gray evaluation weight matrix R of all gray classes is expressed by (17).

$$R = \begin{bmatrix} B_1 \\ B_2 \\ \vdots \\ B_m \end{bmatrix} = \begin{bmatrix} b_{11} & b_{12} & \cdots & b_{1g} \\ b_{21} & b_{22} & \cdots & b_{2g} \\ \vdots & \vdots & \ddots & \vdots \\ b_{m1} & b_{m2} & \cdots & b_{mg} \end{bmatrix} \tag{17}$$

Therefore, the comprehensive evaluation B is expressed by (18).

$$B = A \cdot R = A \cdot \begin{bmatrix} A_1 \cdot R_1 \\ A_2 \cdot R_2 \\ \vdots \\ A_m \cdot R_m \end{bmatrix} = \begin{pmatrix} b_1 & b_2 & \cdots & b_g \end{pmatrix} \tag{18}$$

3.6. Indicating the Gray Class

The comprehensive evaluation results B of the commented object are presented in vectors. These vectors describe the characteristics of all gray classes and can be used to indicate the gray class of the commented object. The normalized processing for vector B results in a binary vector as is shown in (19). The algorithm of comprehensive evaluation value z is expressed by (20).

$$D = \begin{bmatrix} d_1 & d_2 & \cdots & d_g \end{bmatrix} \tag{19}$$

$$z = B \cdot D^T \tag{20}$$

4. Empirical Research and Algorithm based on Matlab

4.1. Algorithm Process

The algorithm process based on Matlab is shown as Figure 3.

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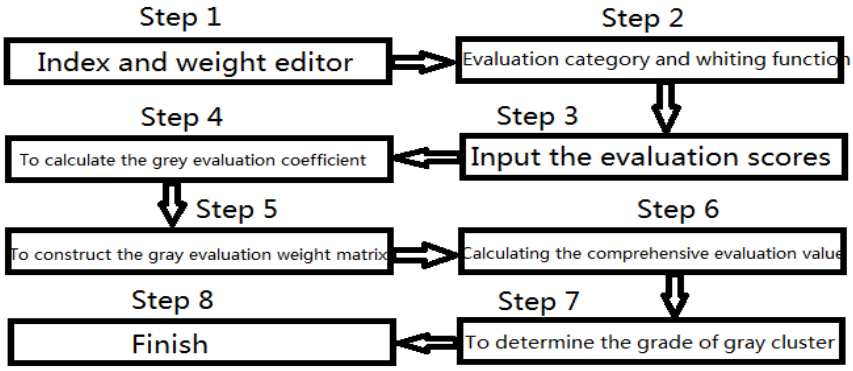

Figure 3. Algorithm Process

4.2. Index Data Editing

This paper conducts the evaluation on 30 English teaching systems in multimedia network. Table 1 shows the rating for 21 indexes with the full score being 100.

Table 1. Third-class Index Evaluation

System number	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
1	92	82	83	82	94	97	87	82	49	93	53
2	50	72	87	49	55	86	52	60	56	57	67
3	45	55	50	77	74	84	81	69	63	57	99
4	49	97	77	61	79	59	76	47	47	60	48
5	98	59	63	96	58	52	76	85	63	78	98
6	77	98	91	99	89	74	93	82	87	58	89
7	46	97	49	68	45	64	97	96	63	65	59
8	82	62	83	61	83	69	80	49	85	77	93
9	48	46	46	91	91	89	73	76	55	94	52
10	78	77	62	68	79	73	62	54	82	98	55
11	71	55	63	83	80	87	59	89	56	68	54
12	73	93	52	76	100	98	54	57	89	78	55
13	59	69	93	92	72	82	49	53	47	83	71
14	57	61	98	60	80	68	88	77	53	73	65
15	76	66	55	72	91	52	60	89	77	65	74
16	59	76	87	47	88	68	66	50	92	91	77
17	51	68	69	64	93	77	53	78	65	95	68
18	91	97	79	91	93	56	84	91	54	54	98
19	83	63	62	97	64	78	89	58	96	91	66
20	74	97	56	53	50	94	97	57	45	71	92
21	45	87	92	99	63	73	84	72	87	74	58
22	48	70	90	57	98	96	58	62	47	64	46
23	87	58	94	82	82	78	92	67	73	82	68

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24	58	60	56	83	91	92	54	75	61	50	55
25	48	83	76	61	81	45	52	62	90	93	69
26	53	67	98	73	77	98	93	66	78	56	50
27	47	53	52	59	73	45	68	55	90	68	48
28	83	69	57	81	87	80	77	76	69	64	54
29	65	87	83	60	65	87	99	93	85	96	46
30	47	63	82	96	91	46	52	66	96	76	49
System number	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	
1	78	50	75	94	89	83	65	91	48	56	
2	61	67	60	95	63	64	90	60	66	93	
3	80	96	92	81	79	72	77	57	46	54	
4	86	98	47	52	84	77	92	99	75	58	
5	56	73	48	60	78	69	53	63	64	98	
6	88	48	84	90	61	85	88	81	58	61	
7	75	51	96	73	69	50	73	63	93	53	
8	54	89	81	64	58	70	97	48	49	48	
9	78	75	95	82	72	48	84	73	90	95	
10	63	64	87	70	95	62	74	51	66	70	
11	90	60	73	80	58	61	69	87	51	94	
12	62	96	94	56	64	82	59	54	95	72	
13	57	72	91	93	68	79	67	73	94	83	
14	60	79	54	91	97	67	86	63	95	97	
15	50	77	47	92	53	96	57	46	50	69	
16	56	88	72	60	100	66	96	72	90	65	
17	53	90	59	63	55	46	79	95	61	51	
18	66	61	61	98	46	84	49	57	54	84	
19	76	85	88	48	77	47	98	66	77	93	
20	75	83	51	87	58	86	67	64	69	45	
21	74	73	94	84	85	79	85	61	84	94	
22	73	86	56	48	71	75	63	58	48	79	
23	93	90	92	66	46	62	45	86	62	52	
24	96	71	92	51	77	69	70	57	52	94	
25	65	89	82	71	100	52	81	46	97	62	
26	88	62	100	96	58	65	46	92	47	53	
27	63	87	84	47	76	85	61	62	89	51	
28	57	70	72	52	50	98	45	84	87	98	
29	69	68	83	73	95	80	62	81	57	74	
30	52	81	54	87	57	81	97	97	67	91	

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4.3. Index Weight of Three Classes based on Matrix

The matrix of the second-class index is shown in (21).

$$\begin{array}{c} U_B \\ B_1 \\ B_2 \\ B_3 \\ B_4 \\ B_5 \end{array} \begin{array}{c} \begin{array}{ccccc} B_1 & B_2 & B_3 & B_4 & B_5 \end{array} \\ \begin{bmatrix} 1 & 2 & 3 & 1 & 2 \\ 1/2 & 1 & 2 & 1 & 2 \\ 1/3 & 1/2 & 1 & 1/3 & 1/2 \\ 1 & 1 & 3 & 1 & 2 \\ 1/2 & 1/2 & 2 & 1/2 & 1 \end{bmatrix} \end{array} \tag{21}$$

From (21) we can get the weight A_B of second-class index as in (22).

$$A_B = (0.30 \quad 0.21 \quad 0.09 \quad 0.26 \quad 0.14) \tag{22}$$

There are 5 matrixes of third-class index, as is shown from (23) to (27).

$$\begin{array}{c} {}_{1\sim3} \\ C_1 \\ C_2 \\ C_3 \end{array} \begin{array}{c} \begin{array}{ccc} C_1 & C_2 & C_3 \end{array} \\ \begin{bmatrix} 1 & 3/5 & 2 \\ 5/3 & 1 & 9/5 \\ 2 & 5/9 & 1 \end{bmatrix} \end{array} \tag{23}$$

$$\begin{array}{c} {}_{4\sim9} \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \\ C_9 \end{array} \begin{array}{c} \begin{array}{cccccc} C_4 & C_5 & C_6 & C_7 & C_8 & C_9 \end{array} \\ \begin{bmatrix} 1 & 1/2 & 6/7 & 3/5 & 1/6 & 3/5 \\ 2 & 1 & 2 & 7/8 & 3/2 & 2/3 \\ 7/6 & 1/2 & 1 & 3/5 & 1 & 2/3 \\ 5/3 & 8/7 & 5/3 & 1 & 3/5 & 2/3 \\ 6 & 2/3 & 1 & 5/3 & 1 & 7/8 \\ 5/3 & 3/2 & 3/2 & 3/2 & 8/7 & 1 \end{bmatrix} \end{array} \tag{24}$$

$$\begin{array}{c} {}_{10\sim14} \\ C_{10} \\ C_{11} \\ C_{12} \\ C_{13} \\ C_{14} \end{array} \begin{array}{c} \begin{array}{ccccc} C_{10} & C_{11} & C_{12} & C_{13} & C_{14} \end{array} \\ \begin{bmatrix} 1 & 5/2 & 5/8 & 7/8 & 1/2 \\ 2/5 & 1 & 7/6 & 6/5 & 2/3 \\ 8/5 & 6/7 & 1 & 5/4 & 2 \\ 8/7 & 5/6 & 4/5 & 1 & 9/7 \\ 2 & 3/2 & 1/2 & 7/9 & 1 \end{bmatrix} \end{array} \tag{25}$$

$$\begin{array}{c} {}_{15\sim18} \\ C_{15} \\ C_{16} \\ C_{17} \\ C_{18} \end{array} \begin{array}{c} \begin{array}{cccc} C_{15} & C_{16} & C_{17} & C_{18} \end{array} \\ \begin{bmatrix} 1 & 4/5 & 3/7 & 2/3 \\ 5/4 & 1 & 1/2 & 3/5 \\ 7/3 & 2 & 1 & 4/3 \\ 3/2 & 5/3 & 3/4 & 1 \end{bmatrix} \end{array} \tag{26}$$

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$$\begin{array}{c} {}_{19\sim21} \\ C_{19} \\ C_{20} \\ C_{21} \end{array} \begin{array}{c} \begin{array}{ccc} C_{19} & C_{20} & C_{21} \end{array} \\ \begin{bmatrix} 1 & 3/2 & 8/7 \\ 2/3 & 1 & 3/5 \\ 7/8 & 5/3 & 1 \end{bmatrix} \end{array} \tag{27}$$

From (23) to (27) we can get the weight as is expressed in (28).

$$\begin{cases} A_{C1\sim3} = (0.30 \quad 0.41 \quad 0.29) \\ A_{C4\sim9} = (0.09 \quad 0.20 \quad 0.12 \quad 0.16 \quad 0.21 \quad 0.22) \\ A_{C10\sim14} = (0.18 \quad 0.16 \quad 0.25 \quad 0.20 \quad 0.21) \\ A_{C15\sim18} = (0.16 \quad 0.19 \quad 0.37 \quad 0.28) \\ A_{C19\sim21} = (0.36 \quad 0.30 \quad 0.34) \end{cases} \tag{28}$$

4.4. Research Results

From the above statement we can get the scores of each second-class index of 30 teaching systems, comprehensive scores and the grade gray cluster, as is shown in Table 2.

Table 2. Comprehensive Evaluation Results and the Grade Gray Cluster

System number	B1	B2	B3	B4	B5	A	The grade gray cluster
1	85.29	79.74	70.47	80.86	66.2	87.97	Best
2	69.75	58.97	62.23	76.05	73.02	57.91	Worse
3	50.55	73.12	84.62	76.17	52.68	77.32	Better
4	76.8	60.74	69.45	78.53	77.86	80.36	Better
5	71.86	70.35	68.4	64.79	75.2	51.86	Worst
6	89.67	86.83	73.92	82.08	67.3	70.55	Normal
7	67.78	72.34	70.25	63.73	68.6	57.02	Worse
8	74.09	72.16	77.05	74.32	48.3	60.40	Worse
9	46.6	76.81	79.69	68.08	85.58	53.96	Worst
10	72.95	69.98	73.26	72.91	61.96	60.81	Worse
11	62.12	74.36	70.71	65.71	78.58	78.70	Better
12	75.11	78.79	77.28	67.98	72.42	88.85	Best
13	72.96	61.83	74.06	75.79	82.7	60.82	Worse
14	70.53	71.47	65.68	81.86	84.16	92.14	Best
15	65.81	76.15	61.31	76.27	55.02	69.79	Normal
16	74.09	71.29	75.42	79.9	75.02	61.26	Worse
17	63.19	72.76	71.62	59.67	69.84	77.97	Better
18	89.98	77.94	66.91	69.22	65.28	95.52	Best
19	68.71	78.43	81.42	67.14	78.48	58.85	Worse
20	78.21	63.44	73.56	75.52	59.04	72.31	Normal

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21	75.85	77.97	75.44	82.62	79.12	65.48	Normal
22	69.2	68.89	66.09	66.56	62.14	72.18	Normal
23	77.14	77.99	86.21	54.84	67.24	71.95	Normal
24	58.24	74.52	75.32	67.92	68.08	47.09	Worst
25	70.47	68.23	79.05	72.28	66.74	81.72	Better
26	71.79	79.63	73.48	63.31	65.24	82.47	Better
27	50.91	67.54	70.71	70.49	66.36	45.44	Worst
28	69.72	77.75	63.53	66.68	89.66	53.85	Worst
29	79.24	82.91	72.92	76.69	71.42	83.68	Better
30	63.71	75.66	62.06	81.88	85.96	92.91	Best

5. Conclusion

This paper uses Gray Hierarchy Evaluation method to evaluate 21 indexed of 30 teaching system in multimedia network and gets the gray classes of each system.

The evaluation algorithm proposed in this paper can function well in Matlab software.

It provides a theoretical foundation for the evaluation system to be accessible.

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