

## A Teaching Quality Control System for Average Four Year Colleges

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**Abstract** — Teaching quality is the result of not only inter-association and interaction between teaching and learning, but also can lead to a comprehensive index which is difficult for precise quantization. Therefore, it is difficult for teaching quality to be guaranteed by taking simple testing methods for judgment. In order to judge, measure, adjust and control teaching quality of each teaching link, evaluation plays an important role to develop a control system. Based on detailed analysis of the characteristics of teaching quality evaluation, the paper proposes a teaching quality control system for average four-year colleges. It applies fuzzy comprehensive evaluation methods and uses quantification to substitute for qualitative evaluation.

**Keywords** - higher education, teaching quality control system, fuzzy comprehensive evaluation

### I. INTRODUCTION

With rapid development of higher education in our country, how to stabilize and improve the teaching quality of higher education in the new situation has become an important problem which is concerned commonly by the government, society and schools. As an important part of teaching quality assurance activities in average four-year college, teaching quality control system in average four-year college has received more and more attention[1]. The construction of teaching quality control system in average four-year college not only has become the focus concerned by the theoretical field of higher education, but also is an important task which needs to be solved in the practice of the current college education management[2-3].

The paper starts from the relevant concepts of teaching quality control system and is on the basis of higher pedagogy, system theory, control theory and comprehensive quality management theory to analyze the principles and content that teaching quality control system in average four-year college should possess and to compares the present situation of teaching quality control system in average four-year college at home and abroad. The author applies fuzzy comprehensive evaluation to evaluate teaching quality in colleges and universities aiming at the characteristics of education and teaching[4].

### II. FUZZY COMPREHENSIVE EVALUATION AND MATHEMATICAL MODELING

#### A. Introduction of Fuzzy Comprehensive Evaluation

Fuzzy comprehensive evaluation applies the principle of comprehensive evaluation and starts from the perspective of judging things to divide different properties into many steps, and it evaluates elementary level, which are the basis for the evaluation of many layers in which includes six very important factors[5]:

1) Fuzzy relation matrix. It is represented by R and is the evaluation result of single factor.

2) Factor weight vector. It is represented by A and means the important degree of some factor in the evaluation process. We should use weighted average.

3) Determining unused domain. It is represented by U and means total set of all factors.

4) Different grades of evaluation. It is represented by V and is the collection consisting of all comments. In different systems, we can adopt different grades of evaluation.

5) Synthesis method. The so-called synthesis is to combine A and R.

6) Results vector. It is represented by U and is the description on degree of evaluation results.

We convert the total set of factors and all comments into a converter by relation matrix. When we input a weight vector A, there is a corresponding evaluation result B. The basic model of evaluation is shown in Figure 1.

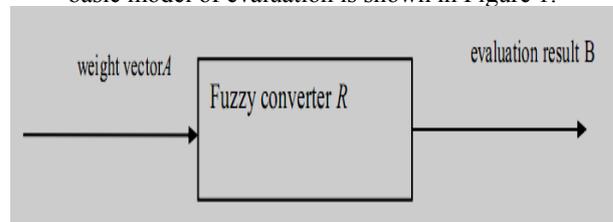


Figure 1. Basic model of fuzzy comprehensive evaluation

Fuzzy comprehensive evaluation is based on fuzzy mathematics. Its fuzzy mathematics has the difference of one level and multi levels. The paper finds that the correlation between individual factors is greater. Although the correlation is among different layers, we can use the condition to establish one model, which can solve many problems such as distribution factor. As we know, the more factors, the smaller of the percentage of each factor,

$\sum_{i=1}^n a_i = 1$ . And the evaluation has no practical significance. If the evaluation has no significance, our evaluation result is not ideal.

#### B. Fuzzy Comprehensive Evaluation of Single Layer

We can adopt simple one-level model consisting of the following aspects:

1) Determination of fuzzy evaluation index set U

$$U = \{u_1, u_2, \dots, u_n\}$$

It means that the set has n indexes.

2) Determination of language set V for evaluation indexes

$$V = \{v_1, v_2, \dots, v_n\}$$

Only determination of evaluating language domain can determine fuzzy evaluation vector and can reflect the fuzzy essence of evaluation in the process of determining language domain.

At technology level, in general, the number of comment grade is 4—9. If there are too much, we can generate the function of differentiating the meaning of the language and can't determine some definite grades. On the other hand, we can't make comments too little which can lead the quality of fuzzy comprehensive evaluation reducing. So the comment grade should be moderate [6-7].

3) Constructing fuzzy matrix

Constructing fuzzy matrix needs to quantify each evaluation factor  $u_i (i = 1, 2, \dots, n)$ , and we can get fuzzy matrix R:

$$R = \begin{bmatrix} R|u_1 \\ R|u_2 \\ \vdots \\ R|u_n \end{bmatrix} \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1m} \\ r_{21} & r_{22} & \dots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \dots & r_{nm} \end{bmatrix}_{n \times m}$$

$r_{ij}$  in the matrix represents the subjection degree of a evaluating thing in  $v_j$  grade of fuzzy subset according to the factor  $u_i$ . The representation of the thing in some factor  $u_i$  is mainly represented by fuzzy vector  $(R|u_i) = (r_{i1}, r_{i2}, \dots, r_{im})$ .

4) Determination of evaluation factor weights A

$$A = \{a_1, a_2, \dots, a_n\}$$

$$\sum_{i=1}^n a_i = 1 \quad 0 \leq a_i \leq 1 \quad (i = 1, 2, \dots, n)$$

The determination of weights should be objective and reasonable. And it mainly considers: on one hand, our evaluation factors are very important. On the other hand, the know ledge degree of experts is different. So we should use different layers to determine our statistical analysis ability of selecting topic.

5) Integrating each factor for comprehensive evaluation

The factor which adapts to us should be found out. And A and R are integrated to get the fuzzy comprehensive evaluation result vector B.

In fuzzy matrix, different single factors reflect different degree of membership of each grade. The integration of weight vector A and fuzzy matrix R can get evaluation result vector B, and its expression is :

$$A \circ R = (a_1 \ a_2 \ \dots \ a_n) \circ \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1m} \\ r_{21} & r_{22} & \dots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \dots & r_{nm} \end{bmatrix}_{n \times m} = (b_1 \ b_2 \ \dots \ b_m) = B$$

“ $\circ$ ” is our factors and  $B = (b_1, b_2, \dots, b_m)$  means a subset in our evaluation. If the result doesn't pass, we must unify it, and the model which belongs to us can be established.

C. *Multilevel Fuzzy Comprehensive Evaluation*

When we evaluate different things, we need to consider in many ways, and the coefficient of each factor is difficult to be determined. And the obtained weight coefficient is relatively small, which can lose more information in fuzzy evaluation even can't get the result. The procedures for multilevel fuzzy comprehensive evaluation are as follows [8]

1) Evaluation factors are divided into s subsets according to different species

$$U = \bigcup_{i=1}^s u_i \quad u_i = \{u_{i1}, u_{i2}, \dots, u_{ipi}\}, \quad i = 1, 2, \dots, s$$

2) Each  $u_i$  needs one-level fuzzy comprehensive evaluation

Supposing the set for the comment grade is :

$$V = \{v_1, v_2, \dots, v_m\}$$

Fuzzy weight vector of each factor for  $u_i$  is :

$$A_i = \{a_{i1}, a_{i2}, \dots, a_{ipi}\}$$

$$\sum_{r=1}^{r=pi} a_{ir} = 1$$

The evaluation result of single factor  $u_i$  is  $R_i$  ( $P_i$  lines, m columns), and the single-level evaluation model is :  $A_i \circ R_i = (b_{i1}, b_{i2}, \dots, b_{im}) = B_i, \quad i = 1, 2, \dots, s$

3) We can see  $u_i$  as the total factor and  $B_i$  as the results of our evaluation, and we can get the following form:

$$R = \begin{bmatrix} B_1 \\ B_2 \\ \vdots \\ B_s \end{bmatrix} \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1m} \\ b_{21} & b_{22} & \dots & b_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ b_{s1} & b_{s2} & \dots & b_{sm} \end{bmatrix}_{s \times m}$$

Comprehensive factor  $u_i (i = 1, 2, \dots, s)$ , and its fuzzy weight vector is:

$$A = (a_1 \ a_2 \ \dots \ a_s)$$

And the established secondary fuzzy comprehensive evaluation model is:

$$A_i \circ R = (b_1 \ b_2 \ \dots \ b_m) = B$$

The established models with different layers reflects the important degree of different factors. Because there are too many factors needing to be avoided, the coefficient is difficult to determine, which is more accurate than the original model[9]. And the factor is also of great importance.

III. TWO-LEVEL FUZZY COMPREHENSIVE TEACHING QUALITY EVALUATION SYSTEM MODEL

A. Establishment of Teaching Quality Evaluation Indexes

There are much factors influencing teaching quality. We start from human, facility, material and environment, incorporate the behaviour belonging to human into the factor

of human for consideration, and consider the difference of facility level in different levels of colleges, desalination facilities and materials which are incorporated into environment. So the factors influencing teaching quality can be divided into teacher, students, teaching management and teaching environment which not only are correlated each other, but also have their won evaluation emphasis and objective:

TABLE I TEACHING QUALITY EVALUATION INDEX SYSTEM IN AVERAGE FOUR-YEAR COLLEGE

One-level index U	Secondary index v	Three-level index w	
Teaching quality of teachers U1	teacher quality v1	education thought and concept w1	
		teachers structure w2	
		teaching style w3	
	teaching level v2	scientific study w4	
		teaching ability w5	
	teaching process v3	theory teaching w6	
		practical teaching w7	
		scientific research training w8	
		ideological and ethical standards w9	
Cultivation quality on students U2	student quality v4	professional quality w10	
		cultural quality w11	
		physical quality w12	
		study style w13	
	learning process v5	learning method w14	
		teaching plan w15	
Teaching management quality U3	top-level design v6	teaching programme w16	
	teaching administration v7	process plan w17	
		teaching daily management w18	
		students status management w19	
	management research v8	organization and system w20	
		research result w21	
	Teaching environment quality U4	teaching condition and utilization v9	application of textbook w22
			book materials w23
campus network construction w24			
teaching laboratory w25			
teaching technology and equipment w26			
practice base w27			
advanced equipment application w28			
teaching atmosphere v10		teaching academic activities w29	
		school climate w30	

TABLE II TWP-LEVEL FUZZY COMPREHENSIVE EVALUATION INDEX SYSTEM OF TEACHING QUALITY IN AVERAGE FOUR-YEAR COLLEGE

One-level index		Secondary index			
Sign	Content	Sign	Content	Reference weight	Unified weight q
U1	Overall teaching quality of college	b1	Overall evaluation on college	0.9	0.53
		b2	Social stigma	0.8	0.47
U2	Teaching quality of teachers	c1	Number of teachers' team	0.7	0.16
		c2	Structure of teachers' team	0.9	0.22
		c3	Classroom teaching effect	0.9	0.22
		c4	Teaching research ability	0.8	0.20
		c5	Scientific research ability	0.8	0.20
U3	Cultivation quality on students	d1	Comprehensive study effect	0.9	0.29
		d2	Extracurricular science and technology culture activities	0.7	0.23
		d3	Employment quality of gradates	0.9	0.29
		d4	Language proficiency	0.6	0.19
U4	Teaching management quality	e1	Management team structure	0.9	0.38
		e2	Teaching rules and regulations	0.9	0.38
		e3	Teaching order	0.6	0.24
U5	Teaching environment quality	f1	Investment of teaching funds	1.0	0.28
		f2	Book materials	0.8	0.24
		f3	Construction of teaching material	0.8	0.24
		f4	Multimedia classroom	0.8	0.24

**B. Basis of Each Index Grading**

**1) Analysis of overall teaching quality (U1) of college**

B1 represents evaluation on overall teaching quality of college. We use assessment achievement of college as a variable investigating overall evaluation of college, and the variable adopts level 4 scoring system, the concrete corresponding scores are:

- excellent 4,
- good 3,
- qualified 2,
- disqualified 1.

b2 represents social stigma, If the maximum and minimum enrollment mark for the evaluated college is respectively  $x_1$  and  $x_2$ , the enrollment mark is  $x$ , we use the ratio of  $(x - x_2)/(x_1 - x_2)$  as a variable investigating the social stigma of the college, and the variable applies level 4 scoring system. And the concrete corresponding scores are:

- $0.8 \leq b_2 \leq 1$  4,
- $0.6 \leq b_2 < 0.8$  3,
- $0.4 \leq b_2 < 0.6$  2,
- $b_2 < 0.4$  1.

$$U1 = \sum b_i q_i = 0.53 * b_1 + 0.47 * b_2$$

We can know from the above analysis that the minimum value and maximum value of U1 is respectively 1 and 4, that is,  $U1 \in [1, 4]$ . We can classify the numerical number and determine judgment standard of U1 and we use level 1 scoring system. And the concrete corresponding scores are:

- $3 < U1 \leq 4$  1,
- $2 < U1 \leq 3$  0.6,
- $1 \leq U1 \leq 2$  0.3.

**2) Analysis of teaching quality of teachers (U2)**

c1 represents the number of teachers' team. We use the ration of the number of students and teachers in the total number of full-time teachers and students as a variable investigating the number of teachers' team. The variable adopts 4-level scoring system. And the concrete corresponding scores are:

- $c_1 \geq 1/16$  4,
- $1/18 \leq c_1 < 1/16$  3,
- $1/20 \leq c_1 < 1/18$  2,
- $c_1 < 1/20$  1.

c2 means the structure of teachers' team. We take the proportion of full-time teachers with doctor's degree as a variable investigating the teachers condition of the college, and the variable adopts 4-level scoring system. And the concrete corresponding scores are:

- $c_2 \geq 50\%$  4,
- $40\% \leq c_2 < 50\%$  3,
- $30\% \leq c_2 < 40\%$  2,
- $c_2 < 30\%$  1.

c3 represents classroom teaching effect. We use the good rate of the evaluated teacher in the school teaching evaluation activities, that is, in the teaching quality of colleges and universities, the proportion of the number of the evaluation results that are excellent and good in the total evaluated teachers as a variable investigating classroom teaching effect

of the college, and the variable adopts 4-level scoring system. And the concrete corresponding scores are:

- $c_3 \geq 80\%$  4,
- $70\% \leq c_3 < 80\%$  3,
- $60\% \leq c_3 < 70\%$  2,
- $c_3 < 60\%$  1.

c4 means teaching research ability. We take the proportion of teachers winning provincial level or above research subject as a variable investigating teaching research ability in the college, and the variable adopts 4-level scoring system. And the concrete corresponding scores are:

- $c_4 \geq 50\%$  4,
- $40\% \leq c_4 < 50\%$  3,
- $30\% \leq c_4 < 40\%$  2,
- $c_4 < 30\%$  1.

c5 represents scientific research ability. In the evaluation of teachers' title, scientific research ability is an important index. So we use the proportion of full-time teachers with sub-senior and above title as a variable investigating scientific research ability of teachers in the college, and the variable adopts 4-level scoring system. And the concrete corresponding scores are:

- $c_5 \geq 60\%$  4,
- $45\% \leq c_5 < 60\%$  3,
- $30\% \leq c_5 < 45\%$  2,
- $c_5 < 30\%$  1.

$$U2 = \sum c_i q_i = 0.16 * c_1 + 0.22 * c_2 + 0.22 * c_3 + 0.20 * c_4 + 0.20 * c_5$$

We can know from the above analysis that the minimum and maximum value of U2 is respectively 1 and 4, that is,  $U2 \in (1, 4)$ . The judgment standard of U2 can be determined according to classification method of U1:

- $3 < U2 \leq 4$  1,
- $2 < U2 \leq 3$  0.6,
- $1 \leq U2 \leq 2$  0.3.

**3) Analysis of cultivation quality on students (U3)**

d1 means the comprehensive study effect. The variable can intuitively reflect the study status of the evaluated students. We use the proportion of students winning scholarship as a variable evaluating the comprehensive study effect of students, and the variable takes 4-level scoring system. And the concrete corresponding scores are:

- $d_1 \geq 30\%$  4,
- $20\% \leq d_1 < 30\%$  3,
- $10\% \leq d_1 < 20\%$  2,
- $d_1 < 10\%$  1.

d2 represents extracurricular science and technology culture activities. We use the proportion of students winning university- level or above the reward of science and technology culture activities to describe the variable, and the concrete corresponding scores are:

- $d_2 \geq 1\%$  4,
- $0.8\% \leq d_2 < 1\%$  3,
- $0.6\% \leq d_2 < 0.8\%$  2,
- $d_2 < 0.6\%$  1.

d3 means employment quality of graduates which is also an important index measuring the quality of students in colleges and universities. We describe the variable by calculating the employment contract rate by the end of the year, and the variable takes 4-level scoring system. And the concrete corresponding scores are:

- d3 ≥ 80% 4,
- 70% ≤ d3 < 80% 3,
- 60% ≤ d3 < 70% 2,
- d3 < 60% 1.

d4 means language proficiency which is an important indicator measuring the ability of students in colleges. We apply the passing rate of CET 4 for graduates to describe the variable, and the variable takes 4-level scoring system. And the concrete corresponding scores are:

- d4 ≥ 75% 4,
- 65% ≤ d4 < 75% 3,
- 55% ≤ d4 < 65% 2,
- d4 < 55% 1.

$$U3 = \sum diqi = 0.29*d1 + 0.23*d2 + 0.29*d3 + 0.19*d4$$

We can see from the above analysis that the minimum and maximum value of U3 is respectively 1 and 4, that is,  $U3 \in (1, 4)$ . And the judgment standard of U3 can be determined by the classification method of U1:

- 3 < U3 ≤ 4 1,
- 2 < U3 ≤ 3 0.6,
- 1 ≤ U3 ≤ 2 0.3.

#### 4) Analysis of teaching quality management(U4)

e1 represents the structure of the team. We take the proportion of managers with intermediate or above title to describe the variable, and the variable takes 4-level scoring system. And the concrete corresponding scores are:

- e1 ≥ 50% 4,
- 40% ≤ e1 < 50% 3,
- 30% ≤ e1 < 40% 2,
- e1 < 30% 1.

e2 means teaching rules and regulations. We use teaching rules and regulations of a college to describe the variable relating to coverage rate of each teaching link, and we take 4-level scoring system on the variable. The concrete corresponding scores are:

- e2 ≥ 100% 4,
- 90% ≤ e2 < 100% 3,
- 80% ≤ e2 < 90% 2,
- e2 < 80% 1.

e3 means teaching order which is described by incidence rate of teaching accident. And we use 4-level scoring system on the variable. The concrete corresponding scores are:

- e3 < 2% 4,
- 2% ≤ e3 < 5% 3,
- 10% ≤ e3 < 5% 2,
- e3 ≥ 10% 1.

$$U4 = \sum eiqi = 0.38*e1 + 0.38*e2 + 0.24*e3$$

We can see from the above analysis that the minimum and maximum value of U4 is respectively 1 and 4, that is,  $U4 \in (1, 4)$ .

And the judgment standard of U4 can be determined by the classification method of U1:

- 3 < U4 ≤ 4 1,
- 2 < U4 ≤ 3 0.6,
- 1 ≤ U4 ≤ 2 0.3.

#### 5) Analysis of teaching environment quality (U5)

f1 means the investment of teaching funds. We use the proportion of teaching funds in the total amount of operation expenses for education to describe the variable. And we take 4-level scoring system on the variable. The concrete corresponding scores are:

- f1 ≥ 30% 4,
- 25% ≤ f1 < 30% 3,
- 20% ≤ f1 < 25% 2,
- f1 < 20% 1.

f2 means books materials which is investigated by the proportion of the funds buying books materials in the total amount of school education expense. And we take 4-level scoring system on the variable. The concrete corresponding scores are:

- f2 ≥ 5% 4,
- 3% ≤ f2 < 5% 3,
- 2% ≤ f2 < 3% 2,
- f2 < 2% 1.

f3 means construction of teaching material which is described by the proportion of course number selecting three categories of materials in the total course number of core course and specialized course. And we take 4-level scoring system on the variable. The concrete corresponding scores are:

- f3 ≥ 70% 4,
- 60% ≤ f3 < 70% 3,
- 50% ≤ f3 < 60% 2,
- f3 < 50% 1.

f4 means multimedia classroom which is described by the proportion possessing multimedia classroom. And we take 4-level scoring system on the variable. The concrete corresponding scores are:

- f4 ≥ 50% 4,
- 40% ≤ f4 < 50% 3,
- 30% ≤ f4 < 40% 2,
- f4 < 30% 1.

$$U5 = \sum fiqi = 0.28*f1 + 0.24*f2 + 0.24*f3 + 0.24*f4$$

We can see from the above analysis that the minimum and maximum value of U5 is respectively 1 and 4, that is,  $U5 \in (1, 4)$ . And the judgment standard of U5 can be determined by the classification method of U1:

- 3 < U5 ≤ 4 1,
- 2 < U5 ≤ 3 0.6,
- 1 ≤ U5 ≤ 2 0.3.

#### C. Application of Fuzzy Comprehensive Evaluation Method in Teaching Quality Evaluation

According to the above system, we can establish one two-level fuzzy comprehensive evaluation index system for each evaluated object and extract 18 evaluation index data.

We suppose that we would make fuzzy comprehensive evaluation on the teaching quality of three colleges to be evaluated, and the comparison is formed, which indicates the reference significance of the evaluation method. We need to use data which basically has fuzzy nature to describe because of the regular of status and movement development. The feeling, experience and architectural competence of human are fuzzy physical parameter. So we use fuzzy mathematic method, that is, fuzzy comprehensive evaluation method. In order to simplify the work, the method is only used in the first level evaluation. And common weighted average method is adopted in the secondary evaluation, the method has simple mathematical formulation, which is not explained here.

Mathematical formulation of fuzzy comprehensive evaluation method is as follows:

The data set of individual characteristics U is known,

$$U = \begin{bmatrix} U_{11} & U_{12} & \dots & U_{1n} \\ U_{21} & U_{22} & \dots & U_{2n} \\ \dots & \dots & \dots & \dots \\ U_{m1} & U_{m2} & \dots & U_{mn} \end{bmatrix}$$

$i = 1, 2, \dots, m$  means index number, (In this model,  $m$  is 5)  
 $j = 1, 2, \dots, n$  is individual number (In this model,  $n$  is 3)

For example, U52 represents the fifth one-level index of the second college to be evaluated, that is, the teaching environment quality. The judgment matrix R can be determined with the following method:

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \dots & \dots & \dots & \dots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix}$$

In the method, the index is different from the above-mentioned meaning. For example,  $r_{ij}$  represents the score of the  $i$  index of the  $j$  individual under a judgment standard.

Index weight is  $A = (a_1, a_2, \dots, a_m)$ , and the problem of fuzzy comprehensive judgment is  $B = A \cdot R = (b_1, b_2, \dots, b_n)$  in which  $b_i$  is the evaluation result of the  $i$  individual which can be made individual ranking according to its size.

In order to explain concretely the application of the method, we select college A, college B and college C. Their teaching quality are evaluated. We still takes weighted average method on secondary index, and the matrix U of individual features is obtained:

$$U = \begin{bmatrix} 2.0 & 3.0 & 3.0 \\ 2.4 & 3.2 & 3.8 \\ 2.3 & 2.7 & 3.7 \\ 2.8 & 3.4 & 3.5 \\ 1.5 & 2.8 & 3.8 \end{bmatrix}$$

According to judgment standard, we can get judgment matrix R:

$$R = \begin{bmatrix} 0.3 & 0.6 & 0.6 \\ 0.6 & 1.0 & 1.0 \\ 0.6 & 0.6 & 1.0 \\ 0.6 & 1.0 & 1.0 \\ 0.3 & 0.6 & 1.0 \end{bmatrix}$$

We can get weight matrix  $M = (0.25, 0.2, 0.3, 0.15, 0.1)$  by the method of expert opinions. Therefore, fuzzy comprehensive evaluation matrix can be obtained:

$$I = M \cdot R = (0.25, 0.2, 0.3, 0.15, 0.1) \begin{bmatrix} 0.3 & 0.6 & 0.6 \\ 0.6 & 1.0 & 1.0 \\ 0.6 & 0.6 & 1.0 \\ 0.6 & 1.0 & 1.0 \\ 0.3 & 0.6 & 1.0 \end{bmatrix} = (0.50, 0.74, 0.90)$$

The result indicates that the teaching quality of collage C is the best, and college B is the second, and college A is the worst. And teaching quality of three colleges is evident.

Applying fuzzy comprehensive evaluation method in teaching quality evaluation has the following characteristics:

Fuzzy comprehensive evaluation tries being used in teaching quality evaluation and uses quantification to replace qualitative process, which can make the evaluation more accurate and comprehensive.

The paper only uses the method in secondary-index system. In order to be more accurate, the targeted indexes, more samples can be taken in practical application for more detailed score.

In order to make evaluation result more accurate, we can make multilevel evaluation.

Complicated calculation process can be completed by computer programme, which is convenient for evaluation application.

#### IV. CONCLUSION

The paper proposes the objective and principles of teaching quality evaluation in colleges and universities. Based on detailed analysis on the characteristics of teaching quality evaluation, the paper proposes teaching quality evaluation in average four-year college, applies fuzzy comprehensive evaluation method to evaluate the teaching quality in colleges, tries to apply fuzzy comprehensive evaluation method in teaching quality evaluation, and use quantification to replace qualitative evaluation, which not only makes the evaluation process more easy for operation, but also has more scientific evaluation result. The paper selects fuzzy comprehensive evaluation method to evaluate teaching quality in colleges for the teaching characteristics. Fuzzy comprehensive evaluation method ties to be used in teaching quality evaluation and uses quantification to replace qualitative evaluation, which not only can make the evaluation result more accurate and increases the feasibility of teaching quality evaluation, but also provides concrete and operable guidance for comprehensive development of all the students, and has some practical significance.

## XUAN QI: A TEACHING QUALITY CONTROL SYSTEM FOR AVERAGE FOUR YEAR COLLEGES

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