

# The Assessment Standard Of Mathematics Classroom Teaching And Two-grade Fuzzy Model

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*Abstracts: The article explains how to appropriately evaluate the mathematics teachers classroom teaching work by ascertaining the quality standard of the mathematics classroom teaching and preliminarily researching the two-grade fuzzy assessment model.*

*Key words: Classroom teaching, assessment standard, synthetic evaluation*

Mathematics is not only a tool by which students learn other subjects, but also cultivate independently thinking ability and the ability of analyzing problems and solving problems by learning this subject.

The content of mathematics is mainly taught to students by classroom teaching and the result of classroom teaching has a direct impact on teaching quality. So it is the classroom teaching that is the key point of improving teaching quality. In view of this, according to the character of mathematics classroom teaching, we bring forth a set of mathematics assessment targets about it, which utilize two-grade fuzzy synthetic assessment and turn out the assessment model of the mathematics classroom teaching.

## **1. The assessment target of mathematics classroom teaching**

Assessment target is a specific factor that is used to depict and reflect the teaching level of a teacher. It is also a base and a standard that can evaluate the classroom teaching, so we should select those factors that are representatively assessment system for assessing, according to the assessment aim, object and scope. Based on the character of mathematics teaching we think that we can take the assessment standard that is representatively in chart one.

As a standard that can assess the teaching quality of a teacher, we use two-grade target. One reason is in order to distinguish the diffident level among those factors. So it is easy to allocate the power of factors, the other reason is to make the factor more measurable, which make the man who evaluates easy to master the standard and avoid too much deviation. We can say, the first grade target reflects the diffident aspects which affect the teaching quality. In contrast,

the second grade target shows the specific content of different aspects.

Chart one The mathematics classroom assessment target system

First grade target	Second grade target	Assessment standard
Teaching aim $X_1$	$X_{11}$	Make teaching aim clear. Through education, knowledge education, technical ability practice should be in accordance with the requirement of outline and the teaching material
	$X_{12}$	In the course of teaching should always teach around the teaching aim
	$X_{13}$	Teaching aim should be accordant with students' practice
Teaching content $X_2$	$X_{21}$	Teaching content should be little and precise, the main point should be outstanding, and make the difficult point clear
	$X_{22}$	Make the fundamental conceptions and principles clear and precise
	$X_{23}$	Proper arrangement should be distinct, and logic should be rigorous
	$X_{24}$	Relations of knowledge should be strengthened, teaching links should be coherent, and the time of teaching should be distributed properly
Teaching Method $X_3$	$X_{31}$	Be good at enlightening students to pay attention to the practice of fundamental technical ability, and pay attention to the improvement of ability
	$X_{32}$	Be good at inducing the students to speculate actively and make the classroom atmosphere lively, and pay attention to the development of students' character
	$X_{33}$	Utilize appropriately teaching means to induce students to master scientific learning methods
	$X_{34}$	Pay attention to the feedback of the information and adjust teaching patterns properly
Teaching accomplishment $X_4$	$X_{41}$	Handwriting should be regular, distinct and brief
	$X_{42}$	Teaching language should be concise to the point, easy and smooth, and lively rhythm
	$X_{43}$	Behavior should be graceful and neatly dressed. Mood run high and naturally. Emergency ability should be high.
	$X_{44}$	Use teaching aid and electric teaching aid effectively

Teaching Link $X_5$	$X_{51}$	The teaching plan should be orderly, clear and brief. Select material painstakingly. Teaching language should be smooth and concise. The teaching plan not only think how to teach as a teacher, but also think how to be understood as a student
	$X_{52}$	Give guidance earnestly
	$X_{53}$	Correct students' papers carefully
Quality education $X_6$	$X_{61}$	Set a good example and do as a teacher.
	$X_{62}$	The teaching aim should be clear, and make the education in teaching
	$X_{63}$	Induce and enlighten students to learn and manage strictly
	$X_{64}$	Help the no good students hardly
	$X_{65}$	Develop diversity outside class activity
Teaching effect $X_7$	$X_{71}$	Concentrate students' energy. Work independently and wide.
	$X_{72}$	Make students study positively and forwardly
	$X_{73}$	Do exercise properly and finish the teaching plan on time
	$X_{74}$	The students' achievement is obvious and no good students are changed obviously

## 2. The mathematics classroom teaching synthetic assessment model

The main purpose of assessing mathematics classroom teaching is to correctly and timely grasp the information, reflecting teaching, which is beneficial to improving teaching and supplying scientific base which can improve the teaching quality. As the assessment standard of teaching is multi-layer and multi-aspect, the factor to ensure the assessment standard is extensive and is related to the feeling of relevant man. It is also subjective, and the uncertainty is significant as well it is difficult to measure by numerical value. Namely it is fuzzy. It is more subjective, reasonable and reliable that we use fuzzy mathematics theory to study the synthetic assessment of mathematics teaching.

Now we use fuzzy synthetic assessment method to build the quality assessment model of mathematics teaching.

### (1) Fundamental Theory

Assume that there is a target assembly  $X=(x_1, x_2, \dots, x_n)$  Remarked assembly is  $Y=(y_1, y_2, y_3, y_4)=(\text{excellent, good, secondary, no good})$ . So the matrix "R" is called fuzzy relationship matrix of " $X \times Y$ ".

$$R = \begin{pmatrix} r_{11} & r_{12} & r_{13} & r_{14} \\ r_{21} & r_{22} & r_{23} & r_{24} \\ \dots & \dots & \dots & \dots \\ r_{n1} & r_{n2} & r_{n3} & r_{n4} \end{pmatrix} \quad (\text{"n" is the target number})$$

In the matrix the element " $r_{ij}$ " indicates the subordinating degree of "j" remark to the "i".  $A=(a_1, a_2, \dots, a_n)$  is the fuzzy vector of the assembly "X". It is also the power of each target.  $B=(b_1, b_2, b_3, b_4)$  is the fuzzy vector of the assembly "Y". It is also the result of assessment. So the model of the vague synthetic assessment is  $B=A \circ R$ .

Usually there are two ways to calculate vague assembly. One is the calculation of taking the minimum or the maximum, which is

$$b_j = \bigvee_{i=1}^n (a_i \wedge r_{ij})$$

The other is the synthetic calculation of common assembly,

$$\text{which is } b_j = \sum_{i=1}^n a_i r_{ij}.$$

The former reflects the synthetic remark determined by

main factors. The later is the synthetic remark of average. According to the factors of the assessment of teaching quality, the synthetic calculation of fuzzy assembly is usually replaced by the calculating rules of common assemblies.

## (2) The second model of assessment

According to the difference of the two targets, we can establish the second model of assessment by using the principle of fuzzy synthetic assessment. The method is that if the " $X_i$ " indicates the target assembly of the second factor which is under the first target, and has an assessment target whose number is "k".

$$X_i = (x_{i1}, x_{i2}, x_{i3}, \dots, x_{in}), \quad i=1,2,3, \dots, n$$

If the power vector is  $A_i=(a_{i1}, a_{i2}, a_{i3}, \dots, a_{in})$ , the fuzzy relationship assembly of  $A_i$  and assessment assembly "Y" is " $R_i$ ". So we can make the first synthetic assessment by using the preceding method to each target of the second factor. The result is " $B_i$ ":

$$B_i = A_i \circ R_i = (b_{i1}, b_{i2}, b_{i3}, b_{i4}), i=1,2,3,\dots, n$$

If " $B_i$ " is the fuzzy relationship vector of the first target " $X_i$ " and assessment assembly " $Y$ " whose number is " $T$ ", we can get the target assembly of the first factor and the fuzzy relationship assembly of " $Y$ ".

$$R = \begin{matrix} B_1 \\ B_2 \\ \dots \\ B_n \end{matrix} = \begin{matrix} A_1 \circ R_1 \\ A_2 \circ R_2 \\ \dots \\ A_n \circ R_n \end{matrix}$$

If the power of each first target is divided as:  $A=(a_1, a_2, a_3, \dots, a_n)$ , we can get the result of the second assessment:  $B=A \circ R=(b_1, b_2, b_3, b_4)$ . Then we can get the

"B" is  $(b'_1, b'_2, b'_3, b'_4)$ , where  $(b'_j = b_j / \sum_{j=1}^4 b_j)$ . This is the final result of the

synthetic assessment.

Assessing the mathematics teaching by using the second fuzzy assessment model, we have to deal with the other question that is to define the power of each target and the subordination degree of each remark. Only extensive investigations, collections and scientific analogy can solve the question.

In short, we preliminarily inquire into the establishment of mathematics teaching assessment and the assessing model. We should constantly improve it in the course of teaching practice, and should develop it according to the teaching requirements and methods, and make it more objective, just and operative.

#### *Reference Documents:*

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