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# A Cognitive Study Based on the English Teaching Method From the Perspective of HPM (History and Pedagogy of Mathematics)



**Abstract:** - The exchanges between China and European and American countries are increasingly frequent, so as a tool for international communication, English has been universally adopted. How students learn English well and how teachers teach English well have become the focus of attention in the education community. HPM, abbreviated as History of Mathematics and Pedagogy, began to emerge as an academic field in 1972. The goal of HPM research is to improve mathematics education through applied history of mathematics. HPM focuses on the relationship between mathematics and other disciplines, and the application of mathematical primitive texts in teaching. This paper mainly studies the relationship between mathematics and English teaching and the application of original mathematical texts in English teaching. Traditional English teaching and mathematics may seem unrelated, but we can see the connection between the two via HPM, and understand the applicability and innovation of teaching English through mathematical methods, and ultimately achieve the effect of good mastery by students. Based on the above ideas, this paper lays emphasis on scientific understanding of how English is taught in education. We have visited schools, communicated with teachers and students, conducted in-depth investigation and research, proposed a series of indicators affecting the amount of English teaching, and constructed and studied the English teaching model based on fuzzy mathematics and provided effective and targeted teaching methods and tools for secondary schools and colleges in the field of second foreign language learning. Among them, the hierarchical analysis method is adopted to determine the index weight coefficient, which is more scientific and also reduces the subjective arbitrariness as much as possible, so as to realize the scientific and effective cognition of foreign language teaching and give full play to the guiding role of cognition in foreign language teaching.

**Keywords:** HPM; English teaching; language teaching; hierarchy method.

## 1. Introduction

Foreign language teaching enjoys an age-old history, while the theoretical summary and systematic research on foreign language teaching is only centuries-old. Foreign language education in China also has a long history. As early as in the mid-19th century, English teaching just began in our country. In 1862, the Tongwenguan was founded in Beijing, becoming the first foreign Chinese school established by the Qing government to train translators and "communicators" in diplomacy. The first of these was the English Pavilion I. China's foreign language teaching has gone through vicissitudes in the following one hundred years, but the vast number of foreign language teachers are constantly exploring, accumulating rich experience in foreign language teaching, and also summarizing a variety of effective teaching methods. Some of these methods are now widely recognized as unique foreign language teaching methods[1].

Teaching methods based on fuzzy integrated evaluation have been widely and successfully applied in a variety of fields[2]. Fuzzy comprehensive evaluation is a quantitative evaluation method that analyzes and evaluates objective things in education via fuzzy mathematical knowledge. For example, there are numerous ambiguities and uncertainties in complex educational phenomena, as opposed to the evaluation of the quality of parts in industrial production, which can be measured by precise dimensions but have great ambiguity (the so-called ambiguity mainly refers to the indifference in the intermediate transition of objective differences)[3].

In China's long-standing traditional sense of the English style of teaching method, the time body is only treated as a purely theoretical grammar phenomenon, with some students with strong comprehension ability explaining the meaning of the time body through abstract classes and freely using it [4].

However, in actual teaching, we find that many students have studied for many years, and their understanding of the time and body is still on the surface, as are teachers. What is the cause of the discrepancy in Chinese students' understanding of time and body? We discovered that the existence of the temporal problem is related to the different expression methods in Chinese and English after extensive investigation and research[5]. Is there a way to visually represent the true meaning of various tenses in English and use it to aid teaching?

The teaching of syntax should be varied to avoid cramming English lessons into students' heads, as this approach has little effect on their ability to speak the language and, in fact, only serves to alienate more and more students from it. The teaching of syntax should be done from a variety of perspectives, including listening, reading,

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dialogue, written expression, and other aspects. Students can learn syntactic knowledge in a more three-dimensional way because to this.

Thomas Thompson, a well-known American operations research scientist, developed the Analytical Hierarchy Process (AHP method). Thornes L. Seaty's decision-making process from the 1970s was first applied in China in the early 1980s and is now generally accepted. It is a decision analysis technique that combines qualitative and quantitative issues to address complicated situations with multiple objectives and indicators. A complete ranking of the relevance of the choice factors in respect to the target layer is obtained by first breaking down the complicated problem into all of its component pieces. These elements are then grouped according to their dominating relationships to create an ordered hierarchy. Through the use of particular models, the method normalizes people's thinking judgements and stresses the objectivity of people's thinking judgments in the decision-making process[6].

In the study of artificial intelligence, traditional mathematics cannot process information that is uncertain, ambiguous, and random. In 1965, Professor L.A. Zadeh of the University of California, Berkeley, founded fuzzy set theory, which provides a very effective tool for describing and handling the ambiguity of things and the uncertainty of the system, and for simulating the fuzzy thinking and decision-making reasoning functions of people[7].

**2. Method of AHP, hierarchy, fuzzy comprehensive evaluation and number axis**

Applying the AHP method to solve the problem can be divided into the following steps:

(1) Establish a hierarchical model. After in-depth analysis of the problems faced, the factors contained in the problem are divided into different levels, such as the target layer, the criterion layer, the indicator layer, the program layer, etc., and the hierarchical structure of the level is illustrated in the form of a block diagram and the subordinate relationship of the factors, and when a certain level contains more factors, the level can be further divided into several sub-levels[8].

$$A_k = (a_{ij})_{n \times n} \tag{1}$$

A<sub>k</sub> represents the resulting judgment matrix, a<sup>n</sup> represents the numerical value on column j of the ith boil on the judgment matrix, and nXn represents the order of the matrix.

(2) Hierarchical single ordering and its consistency test. The  $U_{k1}, U_{k2}, U_{k3}, \dots, U_{kn}$  relative weight of the compared elements to the criterion 5 is calculated by the judgment matrix  $W_{k1}, W_{k2}, \dots, W_{kn}$ , and the consistency of the matrix AK is judged.

The specific steps are as follows:

1) Normalize the columns of the judgment matrix.  
i.e.

$$\bar{a}_{ij} = a_{ij} / \sum_{k=1}^n a_{kj} \quad i, j = 1, 2, \dots, n \tag{2}$$

Find the sum of the elements of each row of the judgment matrix Ak, that is,

$$\bar{w}_i = \sum_{j=1}^n \bar{a}_{ij} \quad i = 1, 2, \dots, n \tag{3}$$

3) Normalize  $\bar{w}_i$  the pair, i.e.

$$w_i = \frac{\bar{w}_i}{\sum_{j=1}^n \bar{w}_j} \quad i = 1, 2, \dots, n \tag{4}$$

Conduct consistency checks

When using the analytic hierarchy method to calculate the weight coefficients of evaluation indicators, it is necessary to maintain the consistency of judgment thinking. The so-called consistency of judgment thinking means that when experts judge the importance of indicators, they must coordinate between various judgments and do not have the result of mutual contradiction. For example, when the indicators a, b, and c are compared between

two or two, a is more important than b, b is slightly more important than c, and c is more important than a. Obviously important contradictions, such as inconsistencies, are extremely prone to occur under multi-stage conditions but the degree of inconsistency varies under different conditions. To test for consistency, we mainly calculate CR (statistically known as CJ, CR is the consistency ratio); The formula is

$$CR = \frac{CI}{RI} \tag{5}$$

$$\frac{CI}{RI} \leq 0.1$$

If so, inconsistencies are acceptable, otherwise they are unacceptable and the ratio of the judgment matrix is re-evaluated. Where: RI

$$CI = \frac{\lambda_{\max} - n}{n - 1} \tag{6}$$

n is the order of the matrix

$$\lambda_{\max} = \frac{1}{n} \sum_{j=1}^n \left[ \frac{\sum_{i=1}^n b_{ij} w_j}{w_{ij}} \right] \tag{7}$$

(4) The total ranking of levels and its consistency test. The composite weights of each layer element on the system target are calculated, sorted, and the consistency test is performed[9].

**2.1 Analytic hierarchy method calculates the indicator weights**

a. Calculate the weight of the importance of each criterion in the A~B judgment matrix for the evaluation of English teaching, the maximum eigenvalue, the test value, etc., and calculate the importance weight of the A~B judgment matrix.

First, the column normalization of the A~B judgment matrix is obtained as follows:

$$\begin{bmatrix} 0.1 & 0.083 & 0.105 & 0.1 & 0.105 \\ 0.2 & 0.167 & 0.158 & 0.2 & 0.158 \\ 0.3 & 0.333 & 0.316 & 0.3 & 0.316 \\ 0.1 & 0.083 & 0.105 & 0.1 & 0.105 \\ 0.3 & 0.333 & 0.316 & 0.3 & 0.316 \end{bmatrix} \tag{8}$$

Second, the matrix is summed for each row of elements of the matrix:

$$\bar{W} = [0.493 \quad 0.883 \quad 1.565 \quad 0.493 \quad 1.565]^T$$

Then normalize the matrix to obtain A~B to determine the importance weight of the matrix:

$$W = [0.0990.1760.3130.0990.313]^T$$

b. Calculate the A ~ B maximum feature root of the judgment matrix  $\lambda_{\max}$

$$GW = \begin{bmatrix} 11/21/311/3 \\ 211/321/2 \\ 32131 \\ 11/21/311/3 \\ 32131 \end{bmatrix} \cdot [0.0990.1760.3130.0990.313]^T$$

$$\text{rule } (GW)_1 = 1 \times 0.099 + 1/2 \times 0.176 + 1/3 \times 0.313 + 1 \times 0.099 + 1/3 \times 0.313 = 0.495$$

$$(GW)_2 = 2 \times 0.099 + 1 \times 0.176 + 1/3 \times 0.313 + 2 \times 0.099 + 1/2 \times 0.313 = 0.887$$

$$(GW)_3 = 3 \times 0.099 + 2 \times 0.176 + 1 \times 0.313 + 3 \times 0.099 + 1 \times 0.313 = 1.574$$

$$(GW)_4 = 1 \times 0.099 + 1/2 \times 0.176 + 1/3 \times 0.313 + 1 \times 0.099 + 1/3 \times 0.313 = 0.495$$

$$(GW)_5 = 3 \times 0.099 + 2 \times 0.176 + 1 \times 0.313 + 3 \times 0.099 + 1 \times 0.313 = 1.574$$

$$\begin{aligned} \lambda_{\max} &= \frac{(GW)_1}{5W_1} + \frac{(GW)_2}{5W_2} + \dots + \frac{(GW)_5}{5W_5} \\ &= \frac{0.495}{5 \times 0.099} + \frac{0.887}{5 \times 0.176} + \frac{1.574}{5 \times 0.313} + \frac{0.495}{5 \times 0.099} + \frac{1.574}{5 \times 0.313} = 5.014 \end{aligned}$$

c. Conduct consistency tests

$$CI = \frac{\lambda_{\max} - n}{n - 1} = \frac{5.014 - 5}{5 - 1} = 0.004$$

$$CR = \frac{CI}{RI} = \frac{0.004}{1.12} = 0.0036 < 0.1$$

rule

It can be seen that when evaluating English teaching in secondary vocational schools, the weight set of teaching concepts, teaching content, teaching art, teaching quality, and teaching effect is as follows : (0.099,0.176,0.313,0.099,0.313)

The weights, maximum eigenvalues, and test values of the judgment matrix are as follows  $B_1 \sim C$  : W represents weight,  $\lambda_{\max}$  represents maximum eigenvalues.

$$W = 0.1950.3320.1070.1070.1950.064$$

$$\lambda_{\max} = 6.031, CI = 0.006, RI = 1.24, CR = 0.005 < 0.1 \tag{9}$$

$$W = [0.0990.1760.3130.0990.313]^T$$

$$\begin{aligned} \lambda_{\max} &= \frac{(GW)_1}{5W_1} + \frac{(GW)_2}{5W_2} + \dots + \frac{(GW)_5}{5W_5} \\ &= \frac{0.495}{5 \times 0.099} + \frac{0.887}{5 \times 0.176} + \frac{1.574}{5 \times 0.313} + \frac{0.495}{5 \times 0.099} + \frac{1.574}{5 \times 0.313} = 5.014 \end{aligned}$$

### 2.2 Use fuzzy comprehensive evaluation methods for evaluation

According to the evaluation index system established earlier and the weight of each indicator, the teaching of English teachers in a secondary vocational school is evaluated[10].

According to the established index system, the two-layer evaluation factor set used to establish the fuzzy comprehensive evaluation model of this paper is established:

$$U_1 = \{U_1, U_2, U_3, \dots, U_n\} U_1 (i = 1, 2, \dots, n) \text{ is a level-1 indicator}$$

$$I_1 = \{u_{11}, u_{i,3}, u_{17}, \dots, u_{ia}\} u_{ij} (j = 1, 2, \dots, m) \text{ is a second-level indicator}$$

$$U_1 = \{u_{11}, u_{12}, u_{13}, u_{11}, u_{15}, u_{16}\}$$

Extracurricular tutoring}

$$U_1 = \{U_{21}, U_{22}, U_{21}, U_{21}, u_{25}, u_{2k}\}$$

$$U_1 = \{u_{11}, u_e, u_{21}, u_{11}, u_s, u_t\}$$

= { Pay attention to the cultivation of various abilities such as listening, speaking, reading and writing, assist teaching with computer and other equipment, and combine teaching with student practice.

Take care of personality differences, be good at inspiring thinking, and create situations.}

$$u_1 = \{u_{11}, u_{12}, u_{41}, u_{11}\}$$

= ¥{Knowledge teaching correctness, oral fluency, board book, classroom organization ability }

$$I_3 = \{u_{s1}, u_{52}, u_{s1}, u_{51}\}$$

= { Academic improvement and progress, ability development, emotional learning, change in mindfulness, classroom discipline }

a. Set the weight of the criterion layer evaluation index to indicate  $A = (A_1, A_2, A_3, A_4, A_5)$  the weight of the indicator in . Using the previous author's conclusion using the analytic hierarchy method  $U_1(i = 1, 2, 3 \dots 5) U$  , the weights are as follows:

$$A_1 = 0.099, A_2 = 0.176, A_3 = 0.313, A_4 = 0.099, A_5 = 0.313$$

b. Set the weight set of the indicator layer to indicate  $A_i = (A_{i1}, A_{i2}, \dots, A_{i11})$  the proportion of each indicator of the indicator layer in the corresponding price indicator layer, and determine the weight as follows:

$$A_{11} = 0.195, A_{12} = 0.332, A_{13} = 0.107, A_{14} = 0.107, A_{15} = 0.195, A_{16} = 0.064,$$

$$A_{21} = 0.129, A_{22} = 0.073, A_{23} = 0.129, A_{24} = 0.234, A_{25} = 0.306, A_{26} = 0.129,$$

$$A_{31} = 0.334, A_{32} = 0.107, A_{33} = 0.121, A_{34} = 0.121, A_{35} = 0.107, A_{36} = 0.21$$

$$A_{41} = 0.239, A_{42} = 0.432, A_{43} = 0.09, A_{44} = 0.239$$

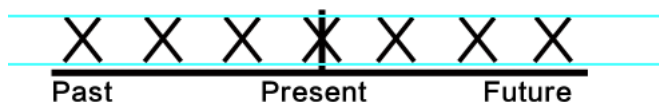
$$A_{51} = 0.305, A_{52} = 0.49, A_{53} = 0.126, A_{54} = 0.079$$

In this study, according to the principle of pluralism of evaluation subjects, students, teachers, and experts evaluate the teaching of a teacher. In the evaluation of students and teachers, the percentage of the number of people in the rated 5 grades is taken as the corresponding subordinate degree, and when the expert evaluates, because the number of experts is usually small, the above percentage cannot reflect the actual situation very scientifically, so the expert scores each indicator, and then performs statistical analysis of the corresponding membership function.

**2.3 The concept of the time number axis assists students in understanding various time bodies**

The X English time system is part of the English instruction system, which is the product of english speakers observing the objective world from the perspective of time. English speakers stand at a certain point on the axis of time and observe the objective world in a way that faces the future and turns their backs on the past, taking the time point or time period in which they are located as the reference point, and regarding it as the present, the time behind the past as past, and the time that will come in front of them as the future[11]. Pls refer to Figure 1.

Figure 1 Simple Present Represents a repetitive action:



The “×××××” indicates actions that are constantly repeated or occur frequently;

The present tense can generally be used to represent an action that is constantly repeated or occurs frequently. This action can be a habit, a hobby, or something that happens on a daily basis, something that is planned, or happens from time to time. Pls refer to Figure 1. At the same time, it can be used to express things that a person often forgets or does not do.

For example: I play tennis.

She does not play tennis.

Present tense indicates facts or generalizations. The above horizontal line represents a true proposition that has existed from the past, the present, and the future. It is generally used now to show that the speaker believes that a fact was true, is true, and will remain true in the future. It does not

Figure 2 Present Continuous

matter whether the speaker is correct. At the same time, it can also be used to express generalizations about people or things[12].

Present Continuous

Composition: [AM /IS/ARE] + [VERB+ing]

For example: I am watching TV.  
 He is quickly learning the language.  
 It's now underway

Past Present Future

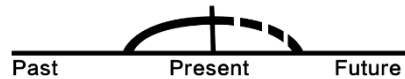
The parabolic lines in this diagram can be real or virtual. It actually means that this action is happening at this moment; The virtual indicates that this action has not occurred at this moment. Pls refer to Figure 2. The present tense uses continuing verbs to express that something is happening at this moment, or it can be used to express negation[13].

For example: You are learning English now.  
 You are not swimming now.  
 They are reading their books.  
 They are not watching television.  
 Why aren't you doing your homework?

The tense represents the progress of an event in a certain period of time. The present tense can be used to represent the progression of an action that lasts for a long time over a period of time, and it does not mean that we are doing it when we are speaking.

Pls refer to Figure 2. The larger parabola in this figure indicates that the event lasted a long time, that is, the occurrence process is long, which is reflected in the alternating between real and virtual in the figure. Actually represents the process of action; The virtual representative is not doing this when he speaks.

**3. Results and analysis of students' feedback on applying HPM in English teaching**



**Table 1** Student evaluation of yield

Evaluation indicators		Rating rating				
Evaluation of projects	Evaluation points	Good	Better	So so	Poor	difference
Teaching attitude	Teaching and educating People $U_n$	0.62	0.27	0.11	0	0
	Lesson Preparation $U 2$	0.77	0.15	0.08	0	0
	Assignment and approval S	0.23	0.20	0.42	0.13	0.02
	Actively soliciting opinions to improve teaching $U''$	0.06	0.26	0.31	0.30	0.07
	Correctly rate student $U_{15}$	0.19	0.34	0.26	0.19	0.02
	Extracurricular Tutoring Mountain	0.11	0.37	0.35	0.08	0.09
	Clarity of teaching objectives S	0.77	0.13	0.10	0	()

Teaching content	Scientific vomiting	0.85	0.10	0.05	0	0
	Integrity U <sub>1</sub>	0.46	0.41	0.08	0.05	0
	Connect with the actual mountain	0.19	0.41	0.25	0.10	0.05
	The difficult points highlight U <sub>M</sub>	0.56	0.34	0.07	0.03	0
	Novelty%	0.43	0.38	0.10	0.09	0
Teaching the Arts	Focus on the cultivation of various abilities such as listening, speaking, reading and writing	0.28	0.44	0.12	0.10	0.06
	Computers and other equipment assist teaching dishes	0.04	0.15	0.36	0.35	0.10
	Lectures are combined with student practice U <sub>1</sub> "	0.22	0.43	0.17	0.09	0.09
	Take care of personality differences U <sub>1</sub> "	0.17	0.38	0.32	0.09	0.04
	Good at inspiring thinking mountains	0.14	0.23	0.46	0.17	0
	Create Context%	0.31	0.37	0.26	0.06	0

The data obtained through survey research methods can be comprehensively, objectively and accurately described educational phenomena and laws by using reasonable and advanced research methods; can maximize the effectiveness of data and data; and can delve deeper into the regularities hidden behind complex phenomena. This study in the collection of a large number of statistical data and expert evaluation data, to analyze the data processing, we will be a part of the data after the quantitative processing, and can use these data to reflect the phenomenon and facts accurately and objectively, can effectively reflect the existence of English teaching, learning in the presence of problems, and have a positive promotion value. Pls refer to Table1.

This study is fundamental in merging multiple research methodologies and applying evaluation research methodologies to develop a performance evaluation index system and evaluation plan that are rational, reasonable, and applicable to real-world situations. The amount of data gathered through inquiry and research methods is employed in the research process to be identified, compared, and judged before being further improved through interviews. The data are mathematically calculated, the actual significance reflected in the quantitative research is deeply analyzed, and the general system structure and comprehensive evaluation results are obtained[14]. This is combined with the fuzzy comprehensive evaluation method, which is frequently used in educational evaluation.[15]

The use of mathematical techniques to support the teaching of English can effectively contribute to the improvement of students' ELT performance and general teaching skills.[16]

The first reason is that, mathematical methods help to improve students' cognitive skills.[17] Identification is primarily about the processes by which the human brain processes information, and cognitive strategies are skills that learners use to organize their attention, memory, and thinking using internal processes.[18] They function by allowing learners to continually reflect on their cognitive activities.[19]

The second reason: students who participate in lab classes motivate excellence; they are motivated by their own motivation and will not back down.[20] They will work deliberately hard and continue to acquire what is in short supply. [21]It can be argued that students who participate in lab classes shape their high achievement, thus contributing to their academic performance and overall competence.[22]

Third, teachers can choose the right instructional strategies and approaches to understand the challenges of classroom instruction,[23] and it is more helpful for students to occasionally use research and discovery techniques to shape the meaning of knowledge,[24] and to have time to talk about and share items reflected in the current content and as relevant knowledge as possible.[25]

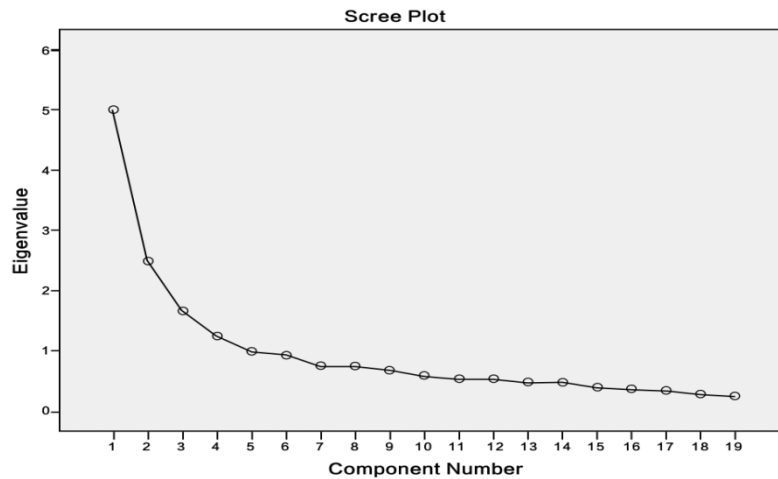


Figure 3 Screen Plot

As can be seen from the picture above, we can determine that these English problems can be divided into four factors.[26] Pls refer to Figure 3.

Table 2 Rotated Component Matrix1

	Component			
	1	2	3	4
t27: The English teacher will let us do some integrated English in our spare time Exercises with mathematical subjects	.777			
t25: The English teacher is very good at guiding us to combine English syntax and mathematics Learn together	.761			
T26 English teachers often design small games that let us use math Methodological English syntax[27]	.749			
t28: The English teacher will let us learn the relevant mathematical knowledge before reviewing Associated English syntax[28]	.723			



t13: The interdisciplinary syntax teaching method of the English teacher suited me very well	.639		
t12 I am confident in learning English syntax		.693	
t23 I will consciously accumulate English vocabulary and sentence patterns		.673	
T1: I am very interested in learning English syntax		.672	.447
t22 In English class, I listen carefully to the lectures and take good notes		.669	
T3: I learn English syntax because I love the language		.624	
T29: I will be very happy after overcoming a difficulty in learning English		.506	
T15 The teacher assigned the exercises in class, I was able to keep up			.704
t16: There are many types of exercises assigned by the teacher, there are choices, there are fill-in-the-blanks, and there are Sentence making, etc[29]			.635
t32 : The homework assigned by the English teacher includes a lot of listening and reading content		.395	.585
t33: The homework assigned by the English teacher includes a lot of content to say and write			.577
T31 The homework assigned by the English teacher I was able to complete every day			.550
It does not take up too much time			
t20 I have a strong ability to associate and always connect related knowledge[30]			.835
Come and learn syntax[31]			
t19 I take the initiative to do some syntactic exercises that integrate various disciplines outside the classroom	.419		.607
t21 I will try to classify knowledge and learn by associating summary memories		.418	.541
syntax			

Table 3 Rotated Component Matrix2

	Initial	Extraction
t1: i am very interested in learning English syntax	1.000	.659
T3: i learn English syntax because I love the language	1.000	.576
t12 I am confident in learning English syntax	1.000	.569
T13: The interdisciplinary syntax teaching method of the t13 English teacher suited me very well	1.000	.511
T15 The teacher assigned the exercises in class, I was able to keep up	1.000	.525

T16:There are many types of exercises assigned by the t16 teacher, including choices, filling in the blanks, and making sentences	1.000	.436
t19 I take the initiative to do some syntactic exercises that integrate various disciplines outside the classroom	1.000	.563
t20 I have a strong ability to associate and always learn syntax by linking related knowledge	1.000	.746
t21 I will try to classify knowledge and learn syntax by associating summarizing memories	1.000	.500
t22 In English class, I listen carefully to the lectures and take good notes	1.000	.488
t23 I will consciously accumulate English vocabulary and sentence patterns	1.000	.479
t25:The English teacher is very good at guiding us to combine English syntax and mathematical knowledge	1.000	.626
t26 English teachers often design small games for us to learn English using mathematical methods	1.000	.644
Syntax		
t27:The English teacher will let us do some integrated English and math subjects in our spare time	1.000	.649
Exercises		
t28 :The English teacher will let us learn the relevant mathematical knowledge before reviewing the associated English	1.000	.588
Syntax		
T29: will be very happy after overcoming a difficulty in learning English	1.000	.415
t31:The homework assigned by the English teacher I can do my best to complete every day, without taking it up	1.000	.438
More time		
t32:The homework assigned by the English teacher includes a lot of listening and reading content	1.000	.536
t33:The homework assigned by the English teacher includes a lot of content to say and write	1.000	.496

According to the figures above: we can determine that these topics can be divided into four factors. By reversing the maximum table, this paper divides the influencing elements of the subject's english reading outside the classroom into four factors (Table 2, Table 3):

- (1) t13, t25, t26, t27, 128 for the first factor of "teacher's teaching method and ability to guide"
  - (2) t1, t3, t12, t22, t23, 129 for the second factor "students have positive attitudes and strong needs for learning English".
  - (3) t15, t16, t31, t32, t33 as the third factor "the variety of exercises and their intensity are appropriate".
  - (4) t19, t20, and t21 are the fourth factor "students' own transfer ability is strong" After the reliability, differentiation, and factor analysis, the following data were obtained
- The entire curve appears down trends, it shows the eigen value is approaching to the component number axle.

#### 4. Conclusion

This paper explores and analyzes the teaching evaluation that serves as a guide for English teaching, proposes a corresponding index system for the assessment of the effectiveness of secondary vocational English teaching, and uses the more popular analytic hierarchy method to determine the weight of the index system. To ensure the weight was determined scientifically, the author distributed a sizable number of questionnaires to the respondents. The analytical hierarchy method's judgment matrix is determined by the past-present tense, which is then used to undertake scientific operations to find a more suitable weight. Finally, the evaluation software was developed, which avoided the repetitive labor of a large amount of data processing in the typical teaching evaluation, greatly improved the work efficiency, and effectively saved the teacher's time. It has the following implications for the current teaching of secondary vocational English in China.

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