

# Personalized Evaluation Method for the Quality of Vocational English Learning based on Ahp

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**Abstract:** The evaluation model for the learning quality of vocational English, based on the Analytic Hierarchy Process, integrates three aspects: English knowledge, skills, and potential. Based on the differences in academic expansion, career expansion, and literacy expansion, a comprehensive evaluation of the learning quality of vocational English is conducted through seven specific indicators, which combines comprehensiveness, openness, and diversity, providing a reference for personalized teaching of vocational English courses.

**Keywords:** Analytic Hierarchy Process; Vocational English; Learning Quality; Evaluation Model.

## 1. Introduction

The assessment and evaluation of students is an important aspect of curriculum construction. With the promotion of online courses during the epidemic, online learning has become popular in various universities. Thanks to the support of information technology, process assessment has received more and more attention, and English courses are no exception. Currently, the assessment indicators for English courses are based on factors such as attendance and classroom performance, combined with final and mid-term exams. Compared to traditional assessment methods, student performance evaluation based on this method is more comprehensive. However, the determination of weight allocation of each evaluation indicator relies on the habits and experience of teachers, with strong subjectivity and a lack of scientific basis. At the same time, with the reform of vocational education, the admission channels of vocational colleges are becoming increasingly diversified, which poses new challenges for the assessment and evaluation of English courses. How to objectively evaluate the learning quality of vocational English? This article attempts to find an answer to this question.

## 2. The Problems of the Current English Learning Quality Evaluation System

a) Neglecting the evaluation of listening and speaking skills.

In vocational colleges, the College English Test Band 4 and Band 6 have not been fully implemented, and in the regular assessment of English courses, speaking is marginalized, and listening has not received the attention it deserves. Due to the lack of comprehensive assessment methods, it is not uncommon to see high scores but low abilities.

b) Lack of evaluation for personalized development of students

The current vocational college students are no longer limited to the traditional single employment route after graduation. Graduates have more choice, such as upgrading from college to university, studying abroad, and starting their own businesses. It is timely to promote the reform of diversified evaluation methods around the differentiated

development goals of students. Given the various problems in the current evaluation system, it is urgent to construct a new evaluation system for vocational English courses.

## 3. Evaluation Methods and Criteria

a) Analytic hierarchy process

Analytic Hierarchy Process (AHP) was a multi-objective decision analysis method first proposed by American operations researcher T. L. Saaty (2006) in the 1970s. This method takes the actual problem being studied as the target layer, constructs a criterion layer and an indicator layer based on various factors related to the target layer, and decomposes them into several levels from bottom to top according to different attributes. Then, consulting expert opinions, a judgment matrix is constructed to calculate the weight allocation of each evaluation indicator at each level, and consistency testing is performed. This method is systematic, flexible, concise, and practical, and is widely adopted in various fields (Hu, 2020).

b) Evaluation criteria for the quality of English learning in vocational colleges

The Chinese Ministry of Education has successively issued the "Teaching Requirements for English Curriculum in Higher Vocational Education" (2009) and "Teaching Requirements for College English Curriculum" (2007), which provide clear requirements for various indicators of students' English knowledge and skills, and consider the relative differences between students at different levels. As the latest authoritative guiding document, the Curriculum Standards for College English in Higher Vocational Education were promulgated in 2021 (hereinafter referred to as the Curriculum Standards, 2021). It proposes that the college English curriculum in higher vocational education consists of basic modules and expansion modules, which lays the foundation for hierarchical teaching and personalized evaluation of vocational English. The corresponding provisions in the Curriculum Standards can directly serve as the basis and indicators for evaluating the learning quality of English courses for vocational college students.

## 4. Establishment of Evaluation Model

To evaluate the learning quality of English courses using

the Analytic Hierarchy Process, it is necessary to first clarify the relationship between the hierarchical structure of evaluation indicators, then obtain valuable expert opinions, construct a judgment matrix on this basis, and finally calculate the weight allocation of each evaluation indicator for the goal of learning quality in vocational English courses.

a) Clarify the hierarchical structure of evaluation indicators

The evaluation of learning quality in vocational English courses should combine goal evaluation and outcome evaluation, combine quantitative testing with qualitative analysis, and integrate English knowledge, skills, and potential(Huang, 2013). According to the Curriculum

Standards, for vocational college students, English knowledge mainly includes elements such as vocabulary and grammar, skills mainly include understanding, expression, interaction, etc. Potential is mainly reflected in learning strategies and personal expansion. Among them, learning strategies include learning efficiency and learning initiative, and personal expansion can be divided into different indicators such as career improvement, academic improvement, and literacy improvement, It is necessary to differentiate and provide personalized evaluations based on the individual development direction of students. On this basis, establish a criterion layer, as shown in

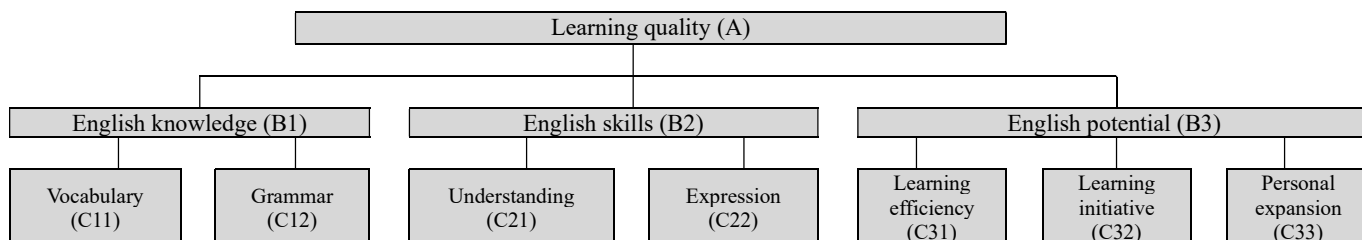


Figure 1. The criterion layer of evaluation model

b) Construction of judgment matrix

Based on the hierarchical structure of evaluation indicators, the subordinate relationship between each indicator can be determined. Experts compare the importance of evaluation indicators at the same level in the hierarchical structure model for indicators at upper level, and then construct a judgment matrix based on the scale assignment survey questionnaire (shown in Table 1). The judgment matrix integrates expert

opinions from three aspects, including enterprise human resource managers, English teachers, and vocational college students. After summarizing and organizing expert opinions, a judgment matrix is obtained. The judgment matrices for English learning quality, English knowledge, and English skills are A, B1, and B2, respectively, as shown in Tables 2, 3, and 4.

Table 1. The scale assignment survey questionnaire

Indicators	Relative importance									Indicators
	9	7	5	3	1	3	5	7	9	
English knowledge										English skills
English knowledge										English potential
English skills										English potential
Vocabulary										Grammar
Understanding										Expression
Learning efficiency										Learning initiative
Learning efficiency										Personal expansion
Learning initiative										Personal expansion

1: Both indicators are equally important  
 3: Comparing two indicators, one is slightly more important than the other.  
 5: Comparing two indicators, one is more important than the other.

7: Comparing two indicators, one is significantly more important than the other.  
 9: Comparing two indicators, one is far more important than the other.

Table 2. Matrix A

A	B1	B2	B3	WB1	Consistency test max=3.0385, CR=0.037<0.1, pass the consistency test
B1	1	1/3	3	0.2583	
B2	3	1	5	0.6370	
B3	1/3	1/5	1	0.1047	

Table 3. Matrix B1

B1	C11	C12	WB1	Consistency test max=2.000, CR=0.000<0.1, pass the consistency test
C11	1	3	0.750	
C12	1/3	1	0.250	

Table 4. Matrix B2

B2	C21	C22	WB1	Consistency test max=2.000, CR=0.000<0.1, Pass the consistency test
C21	1	3	0.750	
C22	1/3	1	0.250	

For the potential of English learning, judgment matrices are constructed based on the differences in students' English expansion, including academic improvement, career improvement, and literacy improvement. The corresponding

matrices are B3 (1), B3 (2), and B3 (3), and their combination consistency ratios are all less than 0.1, all of which can pass the consistency test. Please refer to Tables 5, 6, and 7 for details.

**Table 5. Matrix B3(1)**

B3(1)	C31	C32	C33(1)	WB2	Consistency test
C31	1	1	1/7	0.1111	max=3.00, CR=0<0.1, pass the consistency test
C32	1	1	1/7	0.1111	
C33	7	7	1	0.7778	

**Table 6. Matrix B3(2)**

B3(2)	C31	C32	C33(2)	WB2	Consistency test
C31	1	3	5	0.6370	max=3.0385, CR=0.0370<0.1, pass the consistency test
C32	1/3	1	3	0.2583	
C33	1/5	1/3	1	0.1047	

**Table 7. Matrix B3(3)**

B1(3)	C31	C32	C33(3)	WB2	Consistency test
C31	1	1/5	1/3	0.1047	max=3.0385, CR=0.037<0.1, pass the consistency test
C32	5	1	3	0.6370	
C33	3	1/3	1	0.2583	

c) Calculation of the weight of evaluating indicators

Due to the influence of the judgment subject and individual preferences on expert opinions, there may be extreme situations. Therefore, consistency testing should be conducted before determining the weights. The coefficient CR of matrix consistency test can be obtained using software yaahp. When CR<0.1, it is considered that the inconsistency of the matrix is within an acceptable range and the matrix passes the consistency test (Huang, 2015). Otherwise, it is necessary to reconstruct the judgment matrix.

The calculation results indicate that matrix A itself is a second-order consistency matrix, and matrices B1, B2, B3 (1), B3 (2), and B3 (3) all pass the consistency test. The factor weights and consistency of each matrix are shown in Tables 2-7. Perform a consistency test on the overall ranking based on the above results, and calculate the weights allocation of each indicator in layer C for the overall goal A. According to the differences in English expansion, the calculated evaluation indicators can be divided into the following three situations.

i. For academic improvement, overall ranking consistency test coefficient CR=0.000<0.1, passed the consistency test. The weights allocation of evaluation indicators C11, C12, C21, C22, C31, C32, and C33 for the total target A are 0.1937, 0.0646, 0.4777, 0.1592, 0.0116, 0.0116, 0.0815 respectively.

ii. For career improvement, overall ranking consistency test coefficient CR=0.000<0.1, passed the consistency test. The weights allocation of evaluation indicators C11, C12, C21, C22, C31, C32, and C33 for the total target A are 0.1937, 0.0646, 0.4777, 0.1592, 0.0667, 0.0271, 0.0110 respectively.

iii. For literacy improvement, overall ranking consistency test coefficient CR=0.000<0.1, passed the consistency test. The weights allocation of evaluation indicators C11, C12, C21, C22, C31, C32, and C33 for the total target A are 0.1937, 0.0646, 0.4777, 0.1592, 0.0110, 0.0667, 0.02710 respectively.

d) Establishment of evaluation model

After the evaluation indicators and their weights are determined, the evaluation model is also established accordingly. If the evaluation of the learning quality of students in vocational English courses is A, We can obtain the following model.

For academic improvement,  $A=C11*0.1937+ C12*0.0646 + C21*0.4777 + C22*0.1592+ C31*0.0116+ C32*0.0116+ C33*0.0815$ .

For career improvement,  $A=C11*0.1937+ C12*0.0646 + C21*0.4777 + C22*0.1592+ C31*0.0667+ C32*0.0271+ C33*0.0110$ .

For literacy improvement,  $A=C11*0.1937+ C12*0.0646 + C21*0.4777 + C22*0.1592 + C31*0.0110+ C32*0.0667+ C33*0.0271$ .

Under this model, only the scores of various evaluation indicators such as vocabulary, grammar, and understanding need to be input to obtain the evaluation results of the student's learning quality.

## 5. Application of Models

Select a class from a vocational college in Shandong Province and evaluate the English learning quality of all students in the class using the above model. Firstly, investigate the development path of students. The results of the questionnaire survey show that in future development plans, upgrading from college to university and job searching are the main choices, accounting for 46.5% and 26.9% respectively. Correspondingly, university entrance examination, CET-4 and CET-6 exams, and workplace communication are the main purposes of current vocational college English learning. Based on this, corresponding evaluation models are selected. For English knowledge and skills, scores are mainly assigned based on students' English exam scores during their time in school; The evaluation of learning potential, learning efficiency, and initiative is conducted through a questionnaire survey. Academic improvement is mainly based on the scores of the English exam for university entrance exams, while career improvement is mainly based on the ESP scores of professional English courses. By converting grades into a percentage system, the calculation results show that the average scores of students in academic and career development are 78.16 and 73.12, respectively. The former has relatively higher scores, which is because students often have higher initiative in learning after setting the goal of

upgrading from college to university. In addition, many students have participated in specialized training, effectively improving their English exam scores. In contrast, when students choose to work directly, once the English courses offered by the school are completed, the efficiency and initiative of English learning will decrease. This indirectly indicates that there is a disconnect between English teaching and employment in current vocational colleges.

## 6. Conclusion

The scientific evaluation system for the learning quality of higher vocational education students is directly related to the quality of vocational education (Zhang, 2011). Based on the Analytic Hierarchy Process, the evaluation model designed around English knowledge, ability, and expansion is a positive response to the Curriculum Standards and can comprehensively and scientifically evaluate the quality of English learning in vocational colleges. The evaluation model not only integrates the opinions of employees, English teachers, and students, but also adjusts the weight allocation of each indicator based on expert opinions to meet the needs of English learning quality evaluation for different majors and individuals. The evaluation model combines comprehensiveness and flexibility, which is conducive to promoting the integration of vocational English teaching goals with employment and personal development.

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