An evaluation Model of College English Teaching Comprehension Ability from the Perspective of Cross Culture

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Due to the poor systematicness and serious homogenization of the existing evaluation models, the personalization and differentiation of the cross-cultural level are not obvious, which further affects the accuracy of the output results of the evaluation model. To solve this problem, this paper proposes a cross-cultural perspective of college English teaching comprehension ability evaluation model. From the six dimensions of knowledge and skills, teaching design, resource development, teaching implementation, teaching evaluation, reflection and development, this paper selects evaluation indicators, designs clustering algorithm, and outputs the clustering results of evaluation indicators. The analytic hierarchy process (AHP) is used to assign weights to the clustering results, and an evaluation model of English teaching comprehension ability is constructed. The experimental results show that the model has certain advantages in accuracy and recall rate, F1 value is 6.15 and 9.33 higher than the existing model, which shows that the model has good evaluation accuracy and improves the evaluation results.

Keywords: cross cultural perspective, English teaching, comprehension ability, evaluation model
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From the beginning of the 20th century, the study of teachers' teaching comprehension ability has been one of the hot topics in the world. Teachers' teaching comprehension ability is a big topic worthy of further study. Researchers are committed to finding the typical characteristics of knowledge, ability and attitude that can lead, maintain and promote students' learning and development, or to explore variables and correlation that affect the teaching behavior process or result of teachers, etc, The purpose of this paper is to improve and improve the teachers' teaching comprehension ability, promote the development of teachers' teaching ability and realize the overall development of students' physical and mental [1]. In today's world, communication is becoming more and more frequent. From the perspective of cross-cultural, more and more attention is paid to the comprehensive quality of talents, and the requirement of English teaching comprehension ability is higher and higher. In English teaching, the close relationship between language and culture determines the importance of culture teaching. English teaching can not only pay attention to grammar, vocabulary and other language forms of teaching, cross-cultural and level communication is indispensable [2]. Therefore, the comprehension ability of college English teaching plays an important role in the coordinated development of the whole education system. In the cross-cultural perspective, there are some differences between English and Chinese from expression to thinking. English teaching tends to translate Chinese ideas directly into English, which leads to the lack of cross-cultural comprehension ability in English teaching. In view of this problem, it is necessary to accurately evaluate the comprehension ability of English teaching, so as to take reasonable measures to improve the quality of English teaching.

In order to obtain effective evaluation results, it is necessary to establish an evaluation model of English teaching comprehension ability. At

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present, the research on the evaluation model of teaching comprehension ability at home and abroad has made some achievements, mainly focusing on the principles, methods and evaluation index system of ability evaluation. In the research on the evaluation of teaching comprehension ability, most of them use the methods of literature review, interview and questionnaire to construct the evaluation index system of teaching comprehension ability, mainly including comprehensive, special and professional evaluation indexes. The existing evaluation model mainly involves the teaching comprehension ability that teachers should have. Most of the evaluation indexes are based on the qualitative evaluation of teachers based on experience, and the evaluation results may be affected by subjective factors and more one-sided, which affects the reference of the output results of the evaluation model [3]. In addition, the evaluation method also contains quantitative analysis, but it is only a simple linear statistical relationship between index factors and teachers' teaching ability, lacking high-precision evaluation results. Due to the poor systematicness and serious homogenization of the evaluation content, the personalization and differentiation of the cross-cultural level are not obvious, which further affects the accuracy of the output results of the evaluation model. To solve this problem, this paper proposes a cross-cultural perspective of college English teaching comprehension ability evaluation model, in order to improve the reliability and effectiveness of the evaluation results.

THE DESIGN OF THE EVALUATION MODEL OF COLLEGE ENGLISH TEACHING COMPREHENSION ABILITY FROM THE PERSPECTIVE OF CROSS CULTURE

Select the Evaluation Index of Teaching Comprehension Ability

The evaluation model constructed in this paper will consider the concept of cross-cultural learning community, take teaching professional development as a part of comprehension ability evaluation, and focus on reflective learning in the process of professional development of English teaching, so as to realize self-development. In this regard, the evaluation index of teaching comprehension ability selected in this study will be carried out from three aspects: before class, in class and after class. The pre class part refers to the professional basic knowledge and skills that English teaching should have, as well as the teaching preparation before teaching activities; The link in class refers to the reasonable use of teaching resources and appropriate teaching methods to organize and implement teaching; After class links point to the evaluation and reflection of the teaching process, from which continuous learning can be carried out to promote professional development [4]. Therefore, the primary selection of the indicators of English teaching comprehension ability mainly focuses on knowledge skills, teaching design, teaching implementation, teaching evaluation and reflection development. In the cross-cultural perspective, information technology has been integrated into the various links of English teaching content and methods, and it plays an important role in teaching design, resource development and teaching interaction. Therefore, the development of digital resources and the application of information technology have become the essential elements of English teaching comprehension. Therefore, the evaluation index of teaching comprehension ability selected in this study is mainly composed of six dimensions: knowledge skills, teaching design, resource development, teaching implementation, teaching evaluation and reflection development. After six core dimensions of teaching comprehension ability are determined, we need to combine the cross-cultural background to sort out the framework of comprehension ability to determine the evaluation indicators under each dimension. (1) Ability dimension 1: knowledge and skills. The primary task of English teaching is to master the basic professional knowledge and skills. Professional knowledge includes English education knowledge, subject knowledge, general knowledge, and familiar with teaching methods and teaching ideas in different environments [5]. (2) Ability dimension 2: instructional design. The reasonable design of the teaching process can ensure the smooth development and progress of teaching. English teaching should analyze the teaching objectives according to the course

content, training objectives and learner characteristics, and then select appropriate information resources, media tools and teaching methods to design the teaching content, teaching objectives and teaching process. (3) Capability dimension 3: resource development. In English teaching, we should use certain information technology ability, use corresponding technology to collect and process high-quality resources, make high-quality courseware and micro course resources, and develop online course resources and digital school-based teaching materials with local characteristics, so as to become the creator of resources and the developer of courses. (4) Ability dimension 4: teaching implementation. The organization and implementation of the teaching process is the process of putting the pre class teaching design and preparation into action. On the one hand, we should carry out the teaching according to the teaching program procedures and highlight the students' subjectivity. On the other hand, we should not completely adhere to the design program. We should adjust the teaching program according to the actual situation and properly deal with emergencies [6]. (5) Ability dimension 5: teaching evaluation. The evaluation of teaching process can provide an important basis for the improvement and adjustment of follow-up teaching. With the help of information technology and various teaching evaluation tools, we can evaluate students' classroom learning process and learning results from multiple perspectives and in the whole process, and actively exchange learning effects with students, so as to understand students' learning situation in all aspects, so as to implement targeted teaching guidance for students. (6) Ability dimension 6: Reflection and development. In view of the shortcomings and problems existing in teaching evaluation, this paper finds out the reasons through analysis and puts forward improvement measures [7]. Understand and grasp the highlights and shortcomings of English teaching, make development plans according to teaching analysis and reflection, constantly improve professional quality and teaching comprehension ability, and realize self-development. Each ability dimension is composed of multiple indicators to comprehensively measure English teaching comprehension ability.

Design Clustering Algorithm of Teaching Comprehension Index

Based on the determination of the index selection dimension, a clustering algorithm is designed to divide the comprehension ability index reasonably, and compare the differences of each ability index. Clustering algorithm starts from unsupervised learning algorithm, which is different from simple data classification, but is divided into different clusters according to the characteristics of data sets. Each cluster has a high similarity and different clusters have significant differences [8]. First, S initial centers are selected from the sample data set, and the cluster similarity is calculated according to the attribute distance. The remaining data samples are classified into the initial centers according to the similarity, and then the clusters with similarity are obtained. The above clustering process is repeated until the standard function converges. The calculation formula can be expressed as follows:

$$C=\sum_{S=1}^{S}\sum_{P\in Q_S}\left|P-Q_S\right|^2 \quad (1)$$

In formula (1), C is the standard function; P is the data sample; Q_S is the initial cluster center, S is the number of cluster centers. For clustering algorithm, selecting the appropriate number of clusters is the central part of the algorithm. Only by selecting the best number of clusters, can the similarity of clustering results be achieved to the greatest extent. Based on this, analysis and research are carried out [9]. This model design uses contour coefficient to select the best clustering number. The calculation formula of profile coefficient is as follows:

$$\theta_i=\frac{U_2-U_1}{\max\left(U_1,U_2\right)} \quad (2)$$

In formula (2), θ_i is the contour coefficient; U_1 is the cohesion, which is the average distance from the same cluster sample to other samples; U_2 is the resolution, which is the average distance from different clustering samples to all samples. The smaller U_1 is, the better clustering is; The smaller U_2 is, the worse clustering is. According to equation (2), all θ_i are calculated,

and then the average value of θ_i is taken to obtain the average contour coefficient. The formula is as follows:

$$\theta_S = \frac{1}{O}\sum_{i=1}^{O}\theta_i \quad (3)$$

In formula (3), θ_S is the average contour coefficient; O is the number of samples. Theoretically, the range of θ_S is (1, - 1), and the closer θ_S is to 1, the more reasonable the clustering is; On the contrary, the closer θ_S is to - 1, the more unreasonable clustering is; If θ_S is close to 0, the current sample is considered to be at the boundary of two clusters [10]. Through the above judgment, we can get that the S value at the maximum θ_S is the best cluster number. On the basis of determining the optimal number of clusters, the maximum number of iterations is obtained. The process can be expressed as follows:

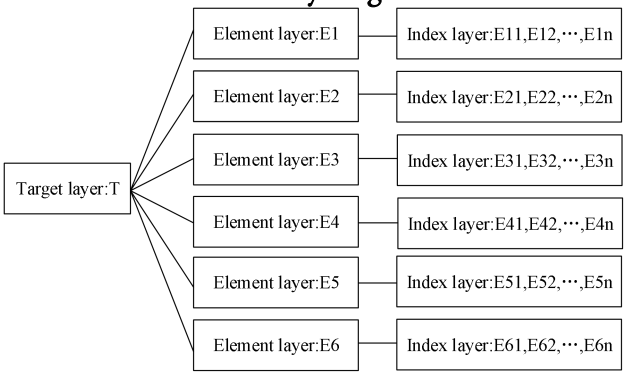
$$\left|T_A - T_{A-1}\right| < \eta \quad (4)$$

In formula (4), T_A and T_{A-1} represent the standard functions of the maximum iteration times A and the previous $A-1$, respectively; η represents a very small number. When the number of iterations meets the above conditions, the iteration reaches the maximum value, and the output result is the iteration termination result of the optimal number of clusters. By using the output results at the end of iteration, the clustering of teaching comprehension ability is completed, and the teaching ability of teachers is analyzed on this basis.

Calculate the Weight of Evaluation index of Teaching Comprehension Ability

After determining the evaluation index of English teaching comprehension ability, in order to make a scientific and comprehensive evaluation, it is necessary to empower the index. Whether the index is reasonable or not directly affects the conclusion of the analysis. In addition to determining the weight, but also for the index system to determine the evaluation level objectives, so that the index has the evaluation criteria and standards. Due to the different importance of each evaluation index to the overall evaluation goal, in order to evaluate effectively, it is necessary to give weight to each index. At present, there are many methods for index weighting, including subjective weighting method and objective weighting method [11]. Subjective weighting evaluation is mainly based on experts' experience to give weights, and then make a comprehensive evaluation of the indicators. It mainly uses qualitative methods, mainly relying on experts' experience and knowledge. At present, Delphi method and circular scoring method are widely used. Objective weighting evaluation is based on the coefficient of variation of indicators or the relationship between indicators to determine the weight of comprehensive evaluation, such as factor analysis, principal component analysis and other methods. Based on the analysis of existing research, it is found that the majority of people use analytic hierarchy process (AHP), which is a method combining objective with subjective [12]. In order to evaluate objectively and effectively as much as possible, this study uses analytic hierarchy process to give weight, and constructs the hierarchical structure as shown in Figure 1.

Figure 1.
Hierarchy diagram



According to several steps of analytic hierarchy process, the index is weighted. The specific steps are as follows:

The first step is to determine the evaluation objectives and establish the evaluation hierarchy. Analytic hierarchy process includes three levels: target level, element level and index level.

The second step is to construct the judgment matrix. In the hierarchical structure analysis, the consistent matrix method is used to compare the importance of each factor at the same level with respect to a certain factor at the upper level, which reduces the difficulties caused by factors with different properties when comparing with each other [13]. The matrix formed by pairwise comparison results becomes the judgment matrix. Suppose α is the comparison result of the importance of element 1 and element 2, and β is the comparison result of the importance of element 2 and element 1, then the judgment matrix has the following properties:

$$\alpha = \frac{1}{\beta} \quad (5)$$

The third step is hierarchical single sort. The so-called single level ranking refers to the ranking of the importance degree of each element in this level for a certain element in the upper level [14]. First, each column of the judgment matrix is normalized, then the sum is obtained by row, and then the vector is normalized to calculate the maximum eigenvalue, and the importance weight of each factor in the same layer relative to a factor in the previous layer is obtained.

The fourth step is consistency test. The consistency test of the judgment matrix is to determine whether the judgment matrix of the expert group is acceptable. Only when the judgment matrix meets the consistency requirements, the subsequent weight calculation can be carried out. The calculation formula of consistency index of judgment matrix is as follows:

$$p = \frac{\eta_{\max} - s}{s - 1} \quad (6)$$

In formula (6), p is the consistency index of judgment matrix; $\eta_{\max}$ is the largest eigenvalue; s is the order of the uniform matrix. According to the consistency index of judgment matrix, the consistency ratio is calculated. The formula is as follows:

$$q = \frac{p}{u} \quad (7)$$

In formula (7), q is the consistency ratio; u is the random consistency index, which is related to the order of the judgment matrix. When the consistency ratio is less than 0.1, the judgment matrix passes the consistency test; When the consistency ratio is greater than 0.1, it means that the judgment matrix cannot pass the consistency test, and the index weight needs to be investigated again.

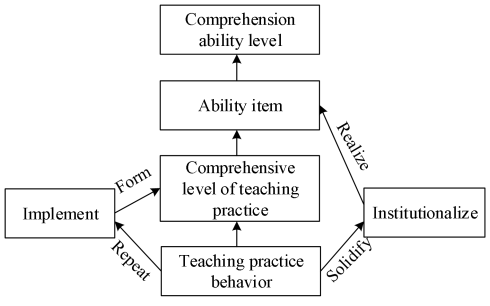
The fifth step is to establish the index weight. After passing the consistency test, it is necessary to sort all elements in a hierarchy, which means to calculate the weight value of the relative importance of all elements in a certain hierarchy to the target layer. This process is carried out from the target layer, element layer and index layer in order to get the weight of the whole decision-making problem. The sum of the weight values of all elements in the index scheme layer and the element layer is equal to 1 [15]. Therefore, based on the evaluation index system constructed above, the weight of the index system is determined, and the evaluation grade objective is determined through theoretical combing. Finally, a complete evaluation index system of English teaching comprehension ability is formed.

Constructing the Evaluation Model of Teaching Comprehension Ability

On the basis of selecting the evaluation index and determining the index weight, the evaluation model of teaching comprehension ability is established. The construction process of the evaluation model includes two steps: structure design and scale formulation. The basic structure of the evaluation model defines the constituent elements and the relationship between them, reflecting the core idea of establishing the model. The evaluation model of teaching comprehension ability in this study is based on the ability framework. Based on the basic requirements of capability assessment, three elements of the assessment model are firstly extracted: capability item, capability level and comprehensive level. The ability item is the ability task of the evaluation model, and it is the precondition to transfer the comprehension ability.

Comprehension ability is a gradual step, which is constantly improved in teaching practice. At the same time, capability is the precondition to produce one or more practice levels, or the comprehensive level of practice [16]. In this study, each ability item is composed of selected evaluation indexes. Comprehensive level is the general name of teaching activity performance and efficiency, and it is the behavior performance of teaching comprehension ability. The resource advantage and ability advantage of English teaching are ultimately reflected in the comprehensive level. By analyzing the comprehensive level of teaching practice, we can evaluate their comprehension ability. It must be recognized that the comprehensive level of English teaching practice is dynamic. After a period of time, the development of comprehension ability will form a new comprehensive level of practice [17]. The level of ability describes the development level of comprehension ability, and also means that the new comprehension ability covers the previous level of teaching practice. When the practice of teaching is repeated to form the comprehension ability, the comprehensive ability of the whole English teaching is improved. The actual performance of each competence means that English teaching exists or meets certain comprehension ability requirements [18]. The concrete teaching practice behavior means the practice state with the ability of comprehension, and the comprehensive effect of multiple abilities results in some ability level. The relationship between the three elements is shown in Figure 2.

Figure 2.
Structure of comprehension ability evaluation model



As shown in Figure 2, the time behavior of English teaching is the cause of the comprehensive level, and practical behavior is also the concrete expression of comprehension ability. When the teaching practice is repeated, it helps to help English teaching form a stable level. If these practical behaviors can be internalized through institutionalized behaviors, they can be transformed into teaching comprehension ability. Combining with the development rules and characteristics of English teaching, comprehension ability is divided into four levels: initial, forming, optimizing and leading. The initial level English teaching is limited to the existing or controllable resources, showing less characteristics and elements, and the comprehension ability is still in an unstable stage [19]. Formative level can accurately grasp the characteristics of English teaching, according to the standard system smooth implementation, can ensure a certain comprehension ability. The optimization level pays attention to the diversified needs of teaching practice and the matching degree of teaching elements and content in the optimization process. English teaching at the leading level can creatively apply methods and tools to highlight professional self-cultivation, and the personalized development of teaching can be realized with the support of data, which can meet the diversified needs of English teaching development [20,21]. According to the requirements and grades of ability items, the evaluation scale is established to accurately express the performance of each ability. Evaluation scale is the core content of evaluation model. The evaluation points in each ability item reflect the core requirements of the ability item, that is, the requirements of representativeness and criticality, not all of them. The purpose of selecting only part of the evaluation points is to control the scale of the scale and avoid reducing its availability due to too much complexity. Based on the above process, the evaluation model of English teaching comprehension ability is designed.

EXPERIMENT

This paper constructs an evaluation model of college English teaching comprehension ability from a cross-cultural perspective, and makes a comparative experiment with the existing models to test the effectiveness of the model.

Experimental Preparation

The experiment takes 10 English teachers in colleges and universities as the research object, and the number of English teachers in each school is shown in Table 1.

Table 1.
Data sheet of college English teachers

School serial number	Number of teachers	School serial number	Number of teachers
1	15	6	18
2	16	7	19
3	20	8	23
4	19	9	22
5	22	10	20

According to the teaching comprehension ability of different clusters, the influence strength of the comprehension ability index is further analyzed, and the weight of each evaluation index cluster is determined. The weight assignment results are shown in Table 2.

Table 2.
Index weight table of teaching comprehension ability

Serial number	Evaluation index clustering	Weight assignment
1	Professional foundation	0.2643
2	Teaching plan	0.1878
3	Curriculum development	0.1186
4	Teaching implementation	0.1845
5	Teaching evaluation	0.1142
6	Self-examination	0.1306

At this point, the model construction on the experimental analysis platform is completed, and the performance of the model is further analyzed.

Teaching Comprehension Evaluation Effect Test

In order to analyze the advantages of the evaluation model of English teaching comprehension ability based on the cross-cultural perspective, this paper compares with the existing evaluation models, and calculates the evaluation accuracy of English teachers' teaching comprehension ability in each school. The precision of the model can be measured by precision and recall. The accuracy rate represents the proportion of the positive cases in the model. The calculation formula is as follows:

$$P_1 = \frac{X}{X+Y} \quad (8)$$

In formula (8), P_1 is the accuracy rate; X and Y are the number of positive cases and negative cases respectively. Recall rate refers to the proportion of positive cases in the data that should be judged as positive cases. The calculation formula is as follows:

$$P_2 = \frac{X}{X+Z} \quad (9)$$

In formula (9), P_2 is the recall rate; Z is the number of positive cases determined to be negative. Because the results of precision rate and recall rate may be contradictory, F value is introduced to adjust them. The calculation formula of F value is as follows:

$$F = \frac{\left(\delta^2+1\right)P_1P_2}{\left(\delta^2P_1\right)+P_2} \quad (10)$$

In formula (10), δ is the adjustment coefficient. Generally, the value of δ is 1. In this case, the attention to accuracy and recall is the same. That is to say, the larger the $F1$ value is, the more effective the model is. The test results of different models are shown in Table 3-5.

Table 3.
Comparison results of model accuracy rate

School serial number	Model accuracy rate (%)		
	Designed model	Existing model 1	Existing model 2
1	75.2	70.4	66.3
2	77.8	71.3	68.4
3	76.4	70.5	67.5
4	77.2	69.4	66.4
5	76.5	70.7	67.6
6	75.8	71.5	66.3
7	75.6	70.8	68.2
8	7601	70.2	68.4
9	75.7	71.6	67.7
10	77.2	69.2	68.6

Table 4.
Comparison results of model accuracy rate

School serial number	Model recall rate (%)		
	Designed model	Existing model 1	Existing model 2
1	86.3	78.3	76.4
2	85.2	79.6	76.6
3	84.4	78.5	75.4
4	86.5	77.9	77.3
5	85.6	79.8	76.8
6	85.4	78.7	74.2
7	86.5	79.5	73.5
8	84.8	78.6	74.9
9	86.7	79.2	75.4
10	84.6	80.1	76.2

Table 5.
Comparison results of model F1 values

School serial number	Model F1 value		
	Designed	Existing	Existing

	model	model 1	model 2
1	80.37	74.14	70.99
2	81.33	75.22	72.27
3	80.20	74.29	71.23
4	81.59	73.40	71.44
5	80.79	74.97	71.91
6	80.31	74.93	70.03
7	80.68	74.90	70.75
8	80.21	74.16	71.50
9	80.83	75.21	71.34
10	80.73	74.25	72.20

According to the test results in Table 3, the average accuracy of the design model is 76.4, and the average accuracy of the existing model is 70.6% and 67.5%. According to the test results in Table 4, the average recall rate of the design model is 85.6, and the average recall rate of the existing model is 79.0% and 75.7%. The above results show that the model has certain advantages in accuracy and recall. According to the test results in Table 5, the F1 value of this design model is 80.70, and that of the existing model is 74.55 and 71.37. The F1 value of this design model is 6.15 and 9.33 higher than that of the existing model, which proves that the output result of this model has higher precision, better quality, and the evaluation result has been improved.

CONCLUSION

This study constructs an evaluation model of college English teaching comprehension ability from a cross-cultural perspective. The experimental results show that the model can effectively improve the evaluation accuracy and has good application effect. There are still some shortcomings in this study. In the future, we can establish a dynamic multi-dimensional comprehensive evaluation system based on the applied data of English teaching, so as to make the evaluation results more scientific and universal.

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