

# Investigation on the Ecological and Mixed College English Teaching Model from the Cross-cultural Perspective

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**Abstract:** *At present, how to guide the combination of traditional teaching and information technology and create personalized teaching has become an important topic to promote the transformation of college English from traditional to modern. In formulating individualized teaching, the English teaching model from the cross-cultural perspective is particularly important. From a cross-cultural perspective, the mixed English teaching model is worth learning. Based on the data mining of ecological mixed English teaching, the design and experimental analysis of mixed English teaching mode are optimized. The results showed that the students' learning ability was improved after the mixed teaching. In terms of pre-class learning, the teachers' evaluation of students before the experiment accounted for 16%, 22%, 20% and 42% of excellent, good, pass and fail students, respectively. After the experiment, the proportion of each evaluation changed to 28%, 22%, 15% and 13%. This showed that the mixed teaching model was of great significance to English teaching.*

**Keywords:** *English Teaching Mode, Ecological Teaching, Ecology Management, Optimal Design*

## 1. Introduction

At present, English classes are mainly taught in the form of textbooks and teachers' lectures. However, with the constant changes of technology and ecology management, English teaching has been innovated from different perspectives, and customized teaching needs have emerged. Hybrid teaching based on English network teaching platform has become a beneficial supplement. Mixed teaching is the combination of classroom teaching and network teaching by using multimedia and network teaching methods. Under this teaching mode, teachers can effectively investigate students' English learning and find students' problems in the learning process, so as to provide timely guidance to students and play the role of teachers in the teaching process. Based on teaching practice, under the guidance of ecological learning theory, this paper explored the mixed teaching mode, which effectively solved the problems that it is difficult for students to integrate into the learning atmosphere when learning. It applied the mixed teaching mode to actual teaching, which effectively improved students' comprehensive English application ability.

Mixed English teaching can optimize English teaching mode to a large extent and improve students' learning efficiency, so many people have studied it. Through the research on blended learning, Albiladi Waheeb S believed that blended learning could effectively improve the English learning environment [1]. Milthorpe, Naomi used online and mobile technologies in mixed English teaching to promote deeper academic exploration [2]. Hockly Nicky proposed that blended learning was applied to English teaching very early, which referred to the teaching mode that combined teaching with computer technology [3]. Quvanch Ziauddin believed that blended learning would had an impact on the process of English writing, and explored its specific impact process through experiments [4]. Sun Zhinong believed that blended learning was ubiquitous in English teaching and conducted a case study on its effectiveness [5]. Wang Chunying showed that blended learning could promote oral and listening learning by studying students' performance in oral English and listening [6]. These researches have all explained the mixed teaching of English, but there are few researches on ecological teaching from the perspective of cross culture.

Ecological English mixed teaching is also crucial to English education. In this regard, the following scholars have studied the ecological English mixed teaching model. Guo Xiaozheng explored the ecological teaching mode through ecological analysis of the collected data [7]. Chen Xiaojing put

forward the strategy of building a harmonious ecological classroom by analyzing the current ecological imbalance between college English and oral English classrooms [8]. Although these studies have analyzed the ecological English teaching model from many aspects, there are still some deficiencies.

This paper analyzed English teaching from the perspective of cross culture through data mining, and optimizes blended teaching on this basis. 92% of the students thought that it was easier to understand knowledge points through this teaching mode; 96% of the students thought they could have more opportunities to learn English. At the same time, the students' learning ability was also improved after the mixed teaching.

## 2. Evaluation of English Teaching from the Perspective of Cross Culture

### 2.1 College English Ecological Course

The theory of "ecology" is often applied in the teaching field. With the improvement of this theory, people put forward the concept of "higher education ecology" [9]. The ecological curriculum has its compatible characteristics by introducing the concept of ecology. In this perspective, this kind of curriculum system can meet the needs of all students, and students can freely choose their own curriculum system according to their own level. At the same time, they can combine multiple courses to find their own learning methods. In ecological theory, the setting and development of English courses are affected by various elements in the classroom [10].

From the perspective of ecology, English classroom belongs to an ecological organic system. Among them, both teachers and students are ecological subjects and interact with the ecological environment (teaching environment). Under this mode, the whole classroom can develop dynamically [11]. Nowadays, in order to promote students' individual language ability, ecological English teaching has been vigorously developed. The ecological English teaching model is shown in Figure 1.

The ecological English teaching model is mainly divided into five parts, namely, theoretical basis, teaching objectives, realization conditions, teaching environment and teaching evaluation. Its theoretical basis is to let students have the learning concept of perception, interpretation and action, so that they can enter a sustainable learning environment; the teaching objectives include improving students' mastery of vocabulary and sentence pattern knowledge and improving students' thinking ability; the realization conditions specifically include the design of teaching subject, content, method and management; the teaching evaluation can score the students' learning status from individual evaluation and team evaluation [12].

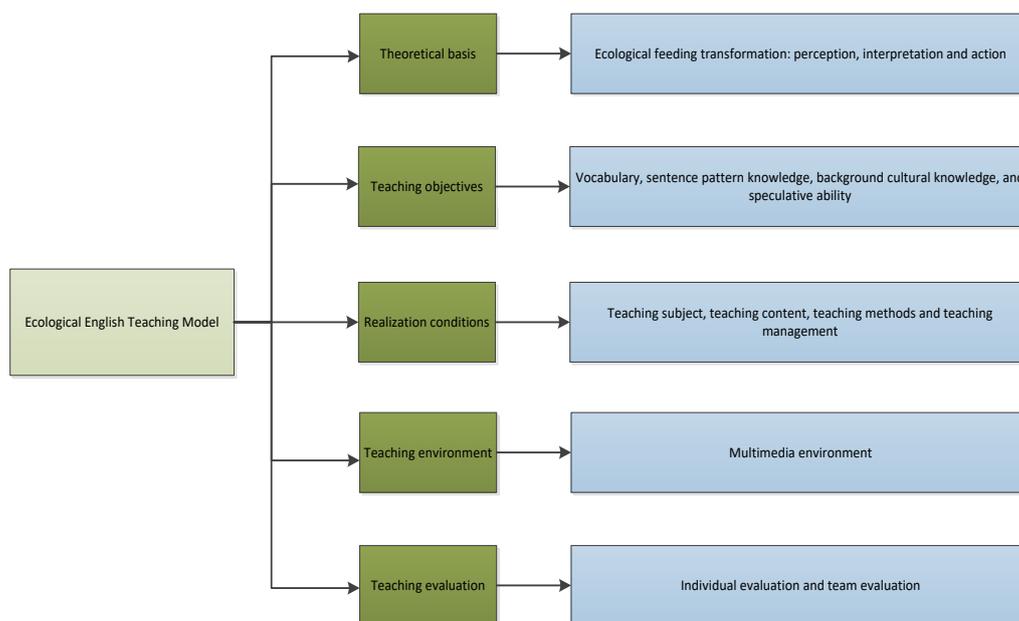


Figure 1: Ecological English teaching mode

## 2.2 Mixed English teaching from a cross-cultural perspective

Cultural differences are an important factor that cannot be ignored in language learning. Learners from different cultural backgrounds have differences in language expression, thinking styles, values, etc. These differences directly affect the effect and efficiency of language learning [13]. Therefore, in English teaching, teachers need to fully understand and respect the characteristics of learners in different cultural backgrounds, so as to help students cross cultural barriers and better master and use English. Cross-cultural communication skills are an essential ability for English learners. By cultivating students' awareness of cross-cultural communication and improving their cross-cultural communication skills, students can better adapt to the multicultural environment and achieve effective communication [14]. In teaching, teachers should pay attention to cultivating students' cross-cultural sensitivity, guide students to understand and respect different cultures, and learn to use appropriate communication strategies and language expressions.

The hybrid teaching model is a teaching method that combines traditional classroom teaching with online teaching. It makes full use of the advantages of modern information technology to realize the sharing and optimized allocation of teaching resources. At the same time, in this model, teacher-student interaction is promoted [15]. In mixed English teaching from a cross-cultural perspective, teachers can use online platforms to provide students with rich and diverse learning resources and practical opportunities for cross-cultural communication, while combining classroom teaching and discussion to promote students' in-depth understanding of English and culture. In mixed English teaching, the selection of course content and the integration of resources are essential. Teachers should choose representative and practical cross-cultural communication content based on the actual needs and interests of students, and integrate it with online resources and traditional teaching materials. At the same time, teachers should also pay attention to the adaptability of teaching content in different cultural contexts to ensure the cross-cultural and inclusive nature of curriculum content. Unlike the basic mixed learning model, the mixed learning model from a cross-cultural perspective requires students to learn on the spot. After receiving theoretical knowledge, students need to strengthen their impressions through field experience to improve their mastery of English. In the evaluation link, the model of mutual evaluation between teachers and students is implemented. While checking the degree of hard work and progress of students, teachers' teaching models are scored through fair and objective evaluation to promote mutual progress [16].

## 3. Construction of Mixed English Teaching Mode

### 3.1 Data Mining

Data mining technology has certain research significance for English online learning platform, teaching quality and course analysis management [17]. When conducting online English teaching, the input learning data can be classified through data mining, and relevant research can be conducted according to the classification results. At the same time, on this basis, a data model is established, the relationship between various elements of English teaching is explored to search the simplest learning platform model. In terms of teaching quality, there are many factors that affect students' learning state. Therefore, it is necessary to mine and analyze these factors, rank them according to the importance of each influencing factor, and make targeted improvements according to the ranking results. Therefore, the application of data mining can facilitate the construction of English teaching model.

Data mining can process a large amount of data. In the process of processing, hidden information can be mined through relevant algorithms. The information mined is effective for testing data and easy to understand [18]. In general, data mining would further process data sets and train models after exploring the correlation between various information. The process specifically includes six steps, as shown in Figure 2.

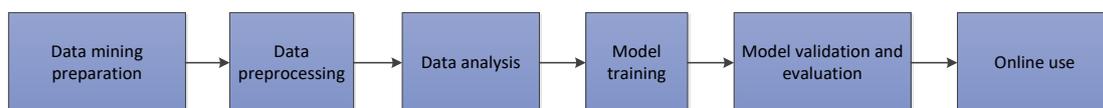


Figure 2: Data mining process

In the preparation stage, the mining target is initially defined, and the experimental data is collected to make relevant records. Next, it needs to preprocess the data, and process and integrate the

incomplete data through the data preprocessing technology. After data preprocessing, the completed data is analyzed and model is trained. Finally, the final results are analyzed, evaluated and verified. The above process is usually analyzed using a logical regression model, which can only be used online if the verification effect meets the target requirements [19].

The linear regression model is analyzed and the general form of the linear regression model is as follows:

$$h(x) = a_0x_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n \tag{1}$$

It is expressed as a vector:

$$h(x) = a^T x \tag{2}$$

The data obtained by linear regression is put into the activation function (Sigmoid function) to get the decimal between (0,1). When the value is greater than the initial threshold value, the value is positive, otherwise it is negative. The formula is as follows:

$$g(z) = \frac{1}{1+e^{-ax}} \tag{3}$$

Among them,  $a$  is the parameter of the model, which is the output result after the model training.  $x$  represents the input sample point, and the image of the Sigmoid function is shown in Figure 3.

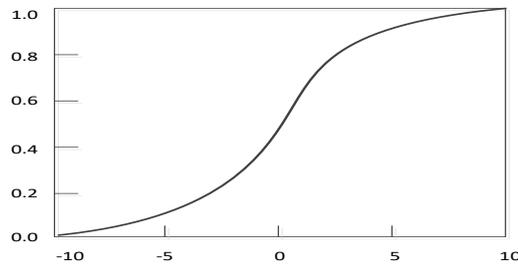


Figure 3: Sigmoid function image

Model training is conducted for the data. It is assumed that there are  $m$  samples;  $p(y_i = 1|x_i)$  represents the probability of occurrence of normal class;  $1 - p(y_i = 1|x_i)$  represents the probability of occurrence of negative class, so the posterior probability of each sample is as follows:

$$p(y|x, a) = p(y_i = 1|x_i)^{y_i} (1 - p(y_i = 1|x_i))^{1-y_i} \tag{4}$$

The maximum likelihood function of the sample is as follows:

$$L(a) = \prod_{i=1}^m p(y_i = 1|x_i)^{y_i} (1 - p(y_i = 1|x_i))^{1-y_i} \tag{5}$$

The log likelihood function is as follows:

$$l(a) = \sum_{i=1}^m \log p(y_i = 1|x_i)^{y_i} + \log(1 - p(y_i = 1|x_i))^{1-y_i} \tag{6}$$

$a$  is derived as follows:

$$\frac{\partial l(a)}{\partial a} = \sum_{i=1}^m (y_i - g(z)) x_i \tag{7}$$

In order to minimize the loss function and minimize the error of the model, a penalty term on  $a$  can be added to the logarithmic likelihood function  $l(a)$ . Through the derivation of the objective function, it is concluded that the direction of the derivative is the direction of the gradient [20]. The direction of gradient descent is the optimal value of the function. Therefore, when the batch echelon descends and each parameter is updated, all training samples would participate in the calculation.

### 3.2 Construction of the Mixed English Teaching Model

Mixed learning provides convenience for online and offline integrated teaching. In addition to offline teaching, teachers can use the online teaching platform to conduct online teaching and generate more learning interaction behaviors with students. In this regard, the preliminary model of the blended English teaching model designed in this study is shown in Figure 4.

The preliminary model of hybrid English teaching uses modern educational information technology to divide teaching into online and offline teaching modes. In online teaching, students have a variety of

learning methods. They can not only learn independently according to the teaching videos shared by teachers, but also choose the appropriate time to complete the learning progress according to their own learning methods. However, teachers must prepare enough teaching resources in advance. In offline teaching, students can divide groups, and strengthen the learning atmosphere in the classroom through group learning and the interaction while allowing students to discuss independently. Finally, teachers and students need to give feedback on teaching and learning experience and adjust the teaching mode according to the feedback.

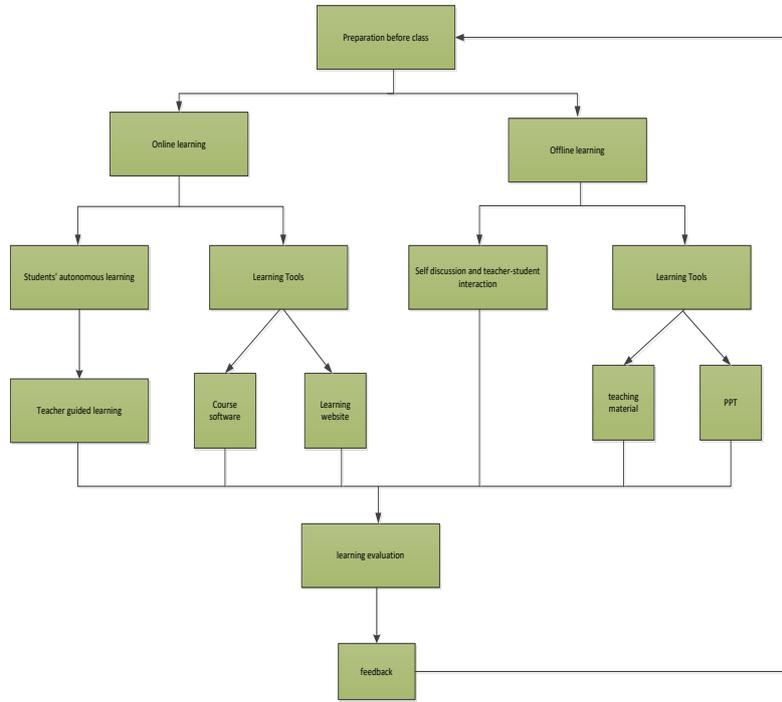


Figure 4: Preliminary model of blended English teaching

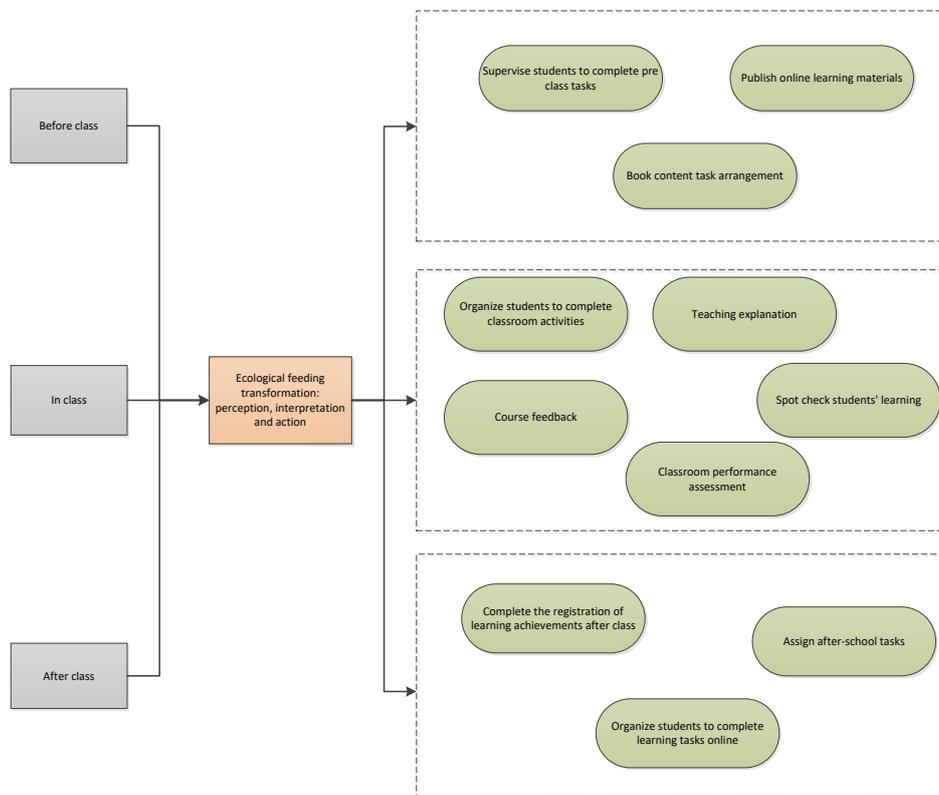


Figure 5: Mixed English teaching model

Ecological teaching has a great influence on the nature and effect of English teaching implementation, and directly affects whether the ecological subject can carry out teaching activities in English class smoothly. Therefore, in the process of adjusting the preliminary model of blended English teaching, ecological teaching should be combined. The adjusted teaching model is shown in Figure 5.

When designing the model, it needs to follow the ecological theoretical basis of "perception", "interpretation" and "action". In ecology, organisms can "perceive" the interaction between organisms and the environment to trigger the "action" cycle of "interpretation" and energy generation, thus forming an ecological cycle system. It is also applicable to the teaching environment of human organism. Teachers need to effectively guide students to have the above learning behaviors, so that students can enter a sustainable ecological cycle of autonomous learning.

#### 4. Experimental Evaluation of Blended College English Teaching

##### 4.1 Evaluation of the Current Situation of English Teaching

In order to better optimize the English teaching mode, it is necessary to analyze the students' learning situation under the mixed teaching mode. For this, this paper scores through a questionnaire survey. The results are shown in Table 1:

Table 1: Questionnaire on English teaching status

Question	Option	Percentage (%)
Whether the teacher adopts the mixed English teaching mode.	often	19
	occasionally	32
	never	49
Whether the teaching resources provided by teachers are sufficient.	very sufficient	12
	adequate	23
	moderate	19
	inadequate	46
Whether teachers often use multimedia teaching in class	often	44
	occasionally	42
	never	14
Whether to accept the mixed English teaching mode	strongly agree	57
	agree	21
	moderate	12
	disagree	10

It can be seen from Table 1 that 19% of teachers often use mixed teaching methods in daily teaching; 32% of teachers occasionally use it in teaching; 49% of teachers would not use it in teaching. It can be seen from this that at present, teachers have used the mixed teaching method relatively less often, and teachers still stay in explaining textbook knowledge. This kind of teaching method is relatively backward, and students can not extract enough interest to learn, which makes students' classroom participation not high. On the issue of teaching resources provided by teachers, according to the data results, 12% of the students think it is very sufficient, 23% think it is basically sufficient, and 46% think it can not meet the teaching requirements. It can be seen that students still cannot get enough teaching resources in the learning process, which is also one of the main reasons for students' difficulties in learning English. In the question of whether teachers would use multimedia technology in the classroom, 44% of teachers would often use it; 42% of teachers occasionally use it; only 14% never use multimedia technology for teaching. This shows that teachers can still accept the application of modern technology to traditional English teaching, but they do not know much about mixed teaching mode.

According to the analysis of students' attitudes towards the mixed English teaching model, 57% of the students agree with it very much and 21% basically agree with it; 10% of the students do not agree with this teaching mode. In this regard, most students still hope to learn through the blended English teaching model, which is of great significance to the promotion of this learning model.

According to the students' views on the English teaching model, the problems encountered by students in learning are investigated, and the results are shown in Figure 6.

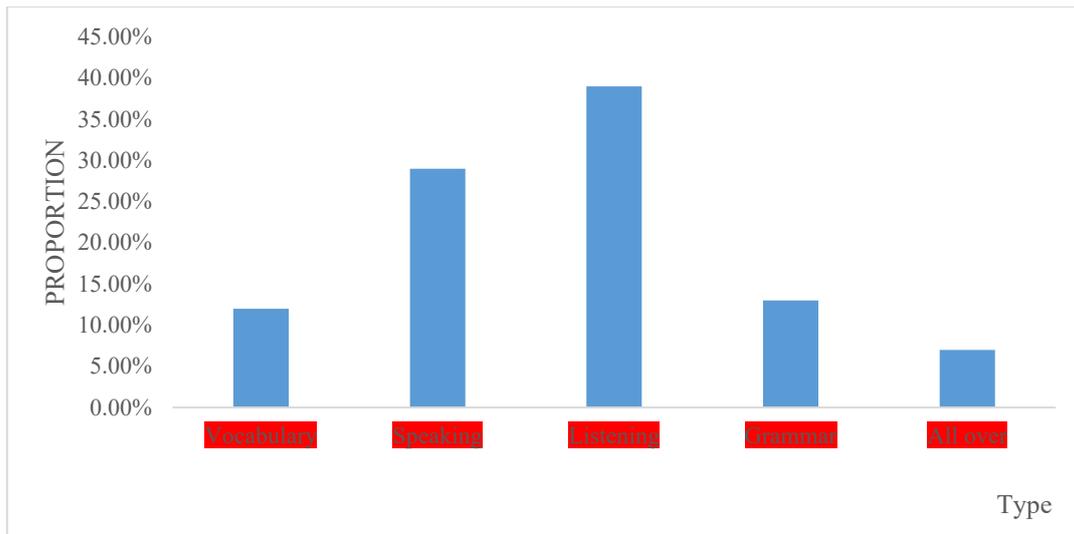


Figure 6: Students' problems in English learning

According to Figure 6, 29% of students encounter difficulties in learning English in oral expression, which is mainly due to lack of exercise. Students just stay in the study of theoretical knowledge, and they are afraid of hands and feet in real practice. On the other hand, teachers have not built a suitable oral practice environment, which makes it impossible for students to practice oral expression. 39% of the students think that listening learning is the most difficult, and there would be some deviation for listening learning. This is because the current English teaching is mainly in the form of Chinese teaching, and the students lack contact with listening. 13% of students believe that grammar learning is the most difficult part of English learning, and they cannot flexibly use grammar knowledge, so they have to turn to teachers when facing changing grammar knowledge. 12% of the students think that vocabulary learning is the most difficult in English learning. In the process of memorizing words, these students often mark the pronunciation of words, and the memory method of marking pronunciation will produce a great deviation in the memory of words, and cannot achieve a good memory effect. Finally, 7% of the students thought they had problems in oral expression, listening, grammar and words, which made them less interested in learning English.

#### 4.2 Effect Evaluation of Mixed Teaching

In order to reflect the influence of blended English teaching mode on students' learning effect, this paper conducts a more detailed investigation on the effect of blended English teaching. The results are shown in Table 2:

Table 2: Effect analysis of mixed teaching

Question	Options and Selected Scale			
	A	B	C	D
Enhance learning confidence	23	62	5	10
Knowledge points are easier to understand	24	68	8	0
More opportunities to learn English	52	44	4	0
Improve learning efficiency	19	57	13	11

The survey found that 85% of the students believe that mixed teaching can enhance their learning confidence, which can be concluded that mixed teaching is conducive to easing classroom pressure and enhancing students' learning confidence. According to the hybrid teaching model, students can choose to complete the course tasks by autonomous learning, or interact with classmates and teachers to obtain more online learning resources. In the course of learning, students can discuss and assign tasks by themselves according to the group to complete the teaching tasks. In addition, 92% of the students think that it is easier to understand knowledge points through mixed teaching mode; 96% of the students think they can have more opportunities to learn English; however, in terms of improving learning efficiency, the proportion of students with favorable attitudes declines, which is only 76%.

#### 4.3 Evaluation of the Adaptability of Various English Question Types under Mixed Teaching

According to the analysis of students' adaptability to each type of questions, the effect of mixed teaching on each type of questions can be better understood. On this basis, targeted teaching is carried out for students and the analysis results are shown in Figure 7.

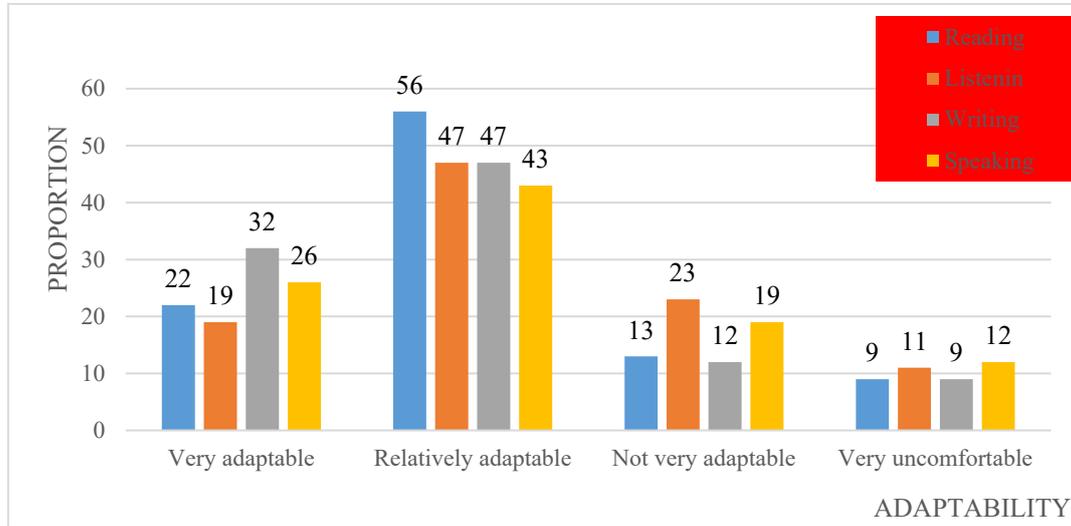


Figure 7: Student's adaptation to each question type

As shown in Figure 7, this article extracts the four indicators of very adaptable, relatively adaptable, not very adaptable, and very uncomfortable for experimental analysis. It can be found that in the mixed teaching mode, the highest proportion of very adaptable and relatively adaptable is the writing question type, the sum of the two accounts for 79%, and the proportion of very uncomfortable is also the least, at 9%. On the issue of reading, the proportion of students who are very adaptable and relatively adaptable is the second, with 78%, and the proportion who are very uncomfortable is also 9%. As for speaking, 69% of the students can adapt to it and the proportion of students who are very uncomfortable is 12%. The proportion of students with listening problems who are very adaptable and relatively adaptable is 66%, and the proportion of students who are very uncomfortable is 11%. Therefore, the mixed teaching model needs to optimize the teaching of listening and speaking problems.

#### 4.4 Evaluation of Changes in Learning Ability before and after Mixed Teaching

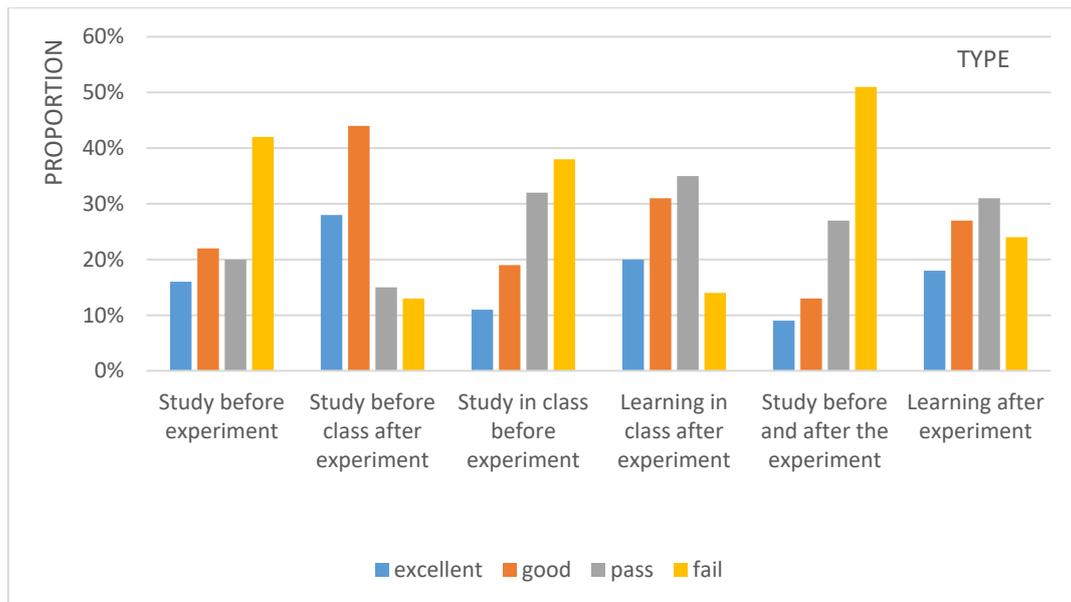


Figure 8: Teachers' assessment of students' learning ability changes

The effect of mixed teaching can be reflected by understanding the change of students' learning

ability before and after they are exposed to mixed teaching. Therefore, this paper conducts an experimental study on the change of students' learning ability from before class to during class and then to after class. The teacher gives them a score, and the evaluation results are shown in Figure 8:

According to Figure 8, students' learning ability is improved after exposure to mixed teaching. In terms of pre-class learning, the teachers' evaluation of students before the experiment account for 16%, 22%, 20% and 42% of excellent, good, pass and fail students, respectively. After the experiment, the proportion of each evaluation change to 28%, 44%, 15% and 13%. Similarly, in classroom learning and after class learning, teachers' evaluation of students after the experiment increases in the proportion of passing and above evaluations. It can be seen that the students' learning ability is improved through mixed English teaching.

## 5. Conclusions

Due to the changes in information technology and ecology management, ecological English teaching has been developed from a cross-cultural perspective. In this context, it is very important to optimize the hybrid English teaching model through data mining. Based on the traditional English teaching model, this paper analyzed its characteristics and shortcomings through data mining technology, and then optimized the hybrid English teaching model. Under the English teaching model from cross-cultural perspective, this study constructed a mixed English teaching model through logistic regression model. Finally, it came to an analysis of the current situation of English, the effect of mixed teaching, the adaptability of various English question types under mixed teaching, and the changes in learning ability before and after mixed teaching. Under the guidance of the mixed teaching mode, the teaching atmosphere in the English classroom would change significantly, and teachers' teaching forms would also become diverse. Students would gradually transform from passive learning to active learning, which effectively improves their English learning ability. Although the ecological mixed teaching mode from the cross-cultural perspective can effectively improve students' learning ability, it requires a high level of consciousness of students. Therefore, in the subsequent research, it is necessary to design appropriate supervision programs to comprehensively improve the teaching mode.

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