

Sustainable Development Model of Green Ecological College English Teaching from Perspective of Cross-Cultural Communication

Yan Li^{1,*}, Yi Luo², Xiaomin Deng¹

¹*School of Foreign Languages, Nanchong Vocational and Technical College, Nanchong, Sichuan, China*

²*Publicity Department, Nanchong Vocational and Technical College, Nanchong, Sichuan, China*

**Corresponding author*

Abstract: *With the increasingly frequent international economic exchanges and the increasing demand for English talents, colleges and universities have increasingly recognized the importance of cultivating students' awareness of cross-cultural communication and improving their practical ability. However, in English teaching, there are some problems in the traditional teaching mode, which cannot meet the needs of the society for English applied talents. Therefore, based on the perspective of cross-cultural communication, this paper explored the sustainable development model of green and ecological college English teaching, and put forward the construction strategies of ecological teaching model, such as building a multicultural and ecological teaching environment, establishing ecological teaching goals, etc. In this paper, the traditional teaching mode and ecological teaching mode were studied experimentally. The research showed that the ecological teaching mode can improve students' English learning efficiency by 2.98% and their oral English expression ability by 5.6%.*

Keywords: *Intercultural Communication; Green Ecological English Teaching Mode; Sustainability of Teaching; Oral English Speaking Skills*

1. Introduction

A good language foundation and strong cross-cultural communication skills are the basic abilities that contemporary college students should have. However, in the actual English teaching activities, schools only focus on the study of theoretical knowledge to cultivate students' English ability, ignoring the cultivation of students' cross-cultural communication practical ability. Green ecological teaching is a teaching mode that applies the principles and rules of ecology to the field of education to ensure the ecological balance of education and promote the sustainable development of teaching activities. Compared with traditional teaching, green ecological teaching can enhance students' practical ability to apply English knowledge, improve students' comprehensive quality, and cultivate students' independent thinking and innovation consciousness.

Green ecological English teaching not only respects students' teaching subject status, but also continuously optimizes their teaching details from the aspects of teacher-student relationship and teaching design. Many scholars have discussed and studied the teaching strategies and methods of green ecological English teaching. Zhang J has studied the ecological English teaching mode of the school from the perspective of ecology, and proposed specific English teaching methods such as personalized homework and group work [1]. Zhao N believed that traditional English teaching and modern educational technology were imbalanced in their integration and development, and explored the reasons for the imbalanced integration and development from the perspective of educational ecology [2]. Jing H U has constructed an ecological teaching mode of English continuous courses based on blended learning, and has proved through teaching practice that this mode can effectively improve teaching efficiency and promote the cultivation of students' English proficiency [3]. Zhu Y C has compared and analyzed the shortcomings of traditional English writing teaching and the advantages of the ecological model of linkage teaching, and proposed specific measures to build ecological English writing teaching [4]. Hu F has applied the concept of ecological linguistics to school English teaching. He believed that the ecological construction of English teaching can guarantee the quality of school English teaching and improve the ecological circle of sustainable development of school English teaching [5]. Yao X G discussed the green and ecological English teaching mode and concluded that the

ecological oriented college English classroom construction was conducive to stimulating classroom vitality and ensuring the sustainable development of teaching order [6]. Jia F explored the interrelationship among classroom subjects, teaching materials, teaching processes and teaching construction [7]. To sum up, green ecological English teaching can promote the improvement of teaching effect and is conducive to the sustainable development of English teaching activities.

The construction of intercultural communication English teaching mode is conducive to improving students' English communication ability, which has been studied by many scholars. Davitishvili N believed that intercultural communication teaching can help students overcome cultural barriers, and proposed some measures to build a cross-cultural communication teaching model [8]. Zhao H put forward some targeted suggestions on the current situation and problems of the cultivation of intercultural communication awareness in English teaching [9]. Xi W U, based on the background of the Belt and Road Initiative, has studied the cultivation of college students' intercultural communicative competence, and analyzed English teaching principles, English teaching objectives, English teaching contents and English teaching methods [10]. Yang D believed that the current students' English cultural competence failed to meet the needs of English cross-cultural communication. Based on this, he discussed the strategies for cultivating students' cross-cultural communication competence in school English teaching [11]. To sum up, intercultural communication English teaching is helpful to cultivate and improve students' English application ability. Therefore, based on the perspective of cross-cultural communication, this paper studies the green ecological English teaching model.

This paper summarizes the problems in English teaching and analyzes the theoretical basis of ecological teaching. This paper puts forward the construction strategy of English green ecological teaching mode, discusses the application of text feature extraction in ecological English teaching evaluation, and conducts an experimental study on traditional teaching mode and ecological teaching mode.

2. Problems in English Teaching

This paper analyzes the problems in English teaching, as shown in Figure 1. These problems include the imbalance between the ecological subjects of teaching and the teaching environment, the imbalance between the improvement of comprehensive quality and the requirements of test oriented teaching, and the imbalance between the ecological niche of teaching subjects.

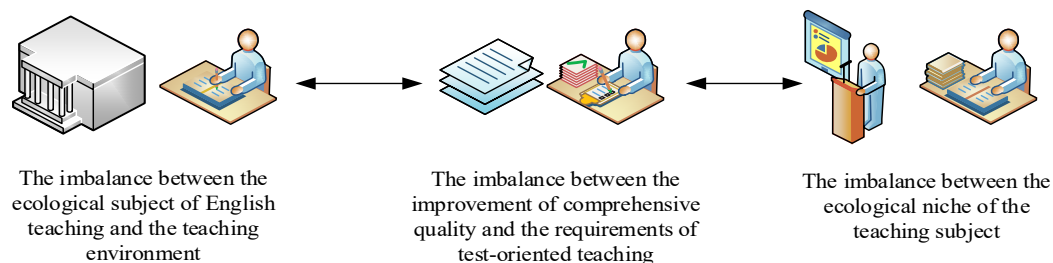


Figure 1: Analysis of the problems existing in English teaching

(1) The imbalance between the ecological subject of English teaching and the teaching environment

In real life, the number of students recruited by the school each year exceeds its own capacity, which makes English teachers basically teach in large classes, and the number of students in each class even exceeds 100. Faced with a large number of students, teachers cannot accurately understand the learning situation of each student in English classroom teaching activities, and students' classroom participation is insufficient. When students encounter problems, they cannot get feedback from teachers in time, which leads to the decline of classroom teaching quality [12]. In addition, some schools that lack teacher resources employ graduate students to teach. These graduate students may have a high level of knowledge and theory, but due to lack of teaching experience, they cannot create a good teaching atmosphere and stimulate students' enthusiasm for learning [13]. Therefore, schools should take appropriate measures to solve the imbalance between the ecological subject of English teaching and the teaching environment.

(2) The imbalance between all-round development and test oriented teaching requirements

At present, schools basically take examination results as the evaluation standard of English teaching

effect, and students' abilities are often assessed by the scores of several test papers and several grade certificates, but this way is not conducive to the comprehensive development of students [14]. The imbalance between the improvement of students' comprehensive quality and the requirements of exam oriented teaching has existed for a long time. If this phenomenon has not been effectively solved, it would make students more resistant to English learning and take a negative attitude to learn, making the teaching classroom boring, thus affecting the improvement of teaching quality.

(3) Unbalanced niche of teaching subject

From an ecological perspective, students should be the main part of teaching activities, and teachers should be the guides, organizers and objective evaluators of teaching activities [15]. In the actual English classroom teaching, teachers, as knowledge indoctrinators, often indoctrinate English knowledge directly to students. This "spoon feeding" teaching is not conducive to cultivating students' active learning awareness and learning ability, nor is it conducive to improving students' English learning quality. Teachers should get rid of the shackles of old teaching concepts, attach importance to the position of students in teaching activities, create a comfortable and orderly learning atmosphere, use flexible teaching strategies to improve students' enthusiasm for learning, and stimulate and cultivate students' autonomous learning ability.

3. Construction of Ecological Teaching Mode in Perspective of Cross-Cultural Communication

(1) The theoretical basis of ecological teaching construction

The theoretical basis for the construction of green ecological teaching mode is mainly educational ecological theory, which is a theory that applies some principles and principles of ecology to the field of education in order to grasp the laws of educational development and predict the trend and direction of educational development. The application of educational ecology theory in the ecological teaching mode of English can help teaching managers find problems in teaching activities, and enable teaching managers to coordinate the ecological balance between teaching subjects and teaching environment, as well as between teaching subjects [16].

(2) Strategies of constructing ecological teaching

Based on the perspective of cross-cultural communication, this paper proposes some strategies for the construction of ecological teaching mode, as shown in Figure 2. It includes five aspects: building a multicultural and ecological teaching environment, establishing ecological teaching objectives, selecting appropriate ecological teaching content, establishing a reasonable ecological teaching evaluation mechanism, and improving teachers' comprehensive quality.

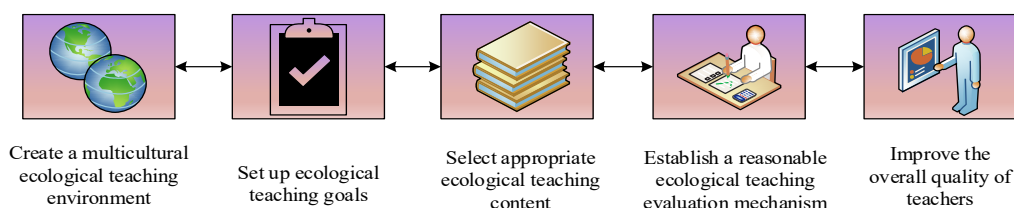


Figure 2: Strategies for ecological teaching construction

1) Creating a Multicultural and Ecological Teaching Environment

Teachers can use multimedia technology to broadcast English movies, English radio programs and other ways to carry out classroom teaching, and conduct teaching guidance and problem feedback in the teaching process, so as to create a modern, diversified and ecological learning environment for students. The establishment of this kind of teaching environment can make students understand English culture better, make students feel the charm of English culture, and increase the motivation of students' sustainable learning. Teachers can also use English to explain in the teaching process, cultivate students' language sense and context, and improve students' English listening level and oral communication level [17]. Of course, when teaching in English, teachers also need to take into account the knowledge level of students to avoid affecting the teaching effect.

2) Setting up ecological teaching objectives

The establishment of clear, feasible and strong teaching objectives is conducive to making English teaching more dynamic. The main goal of college English teaching should be to improve students'

comprehensive English application ability. Teachers can set corresponding sub goals in some aspects in order to achieve this main goal efficiently and effectively. Teachers can use hierarchical teaching to teach, and set personalized goals for students according to their English learning ability and learning level, as shown in Figure 3. For students with strong learning ability and high mastery of knowledge and skills, teachers should set learning objectives in terms of cultivating English creativity and critical thinking [18]. For students with weak learning ability and low mastery of knowledge and skills, teachers should mainly set goals for learning basic English knowledge, English grammar and pronunciation rules. The layered teaching method can enable students at different levels to make progress compared with the original, which is beneficial to cultivate students' learning self-confidence and promote the sustainable development of English teaching.

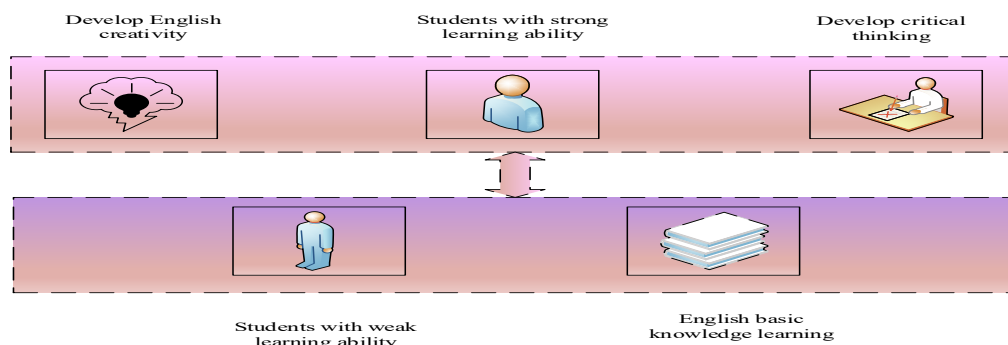


Figure 3: Setting ecological teaching goals

3) Choose appropriate ecological teaching content

The proper choice of English teaching content can effectively improve students' theoretical level and practical ability. The appropriate teaching content is basic, professional, communicative and interesting, as shown in Figure 4. Fundamentality refers to that students can improve basic English knowledge through teaching content, so as to lay a foundation for advanced knowledge learning. Professionalism means that the teaching content can reflect the characteristics of current English disciplines and majors, enabling students to learn professional English vocabulary. Communicative means that the teaching content should reflect the differences between national cultures in the context of cross-cultural communication. Interestingness means that the teaching content should be able to attract students' attention and make them feel the interest of English learning.

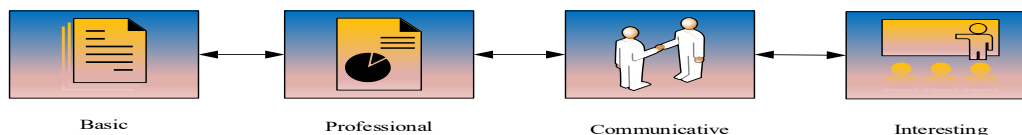


Figure 4: Select the appropriate ecological teaching content

4) Establishing a reasonable ecological teaching evaluation mechanism

Scientific and reasonable evaluation of students' learning and teachers' teaching would help improve students' learning initiative and teachers' teaching initiative, and promote the sustainable development of teaching activities. Therefore, schools should establish a reasonable ecological teaching evaluation mechanism. When evaluating teachers' teaching work, one should not only pay attention to the evaluation given by other teachers, teaching supervision evaluation, teachers' self-evaluation, but also pay attention to the evaluation of students. When evaluating the learning effect of students, in addition to evaluating their theoretical knowledge level, they should also evaluate their practical application ability. It is necessary to evaluate many factors in the teaching process, such as teaching subjects, teachers' teaching methods, school teaching environment, school teaching management, based on the overall perspective, and cannot be limited to one aspect [19].

5) Improve teachers' comprehensive quality

Schools should regularly assess the qualifications of English teachers, including not only teachers' teaching ability, but also teachers' teaching philosophy. For teachers with poor teaching ability, schools should strengthen training to improve their teaching level. For teachers whose teaching ideas are backward, schools should help them break away from the shackles of traditional teaching ideas, so that they can keep up with the times. After the qualification assessment, the school should reward teachers

with strong teaching ability and advanced teaching philosophy, so as to give play to the exemplary role of such teachers [20].

4. Application of Text Feature Extraction in Ecological English Teaching Evaluation

Based on the concept of green ecological English teaching evaluation, this paper studies students' evaluation of teaching quality. As the main body of teaching activities, students' evaluation is an important reference for school reform. Based on the perspective of school administrators, school administrators would summarize and analyze the evaluation of students, which would help them find the problems and deficiencies in teaching management. From the perspective of teachers, teachers can improve teaching methods by watching students' evaluation.

The text about the evaluation of students' teaching quality is extracted with features, and the information gain is used to select the features of the text for students' evaluation. The basis of information gain is entropy in information theory. Set variable $M = (m_1, m_2, \dots, m_p, \dots, m_n)$, the probability of variable m_p is $i(m_p)$, and the calculation formula of entropy is:

$$L(M) = - \sum_{p=1}^n i(m_p) \log i(m_p) \quad (1)$$

The category of text evaluated by students is regarded as a variable $D = (d_1, d_2, d_p, \dots, d_n)$, and the entropy of text classification system evaluated by students is:

$$L(D) = - \sum_{p=1}^n i(d_p) \log i(d_p) \quad (2)$$

It is set that the student evaluation text has the feature S, and the feature S has x values, which are $(s_1, s_2, \dots, s_q, \dots, s_x)$ respectively. Based on the feature S, the student evaluation text classification system is divided. After the division, the entropy of the system is:

$$L(D|S) = \sum_{p=1}^n \sum_{q=1}^x i(d_p, s_q) \log i \frac{i(s_q)}{i(d_p, s_q)} \quad (3)$$

Among them, $i(d_p, s_q)$ is the frequency when the evaluation text category D is d_p , and the evaluation text feature S is s_q .

The information gain of the text system on the evaluation of students' teaching quality is:

$$PG(D, S) = L(D) - L(D|S) \quad (4)$$

The word frequency reverse file frequency weighting method is used to weight the features in the text that students evaluate. Word frequency refers to the frequency of a word that students evaluate the teaching quality in the text, and its calculation formula is:

$$tf_{pq} = \frac{w_{pq}}{\sum_{\kappa} w_{\kappa q}} \quad (5)$$

The reverse file frequency of the word refers to the frequency of the word in the evaluation corpus. Set the word as s_p , and the calculation method is as follows:

$$idf_p = \log \frac{|E|}{|\{q : s_p \in d_p\}| + 1} \quad (6)$$

Among them, $|E|$ is the total number of evaluation texts in the student evaluation corpus, and $|\{q : s_p \in d_p\}|$ is the number of evaluation texts containing the evaluation words s_p .

After obtaining the word frequency and reverse file frequency of the evaluation word s_p , calculate its word frequency reverse file frequency. The calculation method is as follows:

$$tfidf_{pq} = tf_{pq} \cdot idf_p \quad (7)$$

5. Experimental Research on Sustainable Development Model of Green Ecological Teaching

In this paper, 102 students with similar English learning ability and academic level were selected and randomly divided into two classes, with 51 students assigned to each class. One class still uses the traditional English teaching mode for teaching activities, and calls this class Class T. Another class uses the sustainable development model of green ecological teaching to carry out English teaching activities, and calls this class Class G. From five aspects of students' learning initiative, students' learning efficiency, students' oral expression ability, students' written examination results, and students' evaluation of the teaching model, a five month teaching research was conducted on the students of the two classes. English teaching under the two teaching modes is described below.

(1) Students' initiative in English learning

Students' initiative in English learning affects their learning efficiency and time invested in learning, and indirectly affects their own academic level. Through observation and investigation of students' performance in and out of the classroom, students' initiative degree index on English learning is obtained. The value range of the initiative degree index is 1-100. The specific results are shown in Figure 5.



Figure 5: Students' initiative in learning English

As shown in Figure 5, on the whole, the learning initiative index of students in Class G is higher than that of students in Class T. Based on specific data, the learning initiative index of students in Class T in the first month was 82.43, and that of students in Class G in the first month was 87.05. The learning initiative index of students in Class G in the first month is 4.62 higher than that of students in Class T in the first month. It shows that compared with the traditional teaching mode, the ecological teaching mode is more effective in stimulating students' English learning initiative, which is reflected in the first month. The average learning initiative index of students in Class T is 83.09, and the average learning initiative index of students in Class G is 88.07. The average learning initiative index of students in Class G is 4.98 higher than that of students in Class T, with an increase rate of 5.99%.

(2) English learning efficiency of students

This paper follows up the specific learning situation of students. By using classroom observation and interviews, this paper obtains the learning efficiency index of students in Class T and Class G. The value range of the learning efficiency index is 1% - 100%. The results are shown in Figure 6.

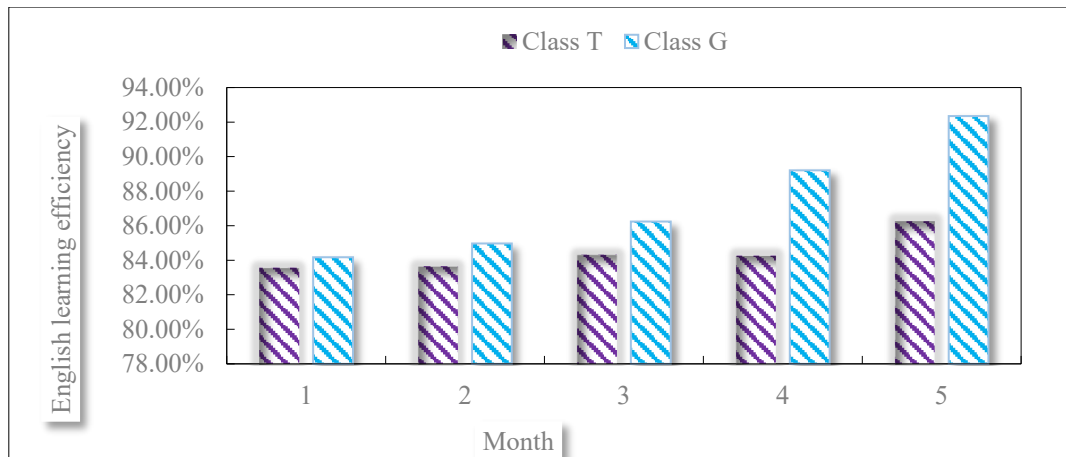


Figure 6: Students' English learning efficiency

As shown in Figure 6, the English learning efficiency of students in Class T in the fifth month is 86.26%, and that of students in Class G in the fifth month is 92.35%. The English learning efficiency of students in Class G is 6.09% higher than that of students in Class T. In the fifth month, the students' English learning efficiency under the ecological teaching mode is higher than that under the traditional teaching mode. The average English learning efficiency of students in Class T for five months is 84.41%, and that of students in Class G for five months is 87.39%. The average English learning efficiency of students in Class G for five months is 2.98% higher than that of students in Class T.

(3) Students' oral expression ability

Therefore, the students of Class T and Class G would be comprehensively tested for their oral English expression ability four times a month. It mainly tests whether students' pronunciation is standard and their proficiency in using English to communicate with others. The full score of the test is 100. The test results are shown in Table 1.

Table 1: Students' oral expression ability

	Class T	Class G
1	81.65	85.25
2	81.43	85.73
3	82.29	86.04
4	83.26	88.79
5	83.7	89.62

As shown in Table 1, in the fifth month, students of Class T scored 83.7 in the oral expression test, and students of Class G scored 89.62 in the oral expression test. The oral expression test scores of students of Class G were 5.92 higher than those of students of Class T. The average oral expression test score of students in Class T for five months is 82.47, and that of students in Class G for five months is 87.09. The average oral expression test score of students in Class G is 4.62 higher than that of students in Class T, with an increase rate of 5.6%. It can be clearly seen that students in the ecological teaching mode have higher oral expression test scores than those in the traditional teaching mode.

(4) Student's written examination results

The theoretical knowledge level of students in Class T and Class G is comprehensively tested four times a month, and the full score is set as 100. The test results are shown in Figure 7.

As shown in Figure 7, in the first month, students of Class T scored 79.6 in the written examination and students of Class G scored 81.26 in the written examination. In the fifth month, the written test scores of students in Class T were 83.06 and that of students in Class G was 89.59. From the first month to the fifth month, the written test scores of students in Class T and Class G increased by 3.46 and 8.33 respectively. The average written test score of students in Class T in five months was 81.41. The average written test score of students in Class G for five months was 85.44, and the average written test score of students in Class G was 4.95% higher than that of students in Class T.

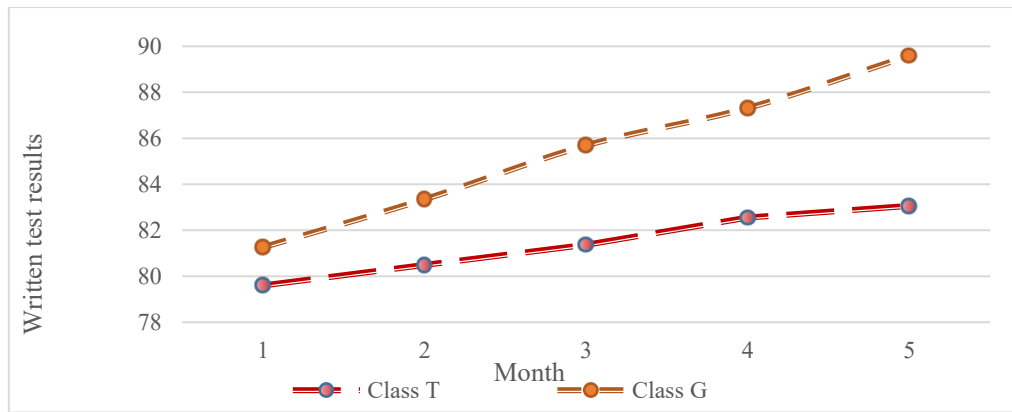


Figure 7: Students' written test scores

(5) Students' evaluation of teaching mode

The students' evaluation of the two teaching modes was investigated by filling in questionnaires and interviews. The evaluation scores of students in Class T and Class G are shown in Figure 8.

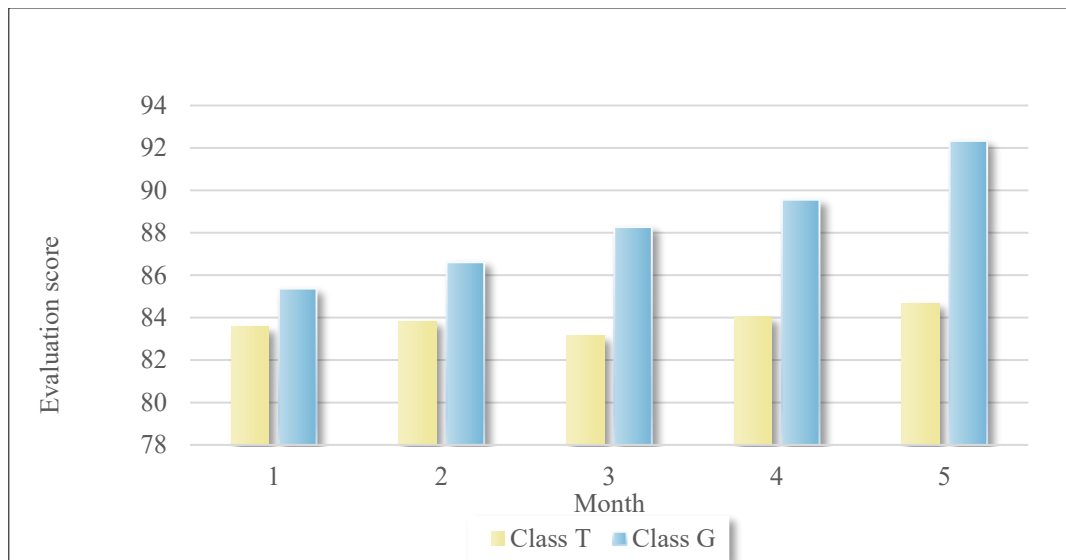


Figure 8: Students' evaluation of the teaching model

As shown in Figure 8, students of Class T scored 84.69 on the teaching model in the fifth month, and students of Class G scored 92.33 on the teaching model in the fifth month. It is obvious that the ecological teaching mode is more recognized by students than the traditional teaching mode. The average evaluation score of students of Class T for the teaching mode in the past five months is 83.86, and the average evaluation score of students of Class G for the teaching mode in the past five months is 88.43. The average evaluation score of students in Class G on the teaching model is 4.57 higher than that of students in Class T.

6. Conclusions

After putting forward the construction strategy of green ecological teaching mode, this paper conducts an experimental study on green ecological teaching mode and traditional teaching mode. Through experiments, it is proved that compared with traditional teaching, green ecological teaching is helpful to improve students' positive emotional investment in English learning. It could increase students' English learning efficiency and enhance students' theoretical knowledge level and oral expression ability, and students are more recognized by the green ecological teaching model.

References

- [1] Zhang J. Research on ecological imbalance of college english teaching under educational informatization and countermeasures[J]. *Revista de la Facultad de Ingenieria*, 2017, 32(8):311-317.
- [2] Zhao N. Study on ecological teaching method of college English based on computer network environment [J]. *Boletin Tecnico/Technical Bulletin*, 2017, 55(19):697-701.
- [3] Jing H, Department E. Ecological Teaching Model of College English Continuous Courses Based on Blended Learning[J]. *Journal of Hubei University of Education*, 2019, 36(6):11-16.
- [4] Zhu Y. Analysis of the ecological environment of college English teaching in the era of big data[J]. *Heilongjiang Science*, 2017, 8(3):31-35.
- [5] Hu F, Wang H. A turn from "task-chain" to "ecosystem": Ecological construction of college English teaching[J]. *Foreign Language Education*, 2019, 40(2):76-79.
- [6] Yao X. The Construction of College English Classroom Teaching Based on Ecological Orientation [J]. *Literature and Art Studies: English Edition*, 2019, 9(11):1194-1199.
- [7] Jia F. Research on the Ecological Development of College English Class: A Perspective of Textbooks [J]. *Theory and Practice of Education*, 2017, 37(30):48-50.
- [8] Davitishvili N. Cross-Cultural Awareness and Teaching English as a Second Language in the Context of Globalization [J]. *Sino American English Teaching: English Version*, 2017, 14 (9): 549-558.
- [9] Zhao H. The Cultivation of Intercultural Communication Awareness in English Teaching under the View of the Core Competence of English Subject[J]. *Francis Academic Press*, 2019, 2(5):31-39.
- [10] Xi W. On Cultivation of Intercultural Communication Competence in the Context of Teaching English as a Lingua Franca[J]. *Journal of Lanzhou University of Arts and Science (Social Science Edition)*, 2019, 35(5):103-107.
- [11] Yang D. A Study on the Cultivation of Students' Intercultural Communicative Competence in College English Teaching[J]. *Frontiers in Educational Research: Chinese and English Editions*, 2019, 9(3):110-113.
- [12] Yue P. Construction of Eco-teaching Mode in College English Classroom[J]. *Journal of Yancheng Teachers University (Humanities & Social Sciences Edition)*, 2019, 39(2):98-101.
- [13] Qian J. A study on the effectiveness of non English Majors' English based on ecological teaching mode [J]. *Journal of Shandong Agriculture and Engineering University*, 2017, 34(8):94-95.
- [14] Bin Q, Ning Q. Research on Ecological Teaching Mode of English Translation Courses in Application-oriented Universities[J]. *Journal of Chengdu Technological University*, 2017, 20(1): 81-84.
- [15] Liang S. The Construction of Ecological Classroom Teaching Mode of College English Under the Background of Big Data[J]. *Shipbuilding Vocational Education*, 2019, 7(5):20-22.
- [16] Yang F. Teaching Mode Construction of "Ecological Classroom" in College English Translation Teaching from Perspective of Educational Ecology[J]. *Journal of Shenyang University (Social Science)*, 2017, 19(4):396-399.
- [17] Zhong B L. Research on the Construction of Happy Learning and Ecological Teaching Mode[J]. *Journal of Changsha Aeronautical Vocational and Technical College*, 2017, 17(4):9-12.
- [18] Li X. On Establishing Ecological College English Teaching Model Under the Network Environment in Universities Run by Local Government[J]. *Journal of Heilongjiang University of Technology (Comprehensive Edition)*, 2018, 18(9):113-117.
- [19] Li X. A Study of College English Instructional Design from the Perspective of Educational Ecology [J]. *Journal of Weifang Engineering Vocational College*, 2019, 32(6):56-60.
- [20] Wu X. AHP-BP-Based Algorithms for Teaching Quality Evaluation of Flipped English Classrooms in the Context of New Media Communication[J]. *International Journal of Information Technologies and Systems Approach*, 2023, 16(2), 1-12.