

# English Semantic Evaluation and Structured Language System in Ecological Teaching from a Cross-cultural Perspective

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**Abstract:** *With the development of economic and political integration, international exchanges are becoming more and more frequent. English is no longer just a course, but a skill and a means of communication. Therefore, proficiency in the use of foreign languages is particularly important. With the passage of time, the teaching methods are becoming more and more diversified. The traditional teaching mode can no longer meet the needs of teachers, so people should take diversified teaching methods to enrich classroom teaching. In the classroom teaching, teachers should reasonably apply the principle of English semantic analysis and the structured teaching system to achieve the best teaching effect. Using semantic analysis technology, this paper analyzed English vocabulary, phrase, and the relationship between phrases, in order to achieve certain teaching effect. The results showed that in the general English teaching, the conventional vocabulary learning method is based on English, while the experimental group is based on the semantic analysis of English teaching and content teaching, and the control class pre-test score is not different. In the experimental group, the pre-test score was 68.7, and the post-test score was 81.9, a difference of 13.2. It may be seen that the utilization of semantic examination and organized showing in English educating can enormously work on the nature of English learning.*

**Keywords:** *Ecological Teaching, Neural Networks, Principal Component Analysis, Semantic Analysis*

## 1. Introduction

With the emergence of human beings and the development of society, human culture is also constantly developing, and people's communication is becoming more and more diversified and complex. Due to the differences in cultural background, people often encounter various problems when communicating. The cross-cultural perspective mentioned in this paper refers to the transformation of information or coding under the language symbols, language logic and language expression modes used by people in different cultural backgrounds. The most important premise of this view is that the cross-cultural vision is limited to the category of language communication between two languages, and it is regarded as a special cross-cultural communication.

The linguistic personality and national characteristics of a nation are different due to the differences in its cultural background. Therefore, in the current environment, the study of cross-cultural communication is particularly important. Teachers ignore the internal relationship of vocabulary in teaching, which is the common meaning and special meaning of vocabulary. Teachers can classify words correctly according to these semantic characteristics, so as to reduce students' learning burden and improve students' learning efficiency. If students' understanding of vocabulary is not in place, it would have a certain impact on their English learning. This requires students to have a deep understanding of the etymology, collocation and semantics of specific words, so that they can better master these words.

With the application and development of semantics in China, scholars gradually understand the meaning, grammar, pragmatics and other characteristics of words from the micro level of semantics, and reveal the logical connection and composition of words through these characteristics, so as to deepen people's understanding of words and help people better use them. It is conceivable that teachers' correct use of semantic feature analysis in English to guide students' vocabulary acquisition would greatly promote students' vocabulary acquisition.

## 2. Related Work

With the acceleration of economic integration and the rapid development of computer network technology, the traditional mode of English teaching is facing new challenges. Taking Jiamusi University as the research object, Zhao N used qualitative and quantitative methods to analyze the causes of maladaptation from the perspective of education ecology, and successfully constructed a college English ecological teaching model in the computer network environment [1]. Zhang J's research results showed that college English teaching, combined with information technology, played a positive role in improving the quality of English teaching. In this process, there are many subjective and objective factors, which lead to the imbalance of ecological environment. This is not good for the development of teaching work, and also has great constraints on the importance of information and ecological education [2]. Zhang S's adapting scope and instructional impact of various enabled people to learn, such as MOOCs, micro-classes, digital, and network platforms, based on the idea of environmental teaching, and examined the digital technology elements in the hypothesis [3]. Guo X undertook categorised survey and economic and environmental analysis in accordance with the gathered statistics and text knowledge based on a study on the latest progress of college English education in the digital mesh topology [4]. Based on the imbalance of college English teaching ecosystem, Li F analyzed the development status of college English teaching in detail for the purpose of ecology of education [5]. However, these studies do not reflect the structure of semantic analysis in English teaching.

Cross-cultural communication has gradually become one of the main modes of communication in modern society. Moser K tried to test whether the simulated experience helps to form an inclusive teaching view of English language learners, and whether pre-service teachers can apply the learned strategies to lesson planning and reflective activities [6]. Orabueze F used digital methods and technologies to study English and German teaching in Nigeria [7]. Through the integration of games in English as a foreign language teaching, Mouddeh M sought to explore the impact of using games in the classroom on English as a foreign language learning process and students' cognition of using games [8]. Elmahdi O used English vocabulary teaching methods to thoroughly demonstrate the challenges of non-native language students, and conducted critical and in-depth mining in these studies to point out the challenges of teaching English vocabulary to non-native language students [9]. All these studies have instructive suggestions, but there is a lack of research on the effect of English teaching.

## 3. Ecological English Teaching Methods

### 3.1. Gating Recurrent Unit Neural Network

With the rapid development of society and economy, international exchanges are becoming more and more frequent. English is a common language in today's world, and the society is in urgent need of a batch of comprehensive applied English teaching. Therefore, the reform of English teaching has come into being [10]. The goal of college English education supported by multimedia and network technology is to integrate traditional classroom teaching with modern information technology, and to integrate network with traditional classroom teaching, so as to achieve the goal of "ecology".

The architecture of expert system means to strengthen students' autonomous learning ability, pay attention to individual differences and explore students' potential at different starting points. Different expert systems have different functions and architecture due to their applicable scope, purpose and other reasons. They have different functions and architectures, but at the abstract level, they include human-computer interaction interface, knowledge acquisition mechanism, reasoning mechanism, interpretation mechanism, knowledge base and database. The structure of traditional expert system is shown in Figure 1.

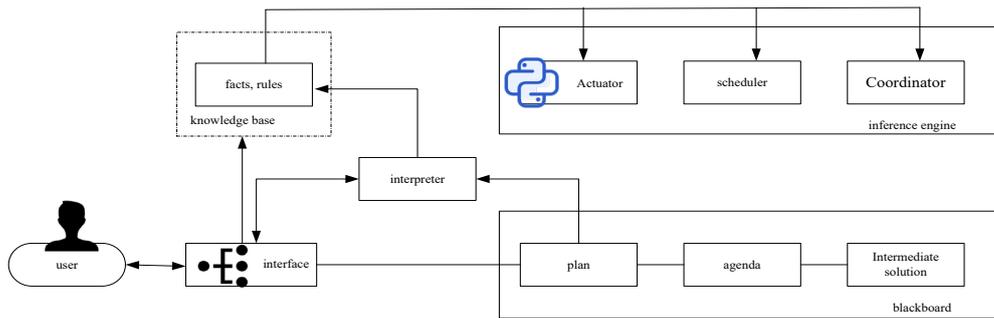


Figure 1: Structure of expert system.

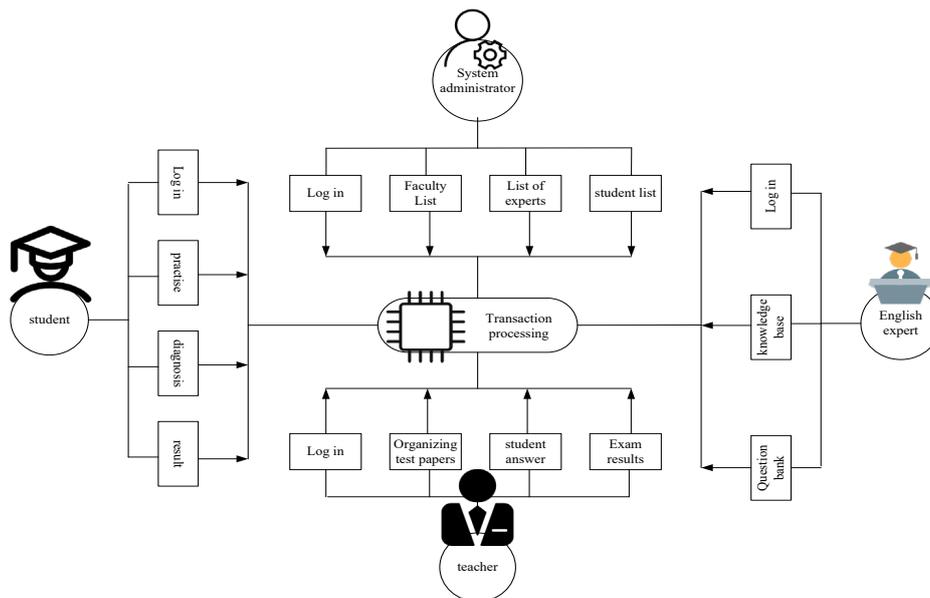


Figure 2: Data flow.

Human-computer interaction interface, also known as user interface, is a interface connected by experts and professionals or knowledge engineers for input data, information, instructions, result output, information display, etc. Domain experts or knowledge engineers can input and output knowledge through it, and update and improve the knowledge base, and users can input questions through it and ask questions to the system. The system can output operation results or ask users through it. Figure 2 shows the design of the data flow [11-12]. Students, teachers, system administrators and domain experts can log in through the interface provided by the system.

Semantics is an important branch of word meaning research, which lays a solid theoretical foundation for vocabulary teaching. English vocabulary learning is a brand new learning method [13-14]. Gated recurrent network is a kind of memory neural network of length. GRU (Ground Replaceable Unit) can not only remember the past information, but also selectively ignore some unimportant information by using gating mechanism, so as to establish a long-term relationship model such as context, which reduces the problem of vanishing gradient.

A schematic of English language-to-semantic expressions is shown in Figure 3.

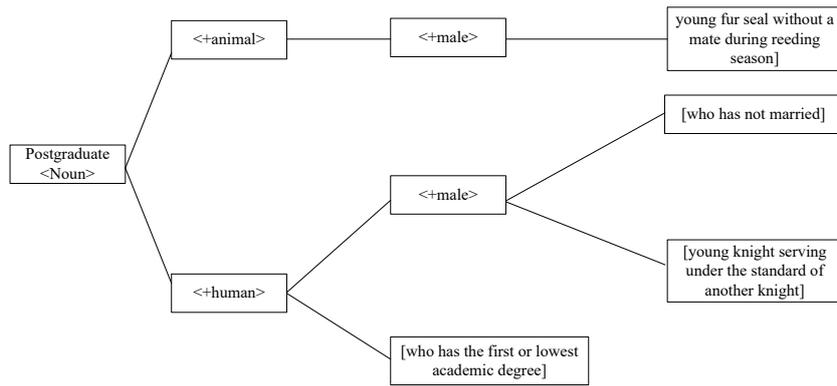


Figure 3: Several different semantic extensions.

As illustrated in Figure 4, several geometric forms represent the meanings of several words, and the following categories represent a common conceptual domain. This circle represents the extent to which a word concept points to an object [15-17].

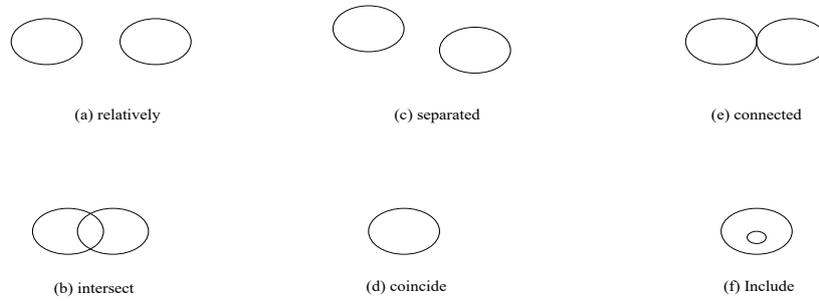


Figure 4: Correlation between English words.

### 3.2. Dimensionality Reduction of Word Vectors by PCA (Principal Component Analysis) Algorithm

Since there are a large number of words and sentences in the corpus, the problem of "dimension explosion" would occur when the counted feature matrix is directly converted into word vectors. Therefore, it is particularly important to reduce the dimension of word vector space [19-21]. The basis of clustering is to classify samples according to their characteristics, distances and relationships. PCA is a common dimensionality reduction method. Its main function is to map multi-dimensional features into a low-dimensional space, and the new low-dimensional space becomes a new vector space. The purpose of PCA is to retain a large number of high-dimensional data and eliminate noise and useless information. PCA is a simple machine learning algorithm derived from basic linear algebra knowledge.

The basic idea of PCA algorithm is to assume that there are m points in the space, and these points must be lossy compressed. Lossy compression only takes up less memory, but it loses some precision. All researchers want to minimize compression and encode these points with low dimensions. For a vector of higher dimensions, the problem is how to maximize its variance in one direction and then look for it in the other direction. However, one cannot simply choose the largest direction, because it would make the other direction overlap with the previous one, and that would be meaningless. At this point, he has to meet certain conditions.

## 4. Based on English Semantic Theory and Structured Teaching Evaluation

### 4.1. Experimental Subjects

According to the application of English semantic analysis and structured language system in ecological teaching, combining with the college English major students in a university, using structured language system, some effective solutions are given to the shortage of teachers in college English teaching at present. The system falls into four broad categories. The first one is a rule expert system

based on English teachers and students. Domain experts store the relevant rules of English semantic analysis in the knowledge base, and English teachers use the system to comprehensively diagnose the whole learner, so as to obtain the understanding of basic knowledge and guide teaching. Students log in the system and train on the basic knowledge. The system would understand the knowledge mastered by the students according to the results of the exercise, provide personalized training programs for each training amount, and give corresponding learning programs according to the previous training results.

In this paper, 136 undergraduates majoring in English were randomly divided into two classes, the experimental class and the control group, with 68 students in each group. The specific distribution is as follows. As can be seen from Table 1, the total number of experimental and control groups is the same, and the proportion of girls is also similar, and there is no difference in their average age. It lays a foundation for the comparative experiment between the experiment class and the control class.

Table 1: Personnel distribution table.

Class	Total people	Gender		Average age
		Female	Male	
Experimental class	68	32	36	20.6
Control class	68	28	40	21.1

#### 4.2. Performance Test of Two Classes before Teaching

Before the teaching test of the two classes, the results of the latest monthly test of the two classes were statistically analyzed, and the comprehensive English ability of the two classes was analyzed. The results are shown in Figure 5.

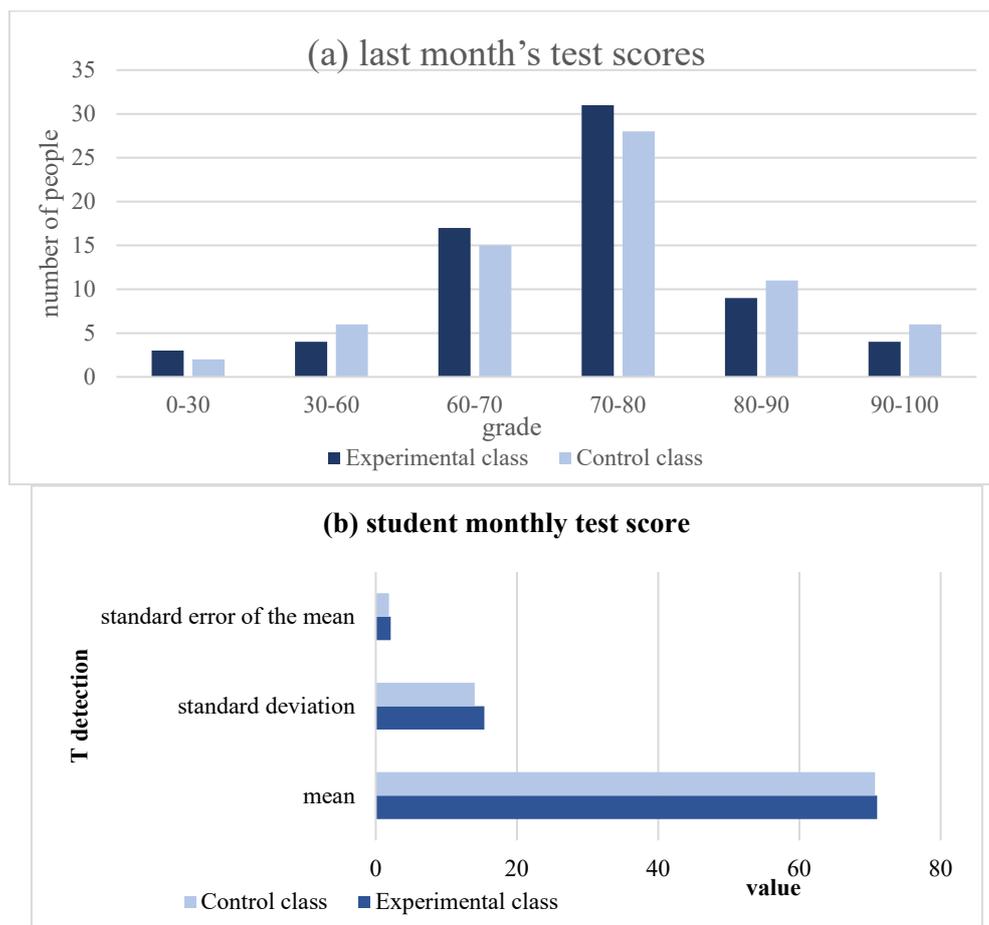


Figure 5: Scores of students in the latest monthly test before the test.

Figure 5(a) shows the distribution of English scores between the experimental class and the control class in the last monthly examination. The total score of this examination is 100. Test scores are divided into six levels: 0-30, 30-60, 60-70, 70-80, 80-90, and 90-100. The distribution chart clearly reflects the

distribution of English scores between experimental and control classes in the last monthly test, and clearly reflects the distribution of scores between experimental and control classes. Most classes have students who score between 60 and 90. The number of students with scores below 60 is similar between the two classes, and the number of students with scores above 90 is similar between the two classes. In other words, the overall level of English is similar between the two classes.

The data in Figure 5(b) show that the average score of the experimental group is 71, and the standard deviation is 15.37; the average score of the control class is 70.7, with a standard deviation of 14. There is not much difference in English scores between the two classes, and the standard deviation is very similar, which indicates that the two classes have similar overall levels, and the distribution of scores is relatively similar.

#### 4.3. Language Teaching Effect Based on Semantic Evaluation and Institutionalization

In class, teachers should be prepared to make clear the objectives and contents of English teaching, that is, it decides what words to teach in class and develops students' language comprehension and application skills. This course uses traditional English teaching method to guide students to learn English word by word, and explain the meaning and main usage of words one by one, and give one or two typical examples. In this course, the theory of semantic analysis is applied to English teaching and content teaching. By understanding, digesting and memorizing vocabulary, students can overcome difficulties in vocabulary learning. According to the previous teaching methods, a word test paper is prepared to test the mastery of words in each class, and the learning results of each class are analyzed and recorded. In order to understand the learning effect of the two classes, a test is conducted before and after the teaching, and the test results are shown in Figure 6.

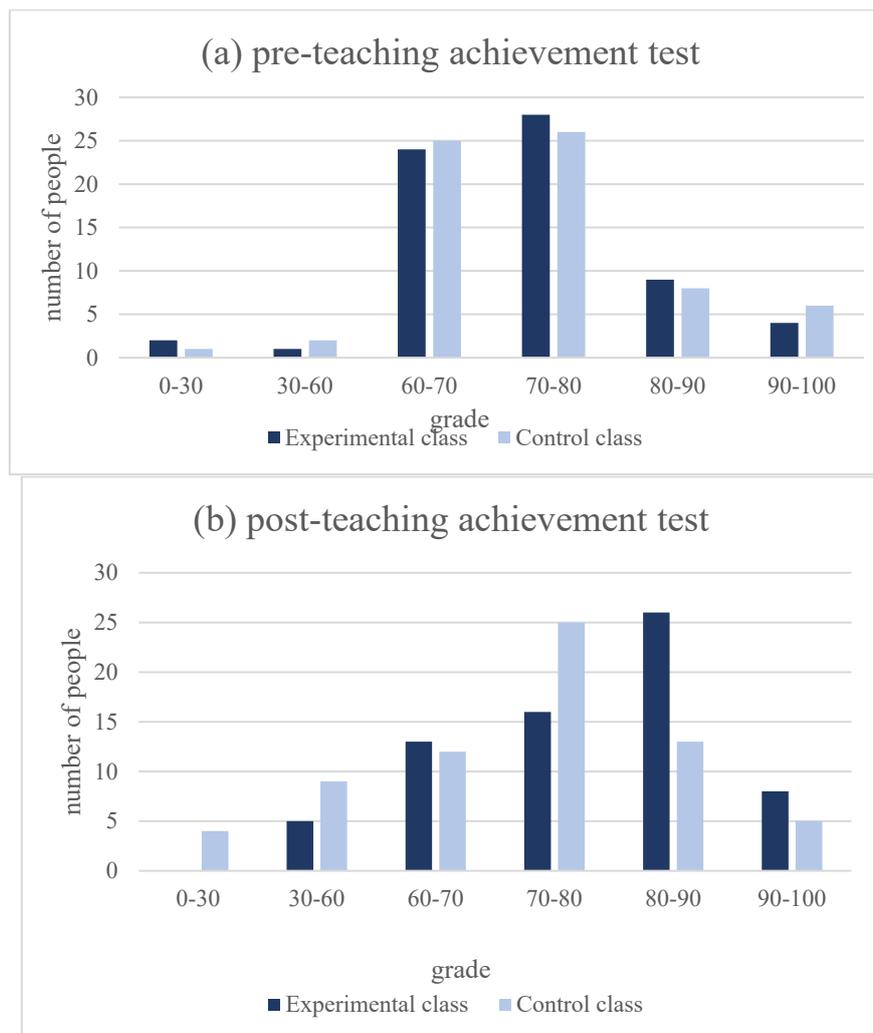


Figure 6: Comparison of the results of two classes before and after the test.

As shown in Figure 6(a), the English proficiency of the experimental class and the control group is the same through the results of the English test before the test. The English proficiency of most students is between 60 and 80. After using different teaching methods, the English test of the two classes is shown in Figure 6(b). The English of the experimental class is generally between 80-90, while the English of the control class is generally between 70-80, with a large gap in English.

At the same time, the credibility of English scores is tested through the mean, standard deviation and standard deviation of the first and last two classes. The test results are shown in Figure 7.

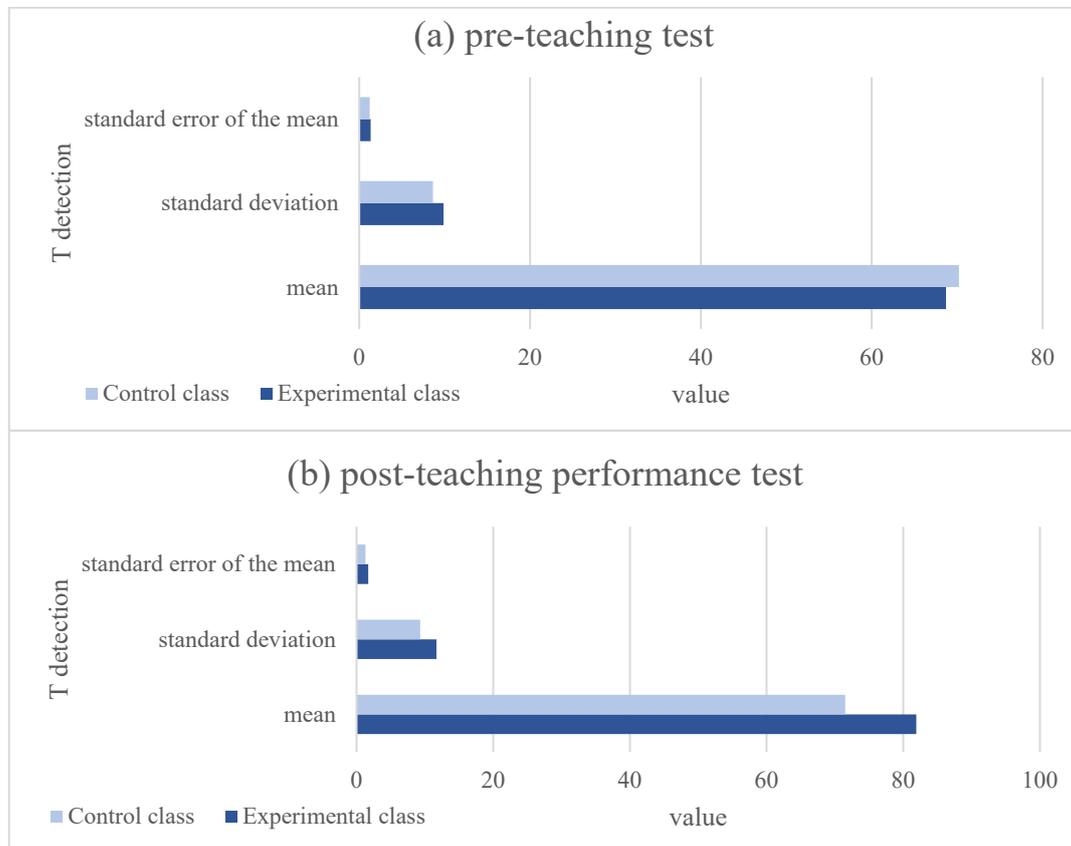


Figure 7: Test of students' English scores.

Figure 7(a) demonstrates that the research class's mean score with change control value were 68.7 and 9.87, respectively, prior to the exam. The controlled class's mean difference was 8.63 and its average rating was 70.2. The error margin was not significant and the pass rates of the treatment and control groups were nearly identical. The findings demonstrate that prior to the English lesson; the initial study or the control group had essentially identical levels of English acquisition.

The disparity between distinct types on the English test following the English course instruction is depicted in Figure 7(b). The testing class's error margin was 11.69 and its overall average was 81.9. The average score from the control class was 71.5, with a standard deviation of 9.32. The results show that English teaching based on semantic analysis is more effective than traditional vocabulary teaching methods.

## 5. Conclusions

Semantic analysis and structuring is a very important research topic in English teaching. This paper made an in-depth discussion from the vocabulary of English, and discussed the method of combining semantic analysis and structured teaching. Starting from students' thoughts, the construction of English must combine theory with practice and strengthen its application in practice, that is, its practicality is strengthened. The application of the principle of English semantic analysis can help students master the characteristics of English, have a direct and accurate grasp of English, and deepen their understanding of the history and culture of their own country and other humanistic knowledge, so that they can smoothly carry out cross-cultural communication.

**References**

- [1] Zhao N. Study on ecological teaching method of college english based on computer network environment. *Boletin Tecnico/Technical Bulletin*, 2017, 55(19):697-701.
- [2] Zhang J. Research on ecological imbalance of college english teaching under educational informatization and countermeasures. *Revista de la Facultad de Ingenieria*, 2017, 32(8):311-317.
- [3] Zhang S. A research on the construction of computer aided college english teaching system based on ecological teaching. *Revista de la Facultad de Ingenieria*, 2017, 32(11):359-364.
- [4] Guo X. Construction Analysis of Ecological College English Teaching Model in Computer Network Environment. *Revista de la Facultad de Ingenieria*, 2017, 14(1):27-31.
- [5] Li F. Model research on the development and transformation of college english teaching paradigm under the ecological environment of education. *Revista de la Facultad de Ingenieria*, 2017, 32(15):322-326.
- [6] Moser K, Zhu D, Nguyen H, Williams E. Teaching English Language Learners: A Mainstream Response to Rural Teacher Preparation. *International Journal of Teacher Education and Professional Development*, 2018, 1(1):58-75.
- [7] Orabueze F, Okafor H I, Okonkwo U U, MM, Ekwueme O. Methods and techniques of teaching English and German classes in Nigeria during the Covid-19 pandemic era. *XLinguae*, 2021, 14(1):91-99.
- [8] Moudden M. The Integration of Games in Teaching English as a Foreign Language in the Classroom: Moulay Ismail University as a Case Study. *International Journal of Language and Literary Studies*, 2021, 3(1):208-229.
- [9] Elmahdi O, Hezam A. Challenges for Methods of Teaching English Vocabulary to Non-native Students. *Advances in Social Sciences Research Journal*, 2020, 7(5):556-575.
- [10] Ghaemi F. The Impact of Telegram as a Social Network on Teaching English Vocabulary among Iranian Intermediate EFL Learners. *International Journal of Information and Communication Sciences*, 2017, 2(5):86-92.
- [11] Moloi J T, Adegioriolu E T. The Transformative Methodology: Expository Study of Teaching English as the Second Language Acquisition. *Research in Social Sciences and Technology*, 2021, 6(2):219-232.
- [12] Dilrabo K. Effective strategies and techniques of teaching English vocabulary. *Academicia an International Multidisciplinary Research Journal*, 2021, 11(3):1454-1457.
- [13] Juraboyeva G, Baxridinova O, Bahridinova Z. Approaches to teaching english. *TRANS Asian Journal of Marketing & Management Research (TAJMMR)*, 2021, 10(4):74-83.
- [14] Spatay A, Baibekova M, Ismanova R, et al. Training of teachers in teaching English and French languages in continuing professional education. *X Linguae*, 2020, 13(1):334-344.
- [15] Susanti R, Syahri I. The Impact of a Brief Teaching English towards the Drivers Online Transportation in Dealing with ASIAN GAMES 2018. *International Journal of Psychosocial Rehabilitation*, 2020, 24(1):1944-1949.
- [16] Setiawan A. The Students' Perceptions on Teacher "Performances" in Teaching English. *INTERACTION Jurnal Pendidikan Bahasa*, 2020, 7(1):15-26.
- [17] Predushchenko O. Individualized Teaching English Writing in China. *International Journal of Educational Development*, 2020, 11(1):1164-1171.
- [18] Vasbieva D G, Vlasova V K, Novikova Y B. Efficiency of teaching English vocabulary and grammar on the basis of assignments in IELTS format. *XLinguae*, 2019, 12(2):99-110.
- [19] Siregar M. Model of Translation Textbook for Teaching English as Foreign Language (TEFL) Pedagogical Purpose. *SALTeL Journal (Southeast Asia Language Teaching and Learning)*, 2019, 2(2):72-82.
- [20] Ekayati R. Study of Blended-Learning Method Assisted By Edmodo in Teaching English at State Vocational School in Deli Serdang. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 2019, 2(3):10-18.
- [21] Ekayati R. Study of Blended-Learning Method Assisted By Edmodo in Teaching English at State Vocational School in Deli Serdang. *Budapest International Research in Exact Sciences (BirEx) Journal*, 2019, 1(3):14-22.