

# A Study on the Construction and Practice of Ecological Teaching Mode in College English —Taking Graduate Public English at Zhengzhou University of Aeronautics as an Example

Jinhai Wang<sup>1,\*</sup>, Yuheng Wang<sup>2</sup>

<sup>1</sup>Zhengzhou University of Aeronautics, Zhengzhou, China

<sup>2</sup>Zhengzhou University of Aeronautics, Zhengzhou, China

\*Corresponding author: coolwang001@zua.edu.cn

**Abstract:** This paper systematically examines the construction and practice of an ecological teaching mode in the Graduate Public English course at Zhengzhou University of Aeronautics, exploring its application and effectiveness in college English education. The literature review analyzes relevant theories on ecological teaching both domestically and internationally, starting from the perspective of ecosystem theory and its impact on education. It proposes basic principles of the ecological teaching mode, such as sustainability, interactivity, and holism. Through a combination of qualitative and quantitative research methods, specific teaching practice schemes are designed, and the implementation effects of the ecological teaching mode are evaluated through data collection and analysis. The study finds that the ecological teaching mode significantly enhances students' English application abilities and learning motivation, fosters interaction between teachers and students, and establishes a positive learning ecological environment. Case studies reveal that during the implementation of ecological teaching at Zhengzhou University of Aeronautics, teachers continuously adjust their teaching strategies based on student feedback, effectively improving teaching quality and student satisfaction. This paper concludes by summarizing the practical value of the ecological teaching mode and proposing future research directions, emphasizing the importance of an ecological perspective in the field of foreign language education and its potential policy implications.

**Keywords:** Ecological Teaching Mode; College English; Graduate Public English; Construction of Teaching Mode

## 1. Introduction

In today's globalized context, college English education not only bears the responsibility of language teaching but also faces intense challenges of cultural integration and diversity. Its importance in cultivating students' intercultural communicative competence, innovative thinking, and comprehensive qualities has become increasingly prominent. Currently, traditional English teaching models are struggling to meet the rapidly changing social demands. The Ecological Teaching Model (ETM) has gradually emerged as a research hotspot due to its focus on the learning environment, teaching content, and the multidimensional relationships among learners. This model emphasizes how to construct an interactive and continuously evolving educational system within natural and cultural ecosystems<sup>[1]</sup>.

The ETM not only focuses on the teaching of English as a tool but also emphasizes how language learners, as part of a complex ecosystem, gradually absorb, digest, and apply English knowledge through interactions both inside and outside the classroom. The proposal of this model is based on in-depth consideration of the "student-centered" educational philosophy in English teaching, particularly regarding learners' initiative and sense of participation. Research shows that course designs adopting the ETM can effectively improve students' English proficiency and application abilities, promoting the enhancement of their comprehensive qualities. For instance, in practical teaching, by introducing Project-based Learning (PBL) and practical experiences, students can engage in effective communication with others in real-life contexts, gaining a deeper understanding of language use.

Against this backdrop, research with Zhengzhou University of Aeronautics (ZUA) as a case study is

particularly significant. The university's practice of the ETM in public English teaching provides abundant empirical data and reflections. In ZUA, the design of the graduate public English course forms a closed loop from theory to practice by integrating English language teaching with industry-specific needs. For example, students not only learn relevant terminology and expressions through classroom instruction but also participate in industry projects, practicing language use based on real-life cases. This teaching method based on real-life scenarios effectively cultivates students' adaptability and teamwork spirit, enabling them not only to master language skills but also to flexibly apply them within their professional fields<sup>[2]</sup>.

## 2. Research Design

### 2.1 Research Method

This study adopts a Qualitative Research Design Framework, aiming to delve into the construction and implementation process of the ecological teaching model in College English, specifically targeting the public English courses for graduate students at Zhengzhou University of Aeronautics. Considering that the research objective is to understand and analyze the essence and implementation effects of the ecological teaching model, qualitative research, through detailed analysis of individual cases, can provide us with richer contextual and background information, which significantly differs from traditional quantitative research methods. Qualitative research is characterized by its emphasis on deep understanding of social phenomena, thereby addressing complex educational issues.

In terms of sample selection, this study employs Purposive Sampling, selecting public English teachers and graduate students at Zhengzhou University of Aeronautics as the primary interviewees. The sample size calculation is based on the principle of similarity in educational research, taking into account the diversity, hierarchy, and representativeness of teachers and students. Ultimately, eight teachers and 24 graduate students were selected for in-depth interviews. This selection strategy not only ensures the richness and depth of data but also reflects the different perspectives and experiences of different roles within the ecological teaching model<sup>[3][4]</sup>.

During the data collection process, this study primarily uses Semi-structured Interviews and Observation. The design of semi-structured interviews aims to ensure the exploration of core issues while giving respondents appropriate expression space to fully tap into their thoughts and experiences. Observation adds a layer of direct observation of the teaching process to complement information that may be omitted in interviews.

Thematic Analysis is adopted for data analysis, which effectively extracts major themes and patterns from complex qualitative data. Specifically, researchers will conduct Coding during the analysis process, identifying recurring themes and trends from interview records. This process requires not only meticulous understanding but also rigorous comparison and contrast of data to ensure the validity and reliability of the research results.

### 2.2 Data Collection and Analysis

In this study, to delve into the construction and practice of the ecological teaching model in College English, particularly within the context of public English instruction for graduate students at Zhengzhou University of Aeronautics, a Mixed Methods Analysis approach is employed for data collection and analysis. The choice of this method is a response to the complex interactive relationship between teaching and learning, especially within the framework of ecological teaching concepts, which emphasizes the importance of diverse data sources in revealing students' learning experiences, teachers' instructional behaviors, and course effectiveness.

During the data collection phase, this study integrates both questionnaire surveys and interviews. The questionnaire survey, primarily designed with a quantitative approach, aims to gather graduate students' attitudes towards learning, learning motivations, and feedback on course content and teaching methods in public English courses<sup>[5][6]</sup>. Validity and reliability pre-tests are conducted using the "Learning Motivation Questionnaire (LMQ)" and "Course Evaluation Scale (CES)" proposed by Li, He, and others to ensure the authenticity and reliability of the collected data. With a sample size of 300, the questionnaire yields a broadly representative set of quantitative data, providing a solid foundation for subsequent statistical analysis.

On the other hand, the interview method adopts a semi-structured format to obtain more in-depth

qualitative data. Interviews are conducted with eight teachers and 24 students, using open-ended questions to guide respondents in sharing their actual teaching and learning experiences in the classroom. The interview content not only covers understanding of ecological teaching, difficulties and challenges encountered in implementation, but also specific impacts of teaching model changes on students' learning outcomes. Through this approach, we can identify potential directions for teaching innovation and practical improvements, and conduct a multidimensional analysis of the complex relationships implicit in the educational ecosystem<sup>[7]</sup>.

### 3. Construction of the Ecological Teaching Model

#### 3.1 Fundamental Principles of the Ecological Teaching Model

In today's globalized context, college English education urgently needs to adapt to evolving societal demands and individual learning characteristics of students. Taking graduate public English instruction at Zhengzhou Aeronautical Institute as an example, this paper delves into the necessity and operational practice of constructing the "College English Ecological Teaching Model," aiming to provide effective strategies for enhancing graduate students' English proficiency and communicative competence. The construction of an ecological teaching model is not merely an innovation of traditional teaching models; rather, it represents a comprehensive educational philosophy that encompasses multiculturalism and language learning needs<sup>[8][9]</sup>.

*Table 1: Analysis of Key Elements in the Construction of an Ecological Teaching Model for Graduate Public English at Zhengzhou University of Aeronautics*

Key Elements Description	Description
Student-Centered Approach	Core Teaching Principle
	Analysis of the Learning Environment
	Course Content and Activity Design
Research Methodology	Combination of Qualitative and Quantitative Methods
	Questionnaire Surveys and Interview Techniques
Integration of Teaching Resources	Existing Textbooks
	Internet Resources
	Language Practice Environment
Case Study Analysis	Empirical Support for Teaching Improvement
	Teachers' Observation and Reflective Practice

As shown in Table 1, the key elements of the ecological teaching model construction revolve Student-Centered Approach, Research Methodology, Integration of Teaching Resources, Case Study Analysis and Ecological Learning System. Through systematic analysis of the learning environment, teachers can better understand students' learning motivations and needs, and tailor course content and teaching activities accordingly. For instance, feedback from course design based on Needs Analysis can prompt teachers to adjust teaching strategies based on students' actual needs, thereby enhancing learning outcomes<sup>[10][11]</sup>.

The selection of research methods is another critical aspect in the construction of the ecological teaching model. By employing a combination of qualitative and quantitative methods, teachers can comprehensively evaluate the implementation effects of ecological teaching. In terms of data collection and analysis, questionnaire surveys combined with interviews are used to explore students' learning experiences and self-perception in an ecological setting. For example, quantitative assessments, combined with statistical analysis, can evaluate students' improvements in language proficiency and cross-cultural communicative competence, while qualitative analysis can provide in-depth interpretations of students' feedback and suggestions on teaching strategies.

In terms of the specific composition of the ecological teaching model, full consideration should be given to the integration and utilization of various teaching resources. Specifically, richer learning materials should be formed from three aspects: existing textbooks, internet resources, and language practice environments both inside and outside the campus. For instance, by introducing Massive Open Online Courses and online learning communities, students can, under the guidance of teachers, independently select learning content suitable for themselves. Teachers' observations and reflective practices provide a basis for further teaching adjustments, contributing to the formation of a virtuous

cycle within the ecological learning system.

The role of case studies in practical research on the ecological teaching model cannot be overlooked. Based on English teaching cases at Zhengzhou University of Aeronautics, analyzing student feedback and data results can more clearly reveal the advantages and disadvantages of the ecological teaching model in practical operation, thereby providing empirical support for subsequent teaching improvements. Through specific data analysis, such as comparisons of students' pre- and post-course test scores combined with teachers' observation records, problems in the teaching process and improvement measures can be effectively identified, thereby providing students with teaching services that better meet their learning needs.

By constructing a college English teaching model based on ecological principles, graduate students can achieve significant improvements in language proficiency, cross-cultural communicative competence, and autonomous learning ability, laying a solid foundation for their future career development. Therefore, it is necessary to promote this teaching model on a broader scale to facilitate the sustained development of college English education<sup>[12]</sup>.

### ***3.2 Specific Components of the Ecological Teaching Model***

In modern educational theory, the ecological teaching model emphasizes the interaction between learners and their learning environment. The specific composition of this model can be understood as a combination of multiple interdependent elements, forming an organic educational ecosystem. In college English teaching, particularly with reference to graduate public English courses at Zhengzhou University of Aeronautics, the ecological teaching model encompasses not only teaching methodologies and learners' central role but also the integration of educational resources and the influence of cultural backgrounds.

Specifically, the composition of the ecological teaching model can be described in the following aspects: Firstly, there is a transformation in the role of teachers, from knowledge transmitters to learning guides and supporters. Meanwhile, learners are granted greater initiative in this model, with their learning motivation and engagement directly impacting learning outcomes. Furthermore, the richness and diversity of the learning environment constitute an important part of the ecological teaching model, encompassing various educational resources both inside and outside the classroom, such as online courses, practical activities, and social interactions. Lastly, the integration of cultural factors adds depth and breadth to learning activities, enabling learners to apply what they have learned in real-life social contexts.

To better understand the relationships among these constituent elements, mathematical models can be employed for analysis. For example, a simple function can be used to represent the relationship between learning outcomes and teacher factors, learner factors, environmental factors, and cultural factors:

$$E = f(T, L, R, C)$$

In this formula, E represents learning outcomes, T stands for teacher factors (such as teaching methodologies), L represents learner factors (such as learning motivation), R represents environmental factors (such as educational resources), and C represents cultural factors. By studying different combinations of these factors, we can delve into the effectiveness and adaptability of the ecological teaching model in practice.

## **4. English Teaching Case at Zhengzhou University of Aeronautics**

### ***4.1 Student Feedback and Data Analysis***

In the research on the construction and practical implementation of the ecological teaching model in graduate public English courses at Zhengzhou University of Aeronautics, the analysis of student feedback data is crucial. By collecting relevant data through surveys, we gain insights into students' perspectives on this teaching model and potential blind spots in its implementation.

Data on the frequency of student class participation reflects significant improvements in both the effectiveness and frequency of interactions at the current stage. Classroom participation is a vital component of the ecological teaching model, as it not only promotes communication and cooperation among students but also enhances their learning motivation to some extent. Therefore, a more detailed

investigation into the implementation of classroom participation is needed to identify factors affecting interaction effectiveness, such as teachers' guiding strategies, the design of classroom activities, and students' psychological preparedness. As shown in Figure 1, students' class participation as well as the degree of satisfaction both improved during the new teaching model.

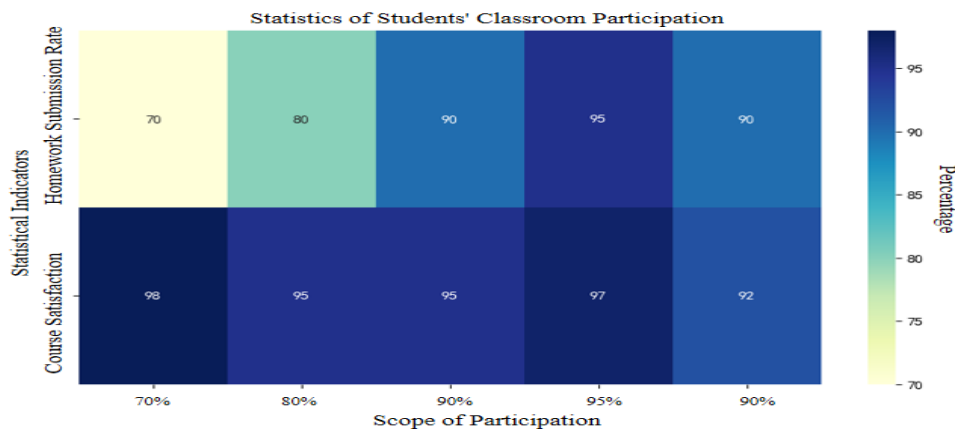


Figure 1: Statistics of Students' Classroom Participation

Homework submission can also serve as a crucial indicator to reflect students' initiative in study. As shown in Figure 2, the homework submission rates are 98%, 95%, 95%, 97%, and 92%. This data indicates a good homework completion rate, suggesting that students are highly motivated in autonomous learning and practice after class, and that the ecological teaching model promotes the continuity and normalization of extracurricular learning. However, the fact that the homework submission rate does not reach 100% also suggests that some students are not fully engaged in the course, potentially due to workload or personal interests. Therefore, in subsequent teaching implementations, further attention and adjustments are needed regarding students' individual learning needs and homework burdens.

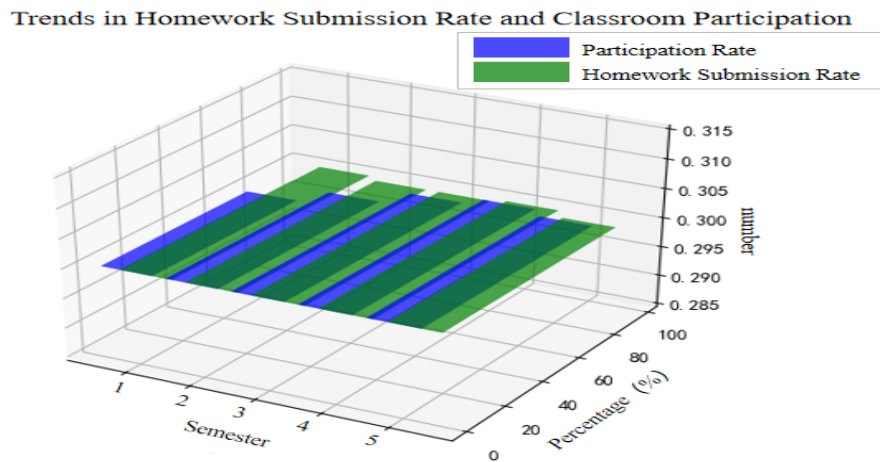


Figure 2: Trend of Assignment Submission Rate

Based on the analysis of the above data, we can point out that during the implementation of the ecological teaching model, student participation and homework submission rates are relatively high, reflecting the effectiveness of this model in improving students' learning motivation. However, the insufficient frequency of classroom interactions and classroom speaking indicate areas for improvement in the teaching process. The lack of course satisfaction is also crucial for enhancing teaching quality. Therefore, based on these feedback data, we recommend that subsequent investigations should focus on the specific implementation of classroom interactions and speaking, in order to effectively identify key factors affecting learning outcomes and provide a practical basis for optimizing the ecological teaching model.

#### **4.2 Teacher Observation and Teaching Adjustment**

In the process of constructing the ecological teaching model, teachers' observations and reflective analysis play a vital role. Through systematic observation of graduate public English teaching activities at Zhengzhou University of Aeronautics, teachers can gain an intuitive understanding of the teaching process and students' learning dynamics, thereby providing a basis for subsequent teaching adjustments. Observation, as a context-based qualitative research method, emphasizes the complex interactions between teachers, students, textbooks, and the teaching environment in actual teaching scenarios, effectively capturing the diversity and dynamism within the educational ecosystem.

In specific implementations, teachers regularly observe classroom activities and record students' participation, learning interests, interaction patterns, and performance in task completion in detail. This data collection and analysis not only reveal students' learning states under the ecological teaching model but also expose potential deficiencies in teaching strategies. For example, in a certain class, teachers noticed uneven participation and inadequate expression of opinions among students during group discussions. This observation prompted teachers to adjust group compositions and discussion methods in subsequent teaching activities, encouraging each student to actively participate in discussions and share their views by designing targeted problem situations, thereby improving the overall classroom participation.

In addition to quantitative observations, teachers' reflective analysis is also an indispensable part. After daily teaching, teachers review observation records and combine them with relevant theories, such as "Constructivist Learning Theory" and "Sociocultural Theory," to conduct in-depth analysis of classroom interactions. Specifically, teachers analyze that in some cases, due to insufficient language abilities, students are unable to fully express their opinions, thereby affecting the depth and breadth of discussions. This in-depth reflection on teaching phenomena makes teachers realize that when implementing ecological teaching strategies, they cannot solely rely on traditional teaching resources but also need to dynamically adjust teaching content and forms to meet the needs of different students.

For example, in one reflection, teachers decided to introduce more multimedia tools and real-life case studies to enhance the interest and relevance of learning materials. By implementing these adjustments, teachers observed significant improvements in students' classroom participation and learning outcomes. This continuous cycle of observation and reflection embodies the multidimensionality and flexibility of teachers' leading roles in the ecological teaching model, making the teaching process more adaptable and targeted.

#### **5. Conclusion and Prospects**

At the theoretical level, this study's literature analysis of the ecological teaching model reveals the diversity and potential shortcomings of this model, providing insights and inspiration for subsequent research. In the future, educators can build upon the realization of the ecological teaching theoretical framework by exploring more systematic implementation strategies. Employing both quantitative and qualitative research methods, they can delve deeper into the impact of individual student differences on learning outcomes. Case studies and teachers' observation and reflection strategies undoubtedly provide an important basis for the continuous improvement of ecological teaching. It is this combination of theory and practice that drives innovation and development in English language teaching in higher education.

In summary, the practice of the ecological teaching model at Zhengzhou University of Aeronautics offers valuable experience and reference for the future reform and development of English language teaching in colleges and universities, laying a solid foundation for cultivating more high-quality talents in cross-cultural communication. Therefore, promoting in-depth research and widespread application of the ecological teaching model will undoubtedly play a positive role in enhancing the overall level of college English education in China. In the new era, cultivating talents with a solid language foundation and a high degree of innovation has become an important goal of higher education. In this process, the ecological teaching model, as an integrated and dynamic teaching philosophy, will continue to exert its unique value in promoting educational diversification and sustainable development.

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