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Application of Ecological Teaching Model in College English Speech and Writing Courses: A Pedagogical Study

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Abstract: Amid digital transformation, developing ecologically-oriented speech and writing courses addresses not only language skill development but also responds to China's strategic initiative of enhancing global storytelling. This study investigates ecological pedagogy in college-level English public speaking and writing instruction, targeting students' persistent difficulties in oral and written expression. Drawing on educational ecology principles that frame language learning as dynamic learner-environment interactions, the research establishes three core teaching principles: holistic integration, dynamic adaptation, and diversified engagement. By analyzing the curriculum framework and learner characteristics at the researcher's university, a three-dimensional framework synergizing linguistic, cultural, and technological dimensions was designed. Through three iterative teaching cycles supported by quantitative data and qualitative feedback, the study demonstrates how responsive ecological adjustments optimize instructional effectiveness. These findings provide implementable strategies for analogous programs while advancing sustainable innovation in collegiate English education.

Keywords: ecological teaching, college English, English public speaking, English writing, ecological curriculum model

1. Introduction

In English language programs of Chinese higher education, students' weaknesses in speaking and writing skills significantly hinder the quality of talent development. Recognizing the shared foundations between these two competencies, some universities have begun combining introductory-level public speaking and writing courses. This integration aims to develop globally competent professionals who can effectively communicate China's narratives in English, possessing bilingual proficiency and cross-cultural understanding. However, persistent challenges remain in these integrated courses, particularly the lack of structured frameworks that enable students to actively achieve learning objectives through engaged participation.

While existing reforms combine the Production-Oriented Approach with critical thinking development in theory, classroom practices still rely on repetitive skill drills. Similarly, digital teaching innovations promoted by national education policies often result in superficial technology use rather than meaningful integration. Addressing these dual challenges requires rethinking teaching models through an ecological perspective — an approach aligning with Goldsmith's (1998) ecological worldview, which advocates holistic solutions when fragmented systems underperform. Emphasis on dynamic interconnectedness in educational ecology provides a timely framework for examining how digital tools can be authentically embedded in language education.

2. Theoretical Foundations of Ecological Teaching Model

The ecological teaching model emerged from combining educational ecology theory with teaching practices. As educational ecology developed into a

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comprehensive theoretical framework, Western scholars have increasingly connected it with second language acquisition and semiotics through social-cultural lenses, creating a systematic research foundation for its use in foreign language education.

2.1 Conceptual analysis of ecological teaching model

The scholarly dialogue between Eastern and Western ecological pedagogical perspectives provides a transcultural lens for theoretical construction. Van Lier's (2004) "ecology of semiotics" in The Ecology and Semiotics of Language Learning posits that language acquisition constitutes a multidimensional interaction between learners and their physical, social, and symbolic environments. This view engages in cross-cultural resonance with Wu Wen's (2017) "harmony between humans and nature" pedagogical philosophy, which defines ecological English teaching as:"a dynamic, unified, harmonious, balanced, and cyclical interactive process rooted in the sociocultural-linguistic ecosystem of Chinese learners of English. Guided by instructors, learners utilize English linguistic knowledge as a medium to comprehend and assimilate foreign cultural elements, construct conceptual frameworks of the English language, and cultivate a thinking mode aligned with native English speakers' language and cognition, thereby fostering holistic development of learners." (Wu, 2004, p. 21) Eastern and Western educational perspectives both view language teaching as involving interconnected, evolving interactions among language, culture, and thinking. In this AI-driven era, where technology is fully integrated into language education, ecological teaching methods highlight the complex relationships between digital tools, teachers, learners, and course materials. As Xu and Long (2022) explain, this approach centers on how learners actively engage with technology, peers, and instructors in multi-layered learning environments to build knowledge collaboratively.

2.2 Current integration of ecological teaching models in college English courses

The integration of ecological teaching models into College English courses has been implemented through both macro-level initiatives and micro-level practices. Based on Zhang Hang and Yu Shanshan's (2020) analysis of journal articles (2005–2019) on domestic College English pedagogy from an ecological perspective, the application of educational ecology to foreign language teaching in higher education can be categorized into three dimensions: linguistic ecological pedagogy, which focuses on classroom interactions, teacher-student relationships, and resource allocation (Liu, 2014); technology integration, such as web-based "flipped classrooms" and blended teaching models (Chen Jianlin, 2010); and ecological curriculum systems, which emphasize curriculum design aligned with ecological principles, including dynamic adjustments to teaching objectives and evaluation criteria (Zhang, 2011). The literature review reveals that while progress has been made in adopting ecological teaching models in College English education, significant issues persist. Notably, there is a lack of cultural ecosystem research, as existing studies predominantly concentrate on linguistic skill training while neglecting "Chinese cultural dissemination" and "intercultural integration." Additionally, insufficient attention has been paid to specialized course types, with most studies treating "College English" as a monolithic entity rather than addressing the ecological design of subdomains such as speaking and writing. Methodological limitations are also evident: of the 968 articles analyzed, only 7% employed mixed-methods empirical approaches, while the majority remained confined to theoretical discussions (Zhang, 2020). In response to these gaps, this study focuses on the ecological design of College English public speaking and writing courses — domains requiring substantial cultural output and cognitive training — and employs an empirical research framework combining quantitative and qualitative methodologies.

3. Analysis of the Current Situation of College English Speech and Writing Courses

This section examines the College English Speech and Writing course implemented at the

author's institution as an analytical case study.

3.1 Curriculum framework and student situation analysis

The current framework of college English public speaking and writing courses exhibits a diversified feature, with different universities formulating distinct designs based on their educational goals and disciplinary characteristics. Some courses are oriented towards cross-cultural academic communication, while others focus on the cultivation of basic skills. On this basis, some universities have responded to "promoting learning and teaching through competitions" (the call of Ministry of Education) by specially setting up integrated courses for speech and writing to prepare students for college English proficiency competitions such as the National College Students' English Competition. The "English Speech and Writing" course, offered as a university-wide elective at the author's institution, is supported by the "Understanding Contemporary China" series of textbooks and is associated with college English subject competitions. The course content focuses on the theme "understanding China and communicating with the World," integrating multiple language versions of President Xi: The Governance of China, multilingual versions of the reports from the National Congress of the Communist Party of China, and the textbooks Understanding Contemporary China Series.

In terms of curriculum structure, the course is roughly the same as most traditional elective courses in universities, with one class per week and 32 class hours per semester. In terms of class size and classroom layout, the course generally adopts small class teaching mode, with about 30 students per class. The students are selected from the school competition who have excellent oral and writing performance. The classroom space design emphasizes flexibility and functionality, using deformable tables and chairs and moving whiteboards. The classroom is equipped with multi-screen projection system and VR intelligent interactive equipment to support real-time display and annotation of group discussion results, while ensuring the visual experience of each student through surround screen layout, and also supporting each student to have immersive oral dialogue with the system.

In terms of learning conditions, digital transformation has a significant impact on students' learning needs. With the popularization of information technology, students have an increasing demand for intelligent learning tools. For example, they hope to use AI technology for grammar proofreading and logic optimization in writing, and they are eager to improve their actual combat ability through virtual scene simulation in speech. However, some students still have the tendency of "emphasizing skills over thinking", relying too much on template expression and lacking the control of content depth and logical structure, resulting in empty speech content and insufficient logic in writing text, and most students can't even distinguish facts from opinions correctly. In addition, the weakness of cross-cultural communication ability is also a common problem, and it is often difficult for students to properly tell "China stories" in English in the international context.

3.2 Teachers teaching methods and challenges in teaching

Teachers employ diverse teaching methods in the speech and writing course to establish a multi-dimensional instructional system. For instance, traditional interactive approaches—combining topic discussions, simulated speeches, and cross-cultural case analyses—not only enhance students' language proficiency but also develop their critical thinking and intercultural communication skills.

Virtual simulation technology further integrates project-driven teaching with online-offline hybrid models. By recreating international academic conference scenarios, students refine their language expression and logical reasoning through authentic tasks, while online platforms provide personalized learning paths.

Intensive classroom teaching, practical exercises, and AI-powered corrections strengthen

grammar and textual structure training while improving feedback accuracy and efficiency through smart technology.

However, challenges remain. First, students' diversity poses fundamental difficulties: learners excelling in writing and those skilled in speaking coexist in the same class. Secondly, the multidimensional nature of instructional objectives intensifies the complexity of pedagogical design. The course development must simultaneously enhance students' linguistic production skills while systematically cultivating composite competencies encompassing critical reasoning and intercultural communicative competence. Instructors face dual challenges: achieving dynamic equilibrium between knowledge transmission and skill development within constrained timetables, and undergoing paradigm shifts in educational roles — from conventional knowledge disseminators to learning facilitators. This transformation process necessitates continuous updating of pedagogical philosophies and methodological frameworks, thereby imposing rigorous academic demands on faculty professional advancement.

4. The Application of Ecological Teaching Model in College English Speech and Writing

According to the three essential characteristics of the ecological teaching concept, the core principles of the ecological teaching model for college English speech and writing courses are: integrality (integrating language skills, cultural awareness, and technological application into a unified system), dynamism (task designs continuously evolve in response to shifting student needs and environmental factors), diversity (accommodating learners with varied language proficiencies and cultural backgrounds).

4.1 Theoretical basis and design principles of ecological teaching model

The core ecological theories of "ecological niche", "state", and "potential" constitute the theoretical foundation. In educational ecology, curriculum niche denotes a course's functional positioning and resource allocation strategy within the broader educational ecosystem (Fan, 2000). Within college English speech and writing courses, this niche manifests through two dimensions: Functional orientation operates as the central training platform for language output capacity, synthesizing three critical functions — language skill cultivation, cross-cultural communication, and critical thinking development; Resource allocation involves dynamic coordination of instructional roles (teachers as cognitive guides, students as active knowledge constructors), technological tools (including online collaborative platforms and AI-powered writing feedback systems), and cultural materials (comparative analyses of Sino-Western rhetorical case studies) to achieve optimized resource adaptation.

"State" and "Potential", fundamental ecological concepts describing a system's current condition and developmental trajectory, find pedagogical relevance in addressing systemic constraints. Traditional classroom practices revealing compartmentalized writing tasks and decontextualized speech training epitomize the teaching system's "state" — characterized by the disjunction between knowledge transmission and competency development (Zhang, 2020). To transcend these limitations, harnessing "potential" becomes imperative: Through VR technology simulating international conference environments, an immersive speech ecosystem is constructed, enabling students to navigate cross-cultural complexities within authentic contexts, thereby enhancing their competitive readiness in academic arenas; Concurrently, big data analytics identify prevalent writing deficiencies (e.g., logical inconsistencies and cultural representation gaps), generating customized learning pathways that transition instruction from standardized approaches to precision-enhanced development (Zhang & Wang, 2017). This state-potential equilibrium mechanism not only optimizes current pedagogical conditions but also activates synergistic potential between technological empowerment and cultural integration, ultimately transforming curricula from static

knowledge repositories into dynamic competency cultivation ecosystems.

4.2 Construction of course framework

The application of ecological teaching model in college English speech and writing courses needs to build a systematic practical framework covering teaching objectives, contents, methods and evaluation, so as to achieve the dynamic balance and sustainable development of teaching ecology. The following is the curriculum framework of "language-culture-technology" three-dimensional ecological model built by our school from 13 observation points based on the above four basic dimensions.

Table 1 Three-dimensional Ecological Model of Curriculum Framework

integrated teaching goal	language competence	Students should be able to develop academic presentation and writing skills that meet international standards (e.g. TED talks, academic paper structures).
	cultural symbiosis	Students should be able to incorporate the task of "Chinese culture interpretation" into the writing (such as writing the proposal of intangible cultural heritage protection in English), and design the "cross-cultural perspective debate" in the speech.
	technology literacy	Students should be skilled in using Echo, Grammarly, Padlet and other tools for collaboration and feedback.
diversified teaching content	public speech	simulation system of oral English training (VR platform); real-time audience feedback system (e.g. Mentimeter)
	academic writing	closed-loop topic chains of "topic selection - research - writing - mutual evaluation - revision"
	culture output	Workshop on the Global Dissemination of Chinese Stories
multiple teaching methods	project-based learning	Students work in groups to complete "Research Report (writing) + Model United Nations Speech (speech)"
	dynamic feedback	three-level evaluation featuring "AI grammar (accent, wording) error correction + peer evaluation + teacher final review", real-time data visualization
	blended learning	deep integration of online (MOOCs resource learning, asynchronous discussion) + offline (scenario simulation, face-to-face discussion)
dynamic evaluation system	language	grammar, lexical complexity (Tool: Coh-Metrix Text Analysis)
	culture	cross-cultural sensitivity (e.g., avoidance of gestures in speech)
	technology	proficiency of use of digital tools (e.g., use of intelligent platforms such as ChatGPT)
	formative evaluation	e-learning portfolio to track students' trajectories on the learning platform

4.3 Effect evaluation and feedback

Since the course's inception, it has undergone three iterative cycles. Course effectiveness evaluation draws on multidimensional data including

institutional course metrics, student performance records, learner feedback, and instructional reflections, systematically assessing four critical dimensions of the curricular ecological framework across implementation phases. The attainment level of teaching objectives, along with the pedagogical appropriateness of instructional content and methodologies, has been empirically validated through quantitative analysis. This investigation employs longitudinal tracking to examine competency progression patterns among distinct student cohorts throughout the semester, thereby verifying the fulfillment of ecological curriculum objectives. A specialized English Speech and Writing Competency Assessment Instrument (ESW-CAI) was developed, administering standardized pre-post testing across all course iterations with six measurement indices aligned to the curricular framework: linguistic structural competence, logical coherence, oral delivery proficiency, cultural integration capacity, collaborative output skills, and technological mediation aptitude. During the initial iteration, cohort-wide mean scores across these six parameters were computed, with statistically significant low-scoring indicators targeted for enhancement in subsequent cycles through strategic modifications to content sequencing, instructional approaches, and assessment protocols. Given demographic variations across the three student cohorts, direct comparison of overall competency gains proves methodologically unsound. Consequently, paired-sample t-tests were exclusively conducted for prioritized improvement indicators per iteration to confirm targeted enhancement efficacy. Representative analysis demonstrates measurable progression in the "oral delivery proficiency" metric across implementation cycles. The table below shows the adjustment result between tow rounds of course.

For example, in the first round of post-test, the average score of "oral expression" was 70.2 points (full mark 100, standard deviation SD=8.5, sample size N=30), which was significantly lower than other indicators (such as language structure level 78.6 points). Therefore, the second round of courses targeted the addition of situational simulation training (such as VR simulation of international conference speech, business negotiation role play), and the introduction of instant feedback mechanism. The paired sample T-test was conducted on the second round of post-test data of students in the same class, and the result showed that the average score of the second round of "oral expression" post-test increased to 80.5 points (SD=7.2), which was 10.3 points higher than that of the first round. The result of T test was $t(29)=5.89$, $p<0.001$ (bilateral test), indicating that the difference between the two rounds was statistically significant. Cohen's $d=1.07$, which is a large effect (usually $d\geq0.8$ is a large effect), indicating that situational simulation training has a significant practical effect on the improvement of oral expression. After the second round of course, "collaboration" output index averaged only 72.1 points (SD = 9.1), reflect the team cooperation problems in division of labor is not clear, low communication efficiency. Therefore, the project-based collaborative learning model was introduced in the third round of the course, including

Table 2 Statistical Test Parameters Comparison Between Two Course Rounds

Indicator	Round 1 (M±SD)	Round 2 (M±SD)	Change Score	t(df)	p-value	Cohen's d (Effect Size)
Oral Expression	70.2±8.5	80.5±7.2	↑10.3	t(29)=5.89	<0.001	1.07 (Large)
Language Structure	78.6±6.8	79.1±7.1	↑0.5	t(29)=0.62	0.539	0.07 (Negligible)

the development of a detailed division of labor table, the setting of phased results reporting nodes, and the evaluation system combining peer evaluation and teacher comments. The average score of the third round of "collaborative output" increased to 83.7 (SD=6.8), an increase of 11.6 points from the second round. The result of T-test was $t(29)=6.23$, $p<0.001$, and the difference was extremely significant. The effect size $d=1.13$ further proves that the optimization of collaborative learning mode has a significant effect on the quality of students' team task completion.

The above numerical analysis provides solid empirical support for the optimization of the curriculum framework. However, Van Lier (2004) pointed out that the quality of education should take precedence over quantitative standards, and more attention should be paid to the deep value of learning experience. It is embodied in personal preferences, past experiences, future aspirations, practical possibilities, and a host of other ingredients (Van Lier, 2010). The college English speech and writing course under the ecological teaching mode should pay more attention to the learners' learning feelings and the teaching implementers' execution feelings. To this end, this study designed interviews, teacher logs, classroom observations and other actions and carried out qualitative analysis. In the first round of the course, the teacher observed that students generally showed nervous emotions and low participation in the lecture, and the classroom interaction mainly focused on the teacher's explanation. After introducing situational simulation training in the second round, the teacher wrote: "Students' enthusiasm for participation was significantly improved. When simulating business negotiations, students actively consulted Chinese and Western business etiquette materials, and tried to use different language strategies in role play, which improved the depth and breadth of class discussion." Students' feedback showed that situational simulation and immediate feedback significantly improved the practical ability of oral expression, and the collaboration mechanism also optimized the efficiency of group tasks. The typical case in the "Facts and Opinions" lesson shows that individuals are able to think autonomously about where to go and how to obtain positive ecological provisions for themselves. Although the above conclusions positively confirm the effectiveness of dynamic adjustment and ecological feedback, they are not accurate to the control variables, and the adjustment of learning content and teaching methods cannot be completely separated. Therefore, data processing must be combined with qualitative analysis.

5. Conclusion

Research demonstrates that the ecological teaching model enhances students' language proficiency, intercultural competence, and digital literacy through balanced course designs and adaptive feedback, while boosting learners' confidence in overcoming speaking/writing challenges. Future efforts should focus on three priorities: (1) integrating balanced Chinese-Western cultural content with AI-driven multidimensional assessments, (2) developing profession-specific modules through cross-disciplinary collaboration and teacher training communities, and (3) refining the model to meet global competency demands. By synergizing language training, intercultural understanding, and technology-enhanced collaboration, this approach offers an innovative framework for cultivating globally competitive professionals.

Conflict of Interest

The author declares that she has no conflicts of interest to this work.

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