

# Construction and Empirical Study of an ESP Teaching Model Oriented by Ecological Discourse Literacy: a CLIL-Based Practice Under the "Beautiful China" Strategy

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## ABSTRACT

Amid the comprehensive implementation of China's "Beautiful China" initiative, ecological civilization has emerged as a pivotal driver of higher education curriculum reform. This study integrates constructivist learning theory, Content and Language Integrated Learning (CLIL), systemic functional linguistics (SFL), and intercultural communication theory to propose a theoretical framework for Ecological Discourse Literacy (EDL). Based on this framework, an English for Specific Purposes (ESP) teaching model tailored to engineering education is developed, embedding ecological concepts within language instruction to enhance students' linguistic proficiency, ecological awareness, and intercultural communicative competence. A 16-week quasi-experimental study involving 120 undergraduate engineering students was conducted, employing a pre- and post-test control group design. Findings reveal statistically significant improvements in the experimental group's linguistic proficiency, ecological cognition, and intercultural communication confidence ( $p < 0.01$ ). This research offers theoretical and pedagogical insights for aligning foreign language education with national ecological and ideological priorities, contributing to the development of China's international ecological discourse system.

## KEYWORDS

Ecological discourse literacy; Content and language integrated learning (CLIL); Beautiful China; Engineering ESP; Teaching model; Ecological cognition

## 1 Introduction

In the context of global ecological governance and China's "Beautiful China" strategy, the cultivation of interdisciplinary talent equipped with ecological literacy and global communicative competence has become a critical imperative for higher education. English for Specific Purposes (ESP) in engineering education, a cornerstone for developing professional and intercultural communication skills, requires realignment with national strategic objectives to integrate ecological values into language pedagogy effectively. While ideological and political education has gained traction in foreign language curricula, the incorporation of ecological civilization into engineering ESP remains inconsistent and lacks depth. Existing pedagogical approaches often fail to synergize content design, professional development goals, and national policy directives.

To address this gap, this study constructs and empirically validates an ESP teaching model grounded in Ecological Discourse Literacy (EDL), aligning with the "Beautiful China" initiative. The model seeks to enhance students' linguistic proficiency, ecological awareness, and capacity to engage in global ecological discourse. By integrating Content and Language Integrated Learning (CLIL) principles, the study bridges language education with ecological content, fostering a holistic educational approach that responds to both national and global imperatives.

## 2 Theoretical foundations and conceptual framework

### 2.1 Integrated theoretical approach to pedagogical design

The construction of the ESP teaching model in this study is underpinned by an integrated theoretical approach, incorporating four key theoretical perspectives:

Constructivist Learning Theory serves as the cognitive foundation for the model, emphasizing learners' active role in constructing knowledge through meaningful contexts. By embedding ecological scenarios relevant to green development and sustainability, learners are encouraged to internalize linguistic knowledge and values through situated learning experiences.

Content and Language Integrated Learning (CLIL) Theory underlines the interdependence between subject-specific knowledge acquisition and language proficiency development. The model adopts a dual-focus instruction strategy, facilitating the simultaneous enhancement of students' ecological knowledge and English language competence.

Systemic Functional Linguistics (SFL) provides analytical tools for exploring the contextual and functional aspects of ecological discourse. SFL-based instruction supports learners in decoding and producing context-appropriate language structures, thereby cultivating critical discourse awareness and functional language skills.

Intercultural Communication Theory, combined with Ecological Education Theory, informs the cultivation of learners' intercultural competence and ecological values. This integrated perspective supports the development of a holistic communicative competence framework—encompassing linguistic accuracy, ecological reasoning, and value articulation.

## 2.2 Conceptualization of ecological discourse literacy (EDL)

Ecological Discourse Literacy (EDL), as proposed in this study, is conceptualized as a multi-dimensional construct integrating three core competencies: linguistic expression, ecological cognition, and value-based judgment. The EDL framework aims to empower learners to critically engage with ecological issues through the medium of English, aligning with the broader goal of contributing Chinese perspectives to global ecological narratives.

Specifically, EDL comprises the following dimensions:

(1)Linguistic Expression: Mastery of ecological terminology, discourse structures, and genre-specific features within ecological contexts.

(2)Ecological Cognition: Understanding ecological systems' principles, sustainability frameworks, and human-environment interactions.

(3)Value Judgment: Ability to articulate ecological values, advocate sustainable development, and interpret environmental ethics within intercultural contexts.

This triadic model of EDL provides a comprehensive framework for designing ESP curricula that support students' development as competent communicators, critical thinkers, and culturally aware ecological advocates in international discourse communities.

## 3 Teaching model construction and implementation

### 3.1 Curriculum content system reconstruction

The teaching model proposed in this study is centered around the theme of "Green Building and Smart City Development," aiming to cultivate integrated competencies in language, content knowledge, and cultural awareness. The curriculum is organized into a multi-tiered structure that aligns pedagogical objectives with real-world applications, structured as follows:

(1)Linguistic Proficiency Objective: To master technical terminology and syntactic structures commonly used in ecological engineering discourse. Implementation includes corpus-informed instruction, lexical chunk learning, and grammar-focused production tasks.

(2)Content Knowledge Objective: To develop a comprehensive understanding of China's green building evaluation systems and regulatory policies. Instructional activities include critical analysis of government white papers, scholarly readings, and guided case study reviews.

(3)Cultural Cognition Objective: To cultivate an understanding of comparative ecological values and sustainable practices across different cultural contexts. Project-based learning, debate, and reflective writing are integrated to promote deep cultural engagement.

Teaching materials were drawn from multimodal sources such as official policy documents, international academic publications, and multimedia ecological data. Assessment tasks required students to compose a research-based academic paper titled "Green Building Innovation and Chinese Practice," fostering synthesis of language skills, ecological knowledge, and critical thinking.

### 3.2 Three-stage instructional model

To facilitate the internalization and application of ecological discourse literacy, a cyclical instructional framework was developed comprising three stages:

Stage 1: Language Input – This stage introduces learners to key linguistic and conceptual elements via multimodal input, including documentaries, academic lectures, and environmental data visualization. Emphasis is placed on vocabulary acquisition, genre awareness, and thematic immersion.

Stage 2: Cognitive Internalization – Learners engage in collaborative inquiry and problem-based tasks that integrate language development with ecological reasoning. Instructional strategies include group discussion, scenario simulation, and guided problem-solving.

Stage 3: Competence Output – Learners demonstrate their ecological discourse literacy through performance-based assessments such as academic presentations, poster exhibitions, and structured academic writing. Feedback mechanisms include peer evaluation and rubric-based instructor assessment.

## 4 Teaching model design and implementation

### 4.1 Teaching philosophy oriented by ecological discourse literacy

Pedagogical Philosophy Guided by the “Beautiful China” strategy, the teaching model transcends traditional language instruction by embedding ecological discourse literacy. This approach equips students to analyze, articulate, and advocate for ecological civilization, fostering socially responsible engineering professionals capable of contributing to global sustainability dialogues.

### 4.2 Construction of the teaching model

This study constructs a CLIL (Content and Language Integrated Learning) teaching model centered on ecological discourse literacy, integrating content and language teaching, which includes the following key elements:

(1)Content Selection: Selecting thematic materials related to ecological civilization and environmental engineering, aligned with the “Beautiful China” strategy;

(2)Language Objectives: Setting listening, speaking, reading, and writing proficiency goals that meet the requirements of engineering English, with emphasis on ecological terminology and expressions;

(3)Teaching Methods: Employing task-based learning, project-driven approaches, and other interactive methods to enhance students’ engagement and practical skills;

(4)Evaluation System: Designing a diversified assessment framework covering language skills and ecological discourse comprehension.

### 4.3 Teaching implementation pathway

The teaching implementation is divided into three stages:

Preparatory Stage: Teachers receive training in ecological discourse literacy and CLIL concepts and develop teaching plans;

Classroom Teaching Stage: Deepening ecological discourse understanding through case analyses, group discussions, and multimedia aids;

Post-Class Extension Stage: Reinforcing students’ autonomous learning and application abilities via extracurricular reading, research reports, and ecological-themed presentations.

### 4.4 Implementation guarantee measures

To ensure the effective implementation of the teaching model, the school needs to provide necessary teacher training and resource support, build interdisciplinary collaboration platforms, and establish feedback mechanisms for continuous optimization of teaching content and methods.

## 5 Empirical validation

### 5.1 Research design

A 16-week quasi-experimental study was conducted with 120 undergraduate engineering students, utilizing a pre- and post-test control group design. The experimental group received instruction based on the proposed EDL-oriented ESP model, while the control group followed a traditional ESP curriculum. Outcome measures included linguistic proficiency, ecological cognition, and intercultural communication confidence, assessed through standardized tests, reflective essays, and self-reported surveys.

### 5.2 Findings

Statistical analysis revealed significant improvements in the experimental group across all measured dimensions ( $p < 0.01$ ). Specifically:

Linguistic Proficiency: Enhanced mastery of ecological terminology and discourse structures.

Ecological Cognition: Increased understanding of sustainability frameworks and environmental policies.

Intercultural Confidence: Greater self-efficacy in articulating ecological values in cross-cultural contexts.

These findings validate the efficacy of the EDL-oriented model in fostering integrated competencies.

### 5.3 Challenges and strategic interventions

Implementation challenges were identified through classroom observations, teacher interviews, and student feedback:

Faculty Competency Gaps: Limited interdisciplinary knowledge among instructors.

Resource Scarcity: Insufficient localized ecological English materials.

Outdated Assessment Systems: Inadequate rubrics for evaluating ecological literacy.

Limited Experiential Opportunities: Few platforms for real-world ecological communication practice.

To address these, the following interventions are proposed:

Faculty Development: Interdisciplinary workshops and team-teaching initiatives.

Resource Innovation: AI-assisted platforms with localized ecological corpora and interactive simulations.

Assessment Reform: Rubrics evaluating linguistic, ecological, and intercultural competencies.

Experiential Learning: Immersive activities, such as mock UN climate summits and community-based projects.

#### 5.4 Strategic recommendations for optimization

To address these constraints, a multi-level intervention framework is proposed:

Faculty Development Programs: Promote interdisciplinary team teaching, conduct workshops on ecological education, and facilitate faculty exchange programs with environmental science departments.

Instructional Resource Innovation: Develop AI-assisted digital platforms containing localized ecological discourse corpora, annotated texts, and interactive case simulations.

Assessment Reform: Design rubrics that assess not only linguistic accuracy but also ecological reasoning, intercultural sensitivity, and discourse coherence. Practice-Oriented Learning Modules: Launch immersive experiences such as mock UN climate summits, eco-debates, and community-based ecological storytelling projects.

### 6 Conclusions and future directions

This study constructs and validates an ESP teaching model grounded in Ecological Discourse Literacy, aligned with the "Beautiful China" strategy. Empirical findings demonstrate significant improvements in students' linguistic proficiency, ecological cognition, and intercultural competence, underscoring the model's pedagogical efficacy. Theoretically, the study advances the conceptualization of EDL and its integration into CLIL-based instruction. Practically, it offers actionable strategies for curriculum reform, resource development, and assessment innovation in ecological civilization education. Future research should focus on:

(1) Expanding the sample size and disciplinary scope to enhance generalizability.

(2) Conducting longitudinal studies to track the development of ecological discourse competence.

(3) Promoting multilingual dissemination of Chinese ecological narratives to strengthen global ecological governance discourse. By aligning foreign language education with national and global ecological priorities, this study contributes to the cultivation of interdisciplinary talent capable of advancing China's ecological civilization on the world stage.

References

#### Funding

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#### References

- [1] Coyle, D., Hood, P., & Marsh, D. (2010). CLIL: Content and Language Integrated Learning. Cambridge University Press.
- [2] Byram, M. (1997). Teaching and Assessing Intercultural Communicative Competence. Multilingual Matters.
- [3] Halliday, M. A. K. (1994). An Introduction to Functional Grammar. Edward Arnold.
- [4] Kramsch, C. (2014). Teaching foreign languages in an era of globalization. *The Modern Language Journal*, 98(1), 296–311.
- [5] Fill, A., & Mühlehäusler, P. (Eds.). (2001). *The Ecological Reader: Language, Ecology and Environment*. Continuum.
- [6] UNESCO. (2020). *Education for Sustainable Development: A Roadmap*. UNESCO Publishing.
- [7] Ministry of Education Higher Education Department. (2023). *Guidelines for Curriculum Ideological and Political Construction in the New Era*. Higher Education Press.
- [8] Han, B. C. (2019). Theory and practice of integrating ecological concepts into college English teaching. *Foreign Language Teaching and Research*, 51(3), 323–332.
- [9] Chen, J. L. (2020). Foreign language teaching reform and practice from the perspective of curriculum ideological and political education. *Foreign Language World*, (2), 2–8.
- [10] Liu, S. X. (2021). Ecological discourse analysis approach: Research on ecological literacy education in college English teaching. *Journal of Beijing International Studies University*, 43(4), 33–44.