

AI-Empowered Innovation in Graduate English Teaching: An Exploratory Study Based on Textile and Apparel Institutes

ZHANG Huiqin

Beijing Institute of Fashion Technology, Beijing, China

YANG Shanru

Hubei University of Technology, Wuhan, China

Graduate English education is now facing an urgent need to shift from “knowledge transmission” to “ability cultivation” and “quality enhancement”. This study focuses on the English teaching for graduate students in textile and apparel Institutes, taking into account the unique disciplinary characteristics and major needs of such institutions. Guided by the artificial intelligence (AI)-empowered 5E instructional model (Engage, Explore, Explain, Elaborate, Evaluate), it explores practical pathways to enhance graduate students’ ability to use English for professional expression, academic communication, and cross-cultural interaction—particularly in the context of telling Chinese clothing culture stories to the world. By employing case analysis, the study implements the specific application of the AI-empowered 5E teaching model, aiming to facilitate the synergistic development of students’ language proficiency, professional competence, and cross-cultural communication skills.

Keywords: artificial intelligence, 5E instructional model, graduate English, cross-cultural communication

Introduction

In recent years, with the rapid advancement of artificial intelligence (AI) technologies, their application in the field of education has gradually shifted from being a supplementary tool to becoming a driver of deep empowerment and pedagogical transformation, serving as a key engine for advancing educational modernization and teaching innovation (Dong & Zhan, 2020). In 2019, UNESCO issued the *Beijing Consensus on Artificial Intelligence and Education*, which explicitly called for “leveraging AI platforms and key technologies such as data-driven learning analytic to build a lifelong learning system that enables everyone to learn, everywhere and anytime”. The *New Generation Artificial Intelligence Development Plan* issued by the State Council of China emphasized “accelerating the reform of talent cultivation models and teaching methods through intelligent technologies”. Similarly, the *Higher Education Institutions Artificial Intelligence Innovation Action Plan* launched by the Ministry of Education initiated two rounds of pilot programs aimed at promoting the development of teachers through AI—among other initiatives. China’s *New Generation Artificial Intelligence Development*

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ZHANG Huiqin, Dr., Professor, International Department, Beijing Institute of Fashion Technology, Beijing, China.

YANG Shanru, International Teacher, International Department, Hubei University of Technology, Wuhan, China.

Plan and *Higher Education Institutions Artificial Intelligence Innovation Action Plan* have both underscored the importance of “utilizing intelligent technologies to accelerate reforms in talent cultivation models and teaching methodologies”. These policies and initiatives indicate that “AI + education” is triggering profound transformations in educational philosophies, teaching models, and learning approaches on a global scale, providing both timely opportunities and policy support for higher education reform—especially in the realm of graduate-level English instruction (Gao & Zhang, 2024).

Theoretical Rationale for Adapting the 5E Instructional Model to the Cultivation of Internationalized Talents in the AI Era

As Hu Jiasheng and Qi Yajuan (2023) point out, ChatGPT symbolizes the advent of a new era, guiding the formation of a new language intelligence ecosystem that will profoundly integrate into people’s learning and the foreign language education ecosystem. Educators in the field of foreign language education should clearly recognize the educational transformations brought about by the era of language intelligence. The 5E model (Engage-Explore-Explain-Elaborate-Evaluate, here adapted as Engage-Explore-Elaborate-Evaluate-Extend) explored in this paper, as a student-centered, active construction and continuous development-oriented teaching framework (Feng & Zhang, 2024), originally a classic paradigm in science education, can—after being localized and adapted—provide theoretical support for the reform of graduate English courses in art-focused institutions and the cultivation of high-level internationalized talents.

In the context of English teaching for graduate students in Art institutions, the 5E model offers a targeted solution:

Engage (Immersive Introduction): Through AI-driven approaches, immersive learning tasks are designed based on virtual scenarios—such as role-playing in virtual international art forums or designing English guided tours for AI-generated artworks—to stimulate students’ intrinsic motivation to view “English as a tool for internationalization”.

Explore (Inquiry-Based Learning): Students are encouraged to engage in self-directed exploration of the expressive logic of professional English in the arts, using AI tools (e.g., academic English corpora, Tencent Yuanbao, ChatGPT). They investigate aspects such as the academic conventions of exhibition texts or the understanding and application of AI art theory.

Elaborate (Deepen and Expand) by engaging in real collaborative activities—such as jointly instructed Sino-foreign English seminars or international workshops (e.g., AI art creation projects in partnership with overseas art institutions)—to strengthen their cross-cultural communication and technical English application skills in authentic collaborative settings.

Evaluate (Multifaceted Assessment): Students’ performance is assessed through diverse evaluation methods—including self-assessment, peer assessment, and teacher feedback—combined with AI-assisted formative assessments (e.g., intelligent speech analysis of the fluency of academic presentations, corpus tracking of the frequency of specialized terminology use) and assumptive evaluations (e.g., the quality of English reports on project outcomes) (Jiao & Chen, 2023). This enables precise diagnosis of students’ weaknesses in areas such as cross-cultural communication strategies and academic English expression, allowing for dynamic feedback on their ongoing development.

Extend (Transfer and Innovation): Finally, teachers guide students in transferring their English proficiency to real-world contexts such as international publication (e.g., writing academic papers in their research fields)

and cross-border collaboration (e.g., participating in applications for international arts funding). This effectively activates students' interest in participation, forming a closed loop of "learning—practice—innovation", and shifting their mindset from "I have to learn" to "I want to learn".

Through this adapted 5E (Engage-Explore-Elaborate-Evaluate-Extend) model, the teaching of English in art-focused graduate programs can be re-imagined to better align with the demands of the AI era, fostering internationally competent professionals who are not only linguistically proficient but also critically engaged and culturally adept.

Graduate English Teaching Design in Art-Focused Institutions: The 5E Model Integrated With AI Technology

According to the instructional requirements of each phase within the 5E model, and in alignment with the teaching theme and objectives of Unit 2, "Beautiful China", from the *Understanding Contemporary China-Reading and Writing Textbook*, teachers construct a logical framework for the AI-powered intelligent teaching system under the AI perspective. The specific framework is illustrated in Figure 1.

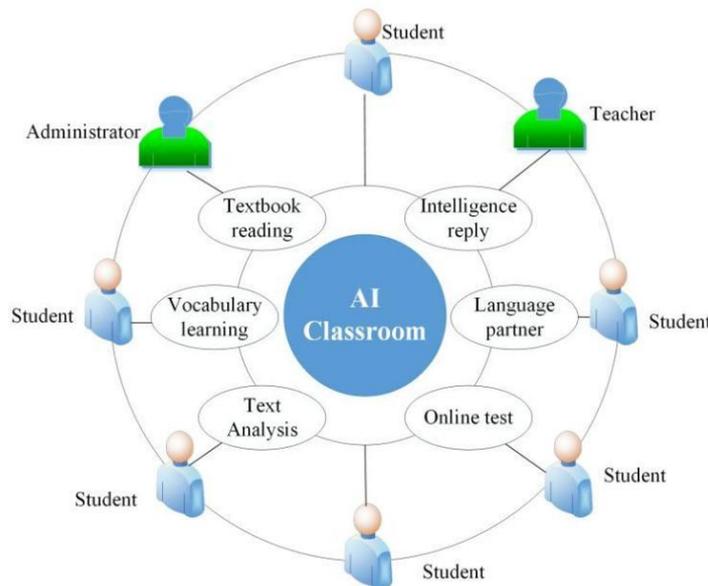


Figure 1. Logical structure diagram of the AI-powered intelligent learning system. Source: drawn by the author.

As shown in the self-drawn Figure 1 Logical Structure Diagram of the AI-Powered Intelligent Learning System, it can be observed that with the support of AI-assisted teaching, students are able to achieve a complete closed loop in the entire language learning process through AI technology. This includes autonomous pre-class activities such as text reading-aloud and vocabulary learning, in-class activities such as text analysis, intelligent Q&A, and interactions with AI learning companions, as well as post-class activities such as online assessments.

Reflections on the AI-Empowered 5E Graduate English Teaching Model

The core of AI-empowered graduate English education lies in leveraging technology to provide multi-modal language input. Through Engage (immersive introduction), students' enthusiasm for learning is stimulated. Under the guidance of clearly defined teaching objectives and tasks, students obtain information through various channels, understand and acquire language, and strengthen the learning process.

While learning with the aid of technology, students are encouraged to search for digital resources according to their individual learning needs, enriching their learning content. In the Explore (inquiry-based learning) phase, they are motivated to gradually shift from being passive “learners” to taking on multiple, even unintentional, roles as “teachers”. Through Elaborate (deepening and expanding), they begin to conduct Evaluate (multidimensional assessment) of their own learning outcomes. Finally, in the “doing” phases such as human-AI dialogue and AI-supported writing, students Extend (transfer and innovate) by continuously refining their work, thereby improving learning effectiveness.

A key point of the 5E model lies in the coordination between teaching and learning during the Elaborate phase, as well as the appropriate balance or “degree” of guidance. Teachers should first guide students in conducting literature searches and inspire them to think independently about how China’s ecological civilization is being advanced within the textile, fashion, and apparel industries—for example, how current policies promote green transformation.

Teachers introduce specific cases, such as: China’s *Green Development Plan for the Textile Industry (2021-2025)*, which mandates the elimination of 30% of outdated production capacity and the promotion of bio-based fibers by 2025. In Zhejiang Province’s “Zero-Waste City” pilot, the wastewater reuse rate of textile enterprises increased to 90% (Ministry of Ecology and Environment, 2023).

The most challenging—and highest—goal of the 5E model is guiding students to achieve Extend (transfer and innovation). Teachers encourage students to use online resources such as Unit 6 of the “Understanding Contemporary China” Speech Course (<https://moocs.unipus.cn/course/explore>) to master presentation skills and articulate their understanding of the quote: “Heaven and earth coexist with me; all things and I are one”. (Explain the following quote and reflect on its contemporary relevance.) Students are also guided to conduct related research based on what they’ve learned.

According to research on the online course provider Study.com, approximately 89% of American college students admit to using ChatGPT to complete homework, 48% use it for quizzes, over 50% use it to write essays, and 22% use it to generate essay outlines (Zhou & Li, 2023, p. 106). To prevent over-reliance on AI, teachers adopt group collaboration strategies. For example: Comparative calculations: Contrasting the resource consumption (water, pesticides, carbon emissions) of producing one cotton T-shirt versus one synthetic jacket. Field surveys: Investigating how local clothing stores handle discarded garments and proposing recycling improvements. Design projects: Creating a “Campus Old Clothes Rebirth Program” that combines biodegradable materials or up-cycling practices to propose innovative solutions.

Through reflection on the above teaching segments under the 5E model, teachers should strengthen curriculum-based ideological and political education (ideological infusion), organically integrating ideological elements into the interpretation of China’s environmental philosophy.

In practice, teachers using the AI-empowered 5E model in graduate English teaching are able to timely identify students’ needs, gain a deeper understanding of learner profiles, and continuously adjust the roles between themselves and their students. Gradually, the role shifts from being a relatively one-dimensional English instructor to becoming a facilitator of “whole-person” development—emphasizing understanding, communication, guidance, support, care, and appreciation.

Within an atmosphere of mutual respect, appreciation, and collaboration, students’ learning interest increases significantly, and teaching effectiveness improves markedly. In just one academic year of practice, the number of graduate students publishing academic papers surged, and this contributed to the launch of an

institutional English-language academic journal. Teachers themselves became key contributors to the journal. In this way, the concept of “learning and teaching mutually reinforcing each other” is vividly validated through the exploration of the 5E teaching model.

Conclusion

AI technology serves not only as a repository of knowledge but also as a vehicle for its transmission. The integration of language and technology, along with the exploration and practice of the 5E instructional model—Engage (immersive introduction), Explore (inquiry-based learning), Elaborate (deepening and expanding), Evaluate (multidimensional assessment), and Extend (transfer an innovation)—creates a more inclusive, engaging, and effective learning space and mode of communication for learners. Through blended online-offline teaching guided by the philosophy of “technology as the oar, and education as the purpose”, the learning ecosystem is transformed. To a certain extent, this reshapes traditional perceptions and understandings of education, giving rise to a new paradigm of foreign language education that is intelligent, precise, and personalized.

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