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From Tool Assistance to Ecosystem Reconstruction: AI-Empowered Advanced Academic English Instruction

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Abstract

Graduate academic English instruction faces a structural mismatch: students need language support oriented toward research output, while conventional classrooms remain centered on general skills. Artificial intelligence offers a technical solution, yet most practices remain at the level of "tool assistance" without touching instructional logic. Drawing on a teaching design based on Unit 5 of New Era Academic English Integrated Course for Postgraduates, this paper proposes the "AI-augmented researcher" orientation and articulates three conceptual pillars: needs transformation driven by postgraduate pedagogy, a constructivist intelligent cognitive ecosystem, and a data-driven precision loop within a CBI framework. Grounded in the BOPPPS model (Liu, 2024), it outlines pathways across objectives, content, method, and assessment. Teaching reflection exposes persistent tensions—shallow human-AI collaboration

Keywords

Artificial Intelligence; Graduate Academic English; Human-AI Collaboration; BOPPPS; Critical AI Literacy

1. Introduction

Graduate public English instruction has long occupied an awkward position. On one hand, students face the immediate pressure of publishing international journal articles and participating in academic conferences from their first year, creating urgent and concrete demands for academic reading, writing, and oral communication. On the other hand, the general English training many students received as undergraduates is insufficient to support higher-order academic tasks such as critical literature review, paper composition, and international dialogue. This mismatch between supply and demand constitutes the core driver of reform in graduate English teaching.

The rapid development of artificial intelligence offers new possibilities for bridging this gap. From intelligent writing feedback to simulated academic scenarios, from

personalized corpus recommendation to data-driven tracking of learning processes, AI tools are reshaping the basic forms of academic English teaching and learning. Yet a close examination of current practice reveals that most explorations remain at the level of "tool assistance": using AI to correct grammar, employing chatbots for oral practice, or relying on translation tools for reading. Technology is inserted into existing frameworks without disturbing the deeper structure of instructional logic. The question worth asking is therefore not whether AI can make existing classrooms more efficient, but whether it can serve as a lever for reconstructing the instructional ecosystem, driving systemic change from objective-setting to assessment logic.

Drawing on a teaching design for a graduate public English course, this paper articulates the conceptual framework and practical pathways of AI-empowered academic English instruction around the orientation of the "AI-augmented researcher." It then draws on teaching reflection to expose the limits and future directions of current explorations, offering an analytical perspective on the paradigm shift of graduate foreign language instruction in the digital-intelligent era.

2. Conceptual Reconstruction: Three Logics of AI Empowerment

2.1. The Logic of Postgraduate Pedagogy: Transforming Needs from "Learner" to "Researcher"

The defining feature of postgraduate education is its centering on research and inquiry. Unlike undergraduates, graduate students' learning motivation typically arises from real dilemmas encountered in research practice: a manuscript awaiting submission must conform to the stylistic norms of a target journal; an upcoming international conference presentation requires repeated refinement of expression strategies; a literature review demands efficient screening and critical evaluation of vast information. Such needs are markedly immediate and situated. Liu (2024), in discussing the design of graduate EAP courses, similarly notes that as adult learners, postgraduates' readiness to learn becomes increasingly oriented toward the developmental tasks of their research work, and that course design should therefore respond to their need for "immediate relevance" through task-based, situated approaches.

In this logic, the empowering role of AI lies not in providing static language "scaffolds" but in transforming students' immediate research needs into dynamic, personalized learning pathways. When a student is drafting a journal article, AI can offer stylistic proofreading and terminology suggestions tailored to the target journal; when preparing a conference presentation, AI can generate simulated questions and response rehearsals based on the student's research background. This needs-driven mode of empowerment embeds language learning within the research process rather than separating it from academic practice, making it an organic component of academic development. In this sense, the instructional

objective is no longer the vague formulation of "improving English proficiency" but is concretized as "supporting students in completing a deliverable academic product."

2.2. The Constructivist Logic: Constructing an Intelligent Cognitive Ecosystem

Constructivist learning theory emphasizes that learning is a process in which learners actively construct meaning through interaction with their environment. Liu (2024), in discussing blended instructional design for graduate academic English, grounds the design precisely in constructivism, stressing that teachers should provide learners with opportunities to access authentic materials, interact with others, and construct their own worlds, with modern educational technology furnishing the conditions for such multi-modal interaction. Artificial intelligence further upgrades this multi-modal environment into an interactive, generative, and adaptive intelligent cognitive ecosystem. Within this system, deep interaction between students and AI agents becomes an important pathway for meaning construction: in a virtual academic conference simulator, students can engage in real-time question-and-answer exchanges and debates with AI-generated "expert questioners," constructing academic discourse competence and impromptu response strategies in an approximation of authentic situations.

Meanwhile, the teacher's role undergoes profound transformation. When standardized tasks such as grammar correction and pronunciation feedback are delegated to AI, teachers are freed from repetitive labor to devote energy to professionally more valuable work: designing the structure of deep discussion, guiding students to critically evaluate AI-generated content, and cultivating awareness of academic ethics. The substance of this transformation is a shift from "knowledge transmitter" to "architect of the learning ecosystem"—no longer directly controlling every link in knowledge transmission, but designing conditions, creating situations, and stimulating higher-order thinking. Liu (2024) likewise characterizes the teacher's role under a constructivist pedagogy as a unity of facilitator, guide, and lecturer, which is directionally consistent with the "architect" positioning advanced here.

2.3. The CBI Logic: A Data-Driven Precision Teaching Loop

Content-Based Instruction (CBI) requires deep integration of language learning with disciplinary content. In conventional CBI practice, the selection of "content" often relies on teachers' experiential judgment and struggles to precisely match the actual needs of students from diverse disciplinary backgrounds. The intervention of AI makes data-driven precision possible in this link.

At the level of objectives, course goals can be concretized as "supporting students in completing a deliverable research output" rather than a generalized

"comprehensive language application ability." At the level of content, AI systems analyze students' disciplinary backgrounds, language proficiency, and current research progress to dynamically recommend authentic corpora highly relevant to their research fields. At the level of method, human-AI collaborative task-based teaching becomes the core organizational form: AI handles standardized training and immediate feedback, while teachers lead tasks requiring creativity and critical thinking. At the level of assessment, AI enables full-process tracking and analysis of learning data, generating personalized learning reports and making formative assessment genuinely precise and operable. The four links interlock to form a closed loop oriented toward research output as its terminal point.

3. Practical Pathways: Human-AI Collaborative Instructional Design within the BOPPPS Framework

These concepts must be operationalized through concrete instructional stages. The course in question takes Unit 5, "Public Health," of New Era Academic English Integrated Course for Postgraduates (Volume 1) as its theme and organizes four class hours using the BOPPPS model. The choice of this model is not incidental: Liu (2024) has systematically demonstrated the applicability of BOPPPS to graduate academic English courses, arguing that its "systematic and interactive nature" aligns well with the dual demand of academic English courses to address both language acquisition and critical thinking development. The present practice can be regarded as an extension that embeds AI-empowerment strategies within this model framework.

In the Bridge-in stage, differences in breakfast cultures across countries serve as an entry point to stimulate interest in the theme of "health and diet," creating a cognitive anchor for subsequent academic reading. In the Pre-assessment stage, a breakfast survey is distributed via an online questionnaire platform, and the Viewing section of the textbook is used as pre-test material to gauge students' existing understanding of the theme and their language proficiency, providing a basis for adjusting the subsequent instructional pace.

The Participatory activity stage is where AI empowerment is most concentrated. Reading instruction is organized around the task situation of a "simulated academic conference": students first clear up language difficulties through teacher explanation and platform-based reading, then draw mind maps to clarify the article's structure, with emphasis on identifying the rhetorical feature of "echo-effect" in academic writing. Subsequently, students use AI tools to produce academic posters, experiencing the complete process of academic communication from content distillation to visual presentation. The speaking component focuses on questioning and responding strategies in academic presentations; students log into a virtual academic conference platform to deliver simulated presentations, with AI playing the role of "expert questioner" to provide low-risk, high-fidelity rehearsal

opportunities. The writing component, drawing on the results of the introductory survey, provides training in chart description, with students using AI writing assistants to obtain immediate feedback on academic register. This sequence of activities is logically homologous to the participatory structure described by Liu (2024)—blended online-offline learning supported by a virtual academic conference system—with the difference that the present design further introduces AI agents into the simulation rehearsal link.

In the Post-assessment stage, students are required to search for and organize additional academic literature around the theme, encouraged to use tools such as ChatGPT, DeepSeek, Semantic Scholar, and Elicit to assist with literature retrieval and critical reading, and to pose reasonable academic questions regarding the limitations of existing research. This design extends AI tool use from the classroom into post-class research practice, making assessment itself a continuation of academic development.

4. Reflection and Tensions: The Limits and Pathways of Human-AI Collaboration

Teaching practice reveals a key problem: the introduction of AI does not automatically improve instructional quality. Between the "usability" of tools and the "effectiveness" of instruction lie several tensions requiring careful handling.

First, the shallowness of human-AI collaboration. In current practice, students' use of AI is concentrated on relatively lower-order cognitive tasks such as language polishing, grammar checking, and information retrieval, while critical evaluation and revision of AI-generated content has not yet become a self-conscious metacognitive behavior. In other words, students are "using" AI rather than "mastering" it. Liu (2024a), in reviewing research on AI-empowered intercultural competence development, notes that AI tools show significant potential for personalized feedback and preparatory training, but that their effectiveness depends heavily on whether they are positioned as "scaffolds" within a more comprehensive educational framework rather than as substitutes for human interaction. This judgment applies equally to academic English writing: without instructional arrangements that require students to question and revise AI output, students easily remain at the level of "procedural competence."

This observation is not isolated. Wang et al. (2026), in a systematic review of empirical research on AI applications in higher education English teaching, found that the existing literature is heavily skewed toward writing, relies predominantly on cross-sectional, small-sample, and self-reported data, and has therefore left unanswered the question of whether, and under what conditions, AI can produce sustainable learning gains. The review further indicates that AI's effectiveness depends heavily on teacher mediation and instructional design rather than on tool adoption per se. This suggests that the root of shallow human-AI collaboration may

lie not in students' inability to use AI, but in the absence of structured conditions and assessment incentives for using it critically.

The systematic review by Law et al. (2026) further refines this picture. Analyzing empirical studies published between 2021 and 2025, the review indicates that mainstream tools such as ChatGPT, Grammarly, and Duolingo do yield moderate to large gains in writing accuracy, vocabulary retention, and learner motivation, but simultaneously stresses that these benefits "depend on digital access, teacher training, and learners' critical engagement." In other words, the mere presence of tools does not guarantee that learning occurs. The review also notes a general lack of longitudinal designs, leaving unanswered a key question: when AI tools are withdrawn or task demands increase, do students still possess independent judgment and regulatory capacity? This gap points precisely to the question of "mastering" rather than "using" that concerns this paper.

Notably, this judgment must be read alongside another body of evidence. The mixed-methods study by Singh et al. (2026) across four Hong Kong universities shows that when GenAI tasks are systematically designed according to AI literacy principles, communicative language teaching, and self-determination theory, students' self-assessed AI literacy and their cognitive, behavioral, and social engagement all improve significantly. On the surface, this finding appears to contradict the judgment of "shallowness," but the divergence precisely reveals the crux of the matter: the effects reported by Singh et al. derive not from the "use" of GenAI tools per se, but from the conditions of competence, autonomy, and relatedness that the task design creates for students. This means that the depth of human-AI collaboration is not determined by technology adoption rates but by whether the instructional design embeds cognitive demands for judgment, selection, and revision into the task structure. Taken together, these three reviews and empirical studies converge on a single judgment: the educational effect of AI is a conditional proposition whose realization depends on whether instructional design provides structural support for critical participation. The phenomenon of students remaining at lower-order use in the present practice stems precisely from the absence of sufficient structural friction for "critical mastery" in the task design. The future direction of improvement, therefore, is to explicitly incorporate "the management and critical use of the AI-assisted process" into instructional objectives, designing dedicated activities that guide students to compare outputs across different prompting strategies and to identify biases and errors in AI-generated content.

Second, assessment criteria lag behind technological practice. When students use AI to produce posters, rehearse presentations, and revise writing, existing scoring systems struggle to distinguish the quality differences between "independent completion" and "AI-assisted completion," and are even less able to assess the judgment and regulatory capacity students display in human-AI

collaboration. Liu (2024a), in discussing AI ethics, specifically emphasizes the need to develop "critical AI literacy" modules so that students no longer treat AI as an infallible cultural "oracle" but as a critical inquiry tool open to questioning and evaluation. This proposition has direct implications for academic English assessment reform: assessment dimensions should gradually incorporate students' reflective accounts of their AI use, examining the rationality of their prompt design, output discrimination, and revision decisions.

Third, the affective dimension cannot be relinquished. The virtual academic conference system provides a high-fidelity rehearsal environment, but Liu (2024a) reminds us of the "simulation–authenticity gap": the safe practice space provided by AI cannot fully replicate the emotional complexity and unpredictability of human interaction, and students may develop procedural competence in simulation that fails in authentic, nuanced intercultural academic encounters. The moments in academic exchange that genuinely possess transformative power—a supervisor's incisive follow-up question, a peer's sincere challenge, the composure required to face uncertainty at a defense—still depend on real interaction between people. Future instructional design needs to delineate more clearly the boundary between human-AI interaction and human-human interaction: entrusting knowledge transmission, personalized practice, and simulation rehearsal to AI, while reserving precious face-to-face classroom time for deep debate, collaborative creation, and teachers' higher-order guidance. This is not a rejection of technology but a clear-eyed recognition of its boundaries.

5. Conclusion

The deeper significance of AI-empowered graduate academic English instruction lies not in adding intelligent tools to the classroom but in re-examining and reconstructing instructional objectives, content, methods, and assessment around students' authentic research needs. The exploration presented here suggests that when AI is embedded within a conceptual framework of "needs-driven—intelligent construction—data loop" and operationalized through the structured BOPPPS model (Liu, 2024), it may drive instruction from experience-driven toward human-AI collaborative, and from language training toward the generation of academic competence.

Yet this transformation is far from complete. The tensions exposed by current practice—the shallowness of human-AI collaboration, the absence of assessment criteria, and the gap between simulation and authenticity (Liu, 2024a)—indicate that technological empowerment is always a bounded and tension-laden process. The systematic reviews by Wang et al. (2026) and Law et al. (2026) jointly suggest that existing research is insufficient to answer the question of the sustainability of AI learning gains, while the positive evidence from Singh et al. (2026) suggests that the answer may lie not in the tools themselves but in whether instructional design

can create structural conditions for critical participation. The repositioning of the teacher—from knowledge transmitter to architect of the learning ecosystem—is both a response to the technological challenge and a return to the essence of education: in an age of increasingly powerful intelligent tools, what is it that only human beings can offer students? This question may be more worthy of sustained reflection than any technical solution.

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