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Constructing Collaborative Teacher-AI-Student Model for L2 Learning in the Context of AI

ZHAI Quanwei

Hubei University of Automotive Technology, China

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Abstract: With the rapid rise of large language models represented by ChatGPT and DeepSeek, foreign language learning has undergone profound changes. The traditional binary interaction model between teachers and students is gradually giving way to a triadic collaborative framework involving teachers, students, and AI systems. Building on a review of relevant domestic and international research, this study argues that research should focus on the functional positioning and operational mechanisms of artificial intelligence across different instructional stages in foreign language classrooms. Accordingly, foreign language teaching is reconceptualized as a three-stage process—pre-class, in-class, and post-class—corresponding respectively to basic language tasks, demanding cognitive activities, and language support. This framework highlights the differentiated instructional roles of AI at each stage and provides a structured approach for integrating AI into foreign language teaching in a pedagogically meaningful and human-centered manner.

Keywords: large language models; AI; collaborative interaction; foreign language teaching

Notes on the contributor: ZHAI Quanwei holds a PhD in translation studies and is an associate professor at Hubei University of Automotive Technology. His email address is 33152490@qq.com.

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1. Introduction

With the rapid emergence of large language models (LLMs) represented by ChatGPT and DeepSeek, foreign language learning has undergone profound transformations. As an increasing number of language-related tasks can now be completed efficiently through artificial intelligence, and as both teachers and students gain access to and proficiency in digital resources, traditional lecture-based classroom practices are facing significant challenges. Under these circumstances, foreign language education must critically examine which instructional components are likely to be replaced or reshaped by AI and how teaching content and pedagogical approaches should be adjusted in the context of AI-driven learning environments (Kong, 2024).

In response to the strategic directives articulated by President Xi Jinping on accelerating the development of artificial intelligence—particularly the emphasis on leveraging AI to support educational transformation—and in alignment with national policy documents such as the *Artificial Intelligence Innovation Action Plan for Higher Education Institutions* issued by the Ministry of Education, regions across China have actively promoted the deep integration of “artificial intelligence + education.” Major cities such as Beijing and Shanghai have taken the lead in implementing AI-supported educational initiatives, while provinces including Jiangsu and Guangdong have successively released action plans addressing AI-related majors and the application of AI in higher education teaching scenarios.

Against this backdrop, the present study adopts a “teacher-AI-student” collaborative perspective to explore new pathways for AI-empowered foreign language classroom instruction. It seeks to construct a diversified and integrated teaching model that is supported by intelligent technologies while grounded in humanistic values. This model emphasizes the coordinated development of teachers’ and students’ technological literacy and humanistic literacy, aiming to facilitate a pedagogical paradigm shift from tool-based empowerment toward value-oriented educational leadership. By doing so, the study endeavors to provide both theoretical support and practical pathways for the modernization of foreign language education in higher education. More broadly, the research contributes to optimizing classroom instructional structures, enhancing the quality of teacher-student interaction, and advancing pedagogical transformation, thereby offering both theoretical significance and practical implications for the development of a foreign language education system with Chinese characteristics that integrates technological empowerment with humanistic orientation.

2. Review of Previous Research at Home and Abroad

Since OpenAI triggered widespread global attention, scholars both in China and abroad have conducted extensive and in-depth investigations into the applications and impacts of generative artificial intelligence (GAI) in the field of education. Existing studies can be broadly categorized into three major strands. First, instructional applications and user engagement have been a primary focus in international research, where attention to artificial intelligence in education emerged earlier than in China. These studies mainly examine how learners and teachers actually employ GAI to support teaching and learning. Researchers have explored the potential uses of ChatGPT in areas such as writing assistance, language learning, and classroom interaction, as well as its role in facilitating



instructional processes and pedagogical efficiency (Hong, 2023; Kohnke et al., 2023). Second, a growing body of domestic research has emphasized learner autonomy and the promotion of personalized foreign language education. Studies have examined the impact of generative AI on teaching practices, instructional models, and pedagogical methods in foreign language education (Hu, 2023; Qin, 2023; Yang & Gu, 2023). Other research has focused on the role of GAI in enhancing learners' autonomous learning capacity (Zhang & Hong, 2023; Xu & Zhao, 2024) and reshaping teachers' professional roles and responsibilities (Yu & Rao, 2023). In specific application contexts, generative AI has demonstrated considerable potential in supporting teachers' instruction, research activities, and professional development (Liu et al., 2024). At the same time, it provides students with personalized learning support by optimizing learning pathways and enabling multidimensional, dynamic, and data-driven monitoring and assessment of learning processes. Third, risk awareness and ethical regulation constitute another important research direction. Scholars have raised concerns regarding potential risks and challenges associated with the integration of ChatGPT into educational settings, including issues of academic integrity, overreliance on technological tools, misinformation, and AI hallucinations (Akinwalere & Ivanov, 2022; Firat, 2023; Jin et al., 2026).

Overall, existing research on generative artificial intelligence in education provides a solid theoretical foundation and practical insights for the present study. In particular, within the context of foreign language education, the continuous evolution of AIGC technologies has created new opportunities for instructional innovation and pedagogical restructuring. Although prior studies have yielded valuable findings on AI-enabled teaching and learning—especially in supporting teachers' instructional practices and enhancing students' learning capacities—and have begun to acknowledge a gradual shift from traditional “teacher-student” interaction toward a “teacher-student-machine” collaborative model, several limitations remain. First, research on the interaction mechanisms among teachers, students, and AI remains underdeveloped. While existing literature has recognized changes in the relationships among teachers, students, and intelligent systems, it lacks a systematic conceptualization of triadic interaction mechanisms. Specifically, “teacher-AI” interaction is often confined to instructional design and task assignment, while “student-AI” interaction is primarily reflected in homework completion and language practice. Classroom “teacher-student” interaction, however, continues to rely largely on traditional lecturing and task-driven approaches, failing to fully reflect the transformative potential of AI for classroom ecology. In many cases, AI remains positioned at the periphery of instruction, with unclear participation pathways and functional roles, resulting in a form of “instrumental isolation” that limits meaningful collaboration among teachers, students, and AI systems. Second, empirical research on classroom-level implementation is insufficient. Although existing studies highlight the broad pedagogical potential of generative AI, there is limited in-depth exploration of its practical integration into real classroom contexts. In particular, research remains scarce on how to construct authentic, dynamic, and efficient “teacher-AI-student” collaborative teaching scenarios; how to design instructional processes and strategies that effectively stimulate triadic interaction; and how to evaluate teaching effectiveness following AI integration. Many studies remain at the conceptual or exploratory level, lacking operationalizable and scalable pedagogical models, which constrains the deep integration of generative AI into classroom instruction.

In response to these gaps, the present study focuses on the reconstruction of foreign language teaching models from a “teacher-AI-student” collaborative perspective. It aims to explore effective pathways for the deep

participation of generative artificial intelligence in instruction, promoting a shift in foreign language classrooms from superficial technological embedding toward integrated pedagogical innovation, and ultimately enhancing the quality of instructional interaction and learning outcomes.

3. Constructing “Teacher-AI-Student” Collaborative L2 Teaching Model in AI Era

Generative artificial intelligence has demonstrated significant empowering potential in foreign language education, particularly in supporting student learning processes. Within language learning contexts, AIGC can function in multiple roles, such as a “language consultant” “AI learning partner” and “assessment expert” (Xu, 2024), providing learners with immediate feedback, simulated interaction, and personalized guidance. These affordances effectively enhance learning efficiency and language output quality. Correspondingly, teachers’ roles are undergoing substantial transformation, shifting from knowledge transmitters to learning facilitators and cultivators of humanistic literacy (Hu Pingping, 2026).

At the same time, the rapid development of AIGC has introduced new challenges. Certain instructional components—such as vocabulary instruction and writing revision—are increasingly being undertaken by AI systems. This development requires teachers not only to acknowledge the structural changes brought about by AI technologies but also to proactively reconstruct teaching content and pedagogical approaches, ensuring that professional expertise and intelligent technologies complement one another. In doing so, teachers can preserve the irreplaceability of human instruction and uphold the humanistic orientation of foreign language education. Exploring the construction and practical pathways of intelligent-integrated foreign language teaching models in the AIGC context involves two key dimensions. First, it requires a systematic examination and classification of teaching content structures following the integration of generative AI, with the aim of optimizing the division of instructional tasks between in-class and out-of-class learning, promoting content reconstruction, and improving task alignment and effectiveness. Second, it entails the development of a new “teacher-student-machine” collaborative interaction model, in which AIGC technologies are organically embedded throughout instructional design and implementation, facilitating a transition from traditional “teacher-student” interaction to an intelligent, collaborative, and systematic teaching paradigm.

3.1 *Teaching Content Classification and Reconstruction in the AI Era*

With the integration of AIGC technologies, foreign language teaching content has exhibited a trend toward functional differentiation, necessitating systematic reorganization and reconstruction of instructional tasks. On the one hand, low-order language tasks that can be efficiently completed by AI—such as syntactic exercises, semantic error correction, and elementary writing—should be appropriately transferred to out-of-class autonomous learning modules. On the other hand, classroom instruction should concentrate on high-order cognitive activities that are difficult for AI to replace, including critical thinking, intercultural understanding, and emotional expression. This division gives rise to a structured instructional framework characterized by “out-of-class learning focused on foundational skills and knowledge expansion, and in-class learning centered on reflective practice and affective cognition,” thereby enabling optimal allocation of instructional resources under human-machine



collaboration.

In AI-empowered teaching content classification and reconstruction, attention should be directed toward the functional positioning and operational mechanisms of technology across different instructional stages, reflecting a learning-process-oriented approach guided by progressive cognitive levels. Overall, foreign language instruction can be divided into three stages—pre-class, in-class, and post-class—corresponding respectively to low-order language tasks, high-order cognitive activities, and intermediate-level language support, thereby highlighting the differentiated roles of AI across instructional phases.

In the **pre-class stage**, AI primarily supports the completion of low-order foundational language tasks, including open information retrieval, basic vocabulary practice, background knowledge acquisition, and review and organization. This stage emphasizes learner autonomy and cognitive preparation. Through intelligent search, corpus-based recommendations, and immediate feedback, AI assists learners in completing essential language input and knowledge construction prior to formal classroom instruction. Research indicates that AI-driven information retrieval systems and intelligent language tools can reduce learners' cognitive load and enhance the efficiency and relevance of pre-class preparation, thereby laying a solid foundation for deeper learning during class time (Kukulska-Hulme et al., 2024; Zawacki-Richter et al., 2019).

In the **in-class stage**, the core objective of foreign language teaching is clearly defined as the organization and implementation of high-order cognitive activities, with particular emphasis on deep teacher-student interaction, peer collaboration, and classroom assessment. At this stage, the functional positioning of AI shifts significantly: rather than focusing on information presentation or knowledge transmission, AI serves a supportive and auxiliary role in facilitating classroom interaction and learners' cognitive processing. Based on considerations of the nature of learning, the explicit involvement of the AI learning partner is intentionally reduced during in-class instruction, in order to create space for effective interaction among real learning partners and to foreground human agency in the teaching process.

Specifically, the AI learning partner mainly provides implicit support, such as offering learning analytics to inform teaching decisions, supplying resources for task design, or providing technical scaffolding for learners' language production. In contrast, the primary learning activities in the classroom are led by real learning partners—namely, teachers, peers, and graduate teaching assistants—who collectively form a learning community. Through face-to-face discussions, collaborative inquiry, and outcome presentations, learners are guided to engage in more challenging language output and higher-level cognitive processing. Compared with the AI learning partner's emphasis on efficiency and personalization, real learning partners possess irreplaceable advantages in emotional interaction, value guidance, and meaning construction, which are critical to the development of advanced language competence and comprehensive literacy. The "HI+AI" teaching and adaptive learning initiatives currently implemented at Shanghai Jiao Tong University exemplify this human-centered approach. Its "HI mentor + AI instructor" classroom reform adopts a structured organization of class time that integrates technology-supported personalized learning with high-order cognitive activities centered on real learning partners. In the initial phase, learners complete adaptive learning tasks with the support of AI learning partners; in the subsequent phase, instruction transitions to a deep interactive environment led by real learning partners, focusing on discussion, analysis, and complex tasks. Through this organizational design, classroom instruction achieves a dynamic balance between efficiency enhancement and humanistic concern, leveraging the

technological advantages of AI while safeguarding the central role of human intelligence in foreign language learning.

In the **post-class stage**, AI functions as an “intermediate-level language companion,” with core roles in review and consolidation, adaptive language practice, and timely feedback. By intelligently diagnosing learners’ language proficiency and learning trajectories, AI systems can provide personalized practice materials and feedback, supporting sustained consolidation and reflective learning. This data-driven adaptive learning model constitutes an important pathway for promoting learning transfer and long-term language development.

From an overall perspective, the logic of “division of labor and collaboration” underpinning AI’s role in foreign language education can be summarized as follows: AI assumes responsibility for repetitive, low-order, and supportive tasks, while high-value interpersonal interaction, meaning construction, and value guidance are preserved for teachers and classroom communities. This principle aligns closely with the prevailing view in AI-in-education research that positions AI as a pedagogical partner rather than a replacement for human educators, and it contributes to the advancement of foreign language teaching toward greater precision, personalization, and quality (Zawacki-Richter et al., 2019).

3.2 Constructing Teacher-AI -Student Model

At the level of instructional organization, the integration of AIGC technologies is profoundly reshaping the structural configuration and operational logic of foreign language teaching. It is driving a transformation from the traditional teacher-centered “teacher-student” interaction model toward a collaborative and multi-output paradigm characterized by “teacher-student-AI” synergy. Within this emerging instructional ecosystem, artificial intelligence is no longer positioned merely as an auxiliary tool; rather, it is increasingly embedded in key stages of instructional organization and learning support, becoming an active participant in teaching and learning processes.

In extracurricular instructional organization, full use should be made of AI’s technological advantages in learning analytics, adaptive recommendation, and real-time feedback to support the design and implementation of personalized foreign language learning pathways. Based on learners’ language proficiency, learning behaviors, and developmental trajectories, AIGC systems are capable of dynamically adjusting learning content and task difficulty, enabling continuous monitoring and precise intervention throughout the learning process. At the same time, through intelligent process-based recording and analysis, assessment is no longer confined to outcome-oriented evaluation but shifts toward dynamic evaluation of learning processes and competency development, thereby enhancing the relevance and effectiveness of out-of-class learning.

In in-class instructional organization, the core value of AI empowerment lies in the construction of a task-based, output-oriented learning environment. By designing authentic or semi-authentic language tasks and leveraging AI-provided informational support, linguistic scaffolding, and immediate feedback, classroom instruction can place greater emphasis on language production, collaborative inquiry, and the integrated development of higher-order thinking skills. In this process, teachers primarily assume the roles of task designers, learning facilitators, and cognitive regulators, while AI plays a collaborative role in language support, resource allocation, and process feedback. This division of labor effectively enhances the depth of classroom interaction and student engagement.



Meanwhile, the reconstruction of assessment systems constitutes a critical safeguard for AI-enabled transformation in instructional organization. Traditional assessment models dominated by summative testing are no longer sufficient to comprehensively reflect learners' language development and overall competencies. With the support of AIGC, a multidimensional assessment framework integrating formative and summative evaluation should be established to holistically examine students' linguistic knowledge, language use ability, collaboration skills, and quality of thinking. Through AI-assisted data collection and analysis, assessment outcomes can become more objective, continuous, and traceable, providing a robust empirical basis for instructional improvement and learning support.

Overall, AI-empowered reconstruction of instructional organization in foreign language education reflects a transformation pathway that is learner-centered, technologically collaborative, and systemically optimized. This model not only contributes to improving the overall effectiveness of instructional organization but also offers a new practical framework and theoretical foundation for the sustained enhancement of foreign language teaching quality.

4. Conclusion and Future Research Directions

This study has focused on the reconstruction of instructional content and the transformation of instructional organization in foreign language education within the context of generative artificial intelligence. By systematically examining the paradigm shifts triggered by the deep integration of artificial intelligence into language teaching scenarios, the study argues that AIGC is exerting profound influences on instructional content structures, interaction patterns, and assessment systems. The traditional binary "teacher-student" interaction model is gradually evolving into a triadic, collaborative "Teacher-AI-Student" configuration, calling for a comprehensive reconceptualization of foreign language teaching at both the theoretical and practical levels.

At the level of instructional content, the study proposes a phased reconstruction of foreign language learning tasks based on the degree of AI involvement. In the pre-class stage, AI language companions primarily support learners in completing lower-order language tasks, such as vocabulary practice, background knowledge acquisition, and open-ended information retrieval. In the post-class stage, AI learning companions facilitate adaptive language practice—including review and consolidation, writing feedback, and translation analysis—thereby enabling personalized support and sustained feedback. By contrast, during the in-class stage, the study advocates a deliberate reduction of AI's explicit presence, returning pedagogical leadership to the authentic learning community composed of teachers and students. Through face-to-face discussion, collaborative inquiry, and presentation-based activities, classroom instruction emphasizes language output, meaning-making, and affective interaction, preventing technology from obscuring the fundamental nature of learning.

Paradoxically, the more pervasive AI becomes, the more necessary it is to reassert the centrality of human intelligence (HI) and to foreground the irreplaceable humanistic dimensions of language learning, including emotional experience, value judgment, and cultural understanding. Future research may further examine the instructional effectiveness of the "teacher-AI-student" collaborative model through empirical investigation and continue to explore the appropriate boundaries of AI integration in foreign language education, thereby promoting a balanced and sustainable development of intelligent technologies and humanistic education.

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