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Generative AI-Enabled International Chinese Language Teaching: Innovations and Challenges

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Abstract

The rapid advancement of generative artificial intelligence has reshaped traditional operational systems across numerous social sectors. In China, increasing emphasis has been placed on educational applications of AI, with consistent support for exploring the potential of generative models in teaching and learning. In 2025, the Ministry of Education issued the Digital Strategy for Education, which promotes the construction of new educational infrastructure and encourages universities to develop innovative "AI + Education" models. Through deep learning and algorithm-driven pattern simulation, generative AI can support teachers in lesson planning, resource creation, and AI-integrated textbook development. It also facilitates personalized learning and helps cultivate talents with strong information literacy. Supported by AI technologies, the "HI + AI" teaching framework creates a tripartite collaborative system involving teachers, students, and machines, leading to more adaptive and efficient classroom practices. While generative AI opens new prospects for international Chinese language education, it also brings emerging challenges that require systematic reflection and response.

Keywords: artificial intelligence in education, international Chinese language teaching, generative artificial intelligence

1. Introduction

The rapid development of artificial intelligence has reshaped the traditional ecosystems of various sectors in society. As reported in the 2023 government work statement, China will continue to advance the "AI+" initiative and support the widespread application of large-scale models, marking a shift from the "Internet+" era to the "AI+" era. AI has also profoundly impacted the field of education. In late 2022, OpenAI launched the ChatGPT-3.5 model, positioning generative AI at the forefront of AI technologies. On January 15, 2025, the DeepSeek application was officially released, once again sparking reflection on the potential applications of generative AI in education. The Chinese government places a high priority on AI in education. In January 2025, the Central Committee of the Communist Party of China and the State Council issued the Outline for the Construction of a Leading Country in Education, which states the need to "promote AI-driven educational transformation." The outline emphasizes leveraging AI to advance educational equity and personalized development in China and to facilitate digital transformation. The 2025 Digital Strategy for Education issued by the Ministry of Education actively promotes the construction of new educational infrastructure, encouraging colleges and universities to explore novel models of "AI + Education." As international Chinese language education constitutes an important component of the broader educational enterprise, how to harness AI to empower international Chinese language teaching has become a question of ongoing reflection and practice for frontline teachers.

At present, the field of international Chinese language education has seen considerable discussion regarding the

use of AI, including its advantages and disadvantages. Beyond supporting instructional processes, AI can also provide multilingual outreach and customized services in other areas, such as student admissions (Du & Zheng, 2025). However, existing research outcomes remain predominantly focused on macro-level frameworks, future application scenarios, and general principles, with a relative lack of empirical research and practice-based instructional analyses. In response, this study adopts a practice-oriented research approach to explore the concrete application scenarios of generative AI technologies in international Chinese language education. It also aims to synthesize the specific difficulties encountered by teachers and students in the application process and to propose corresponding solutions, thereby exploring new pathways for the digital transformation of international Chinese language education.

2. Literature Review

To date, scholars both domestically and internationally have conducted extensive research on the application of generative artificial intelligence (AI) in education, yielding fruitful results. Research topics span various levels of technological application, including the use of generative AI for curriculum design, instructional assessment, and analysis of student learning behaviors. Some scholars have carried out empirical studies examining the impact of generative AI on students' learning interest and academic performance. Regarding the integration of generative AI into language teaching, research has primarily focused on the following directions: generative AI-assisted language skills training, adaptive learning and personalized instruction, teaching resource development, and evaluation of teaching effectiveness. Scholars generally acknowledge the value of generative AI in developing instructional resources, including smart hardware, smart software, and latent intelligent systems (Ma & Xu, 2025). Generative AI can facilitate personalized and individualized student learning, and human–machine collaborative learning approaches can significantly enhance learning efficiency. For teachers, generative AI offers assistance in designing lesson plans, generating exercises, and grading assignments. For students, it serves as a 24/7 online teaching assistant, providing customized learning resources and pathways.

The rapid advancement of generative AI also presents challenges for teachers, primarily concerning how to enhance their digital literacy to better utilize generative AI technologies, as well as how to improve relevant policies and regulations to ensure the security and standardization of technological applications. Ethical issues arising from the use of AI in teaching, such as data privacy protection and algorithmic bias, have also been the subject of in-depth discussion.

Nevertheless, existing research has yet to thoroughly investigate the specific application models of generative AI in international Chinese language teaching. There remains a lack of empirical research, practice-oriented exploration, and studies on long-term effects. The integration of generative AI with international Chinese language teaching stands at a crossroads where opportunities and challenges coexist. Future development should pursue the parallel paths of "technological integration" and "ethical governance," develop "AI–teacher" collaboration models, and provide intelligent support for education under the principles of human-centeredness and human–machine collaboration.

3. Feasibility Analysis of Integrating Generative AI into International Chinese Language Teaching

3.1 Technical Concepts and Principles

Generative artificial intelligence is an important branch of AI. Unlike traditional discriminative AI, whose core function lies in analyzing and judging existing data, generative AI is characterized by its ability to generate novel content. Through deep learning and the simulation of inherent patterns in phenomena, and based on algorithms, models, and rules, generative AI can autonomously create new content, which can be output in forms such as text, images, audio, video, and code.

The technical principles of generative AI primarily rely on technologies such as deep learning and natural language processing (NLP). By constructing neural network models with multiple layers, computers automatically learn features and patterns from vast amounts of text data. Commonly used deep learning models in generative AI include generative adversarial networks (GANs), variational autoencoders (VAEs), and large language models (LLMs) based on the Transformer architecture. Generative AI possesses robust capabilities in natural language understanding and generation. When a user inputs a prompt, the model generates coherent text, images, or other forms of content based on learned knowledge and probabilistic computations, while supervised fine-tuning (SFT) and reinforcement learning from human feedback (RLHF) enable controllability of the generated output. Mainstream LLMs typically exhibit the following characteristics: first, they have massive parameter sizes, enabling them to learn rich linguistic knowledge and semantic information; second, they possess strong generalization capabilities, performing well across a variety of NLP tasks; and third, through large-scale unsupervised learning and supervised fine-tuning, they continuously optimize model performance and effectiveness.

Based on the above characteristics, generative AI holds immense potential for application in educational contexts.

It enables on-demand synthesis of personalized learning materials, multi-dimensional analysis and reconstruction of complex concepts, and the provision of dynamic cognitive feedback through conversational interaction.

3.2 The Need for Talent Development

On one hand, the widespread societal application of AI is a foreseeable future trend. In this context, AI literacy, as a core dimension of digital literacy, is gradually becoming a key component of the competency structure of modern talent. How to evaluate the technical characteristics of different AI platforms based on task requirements and make optimal choices, how to issue instructions and interact with AI logic to achieve one's goals, and how to select and critically evaluate the vast amount of information provided by generative AI have all become new "required competencies." This underscores the necessity of introducing generative AI into the classroom to cultivate students' professional capabilities and guide them in adapting to societal demands.

On the other hand, in the era of AI, global educational objectives are undergoing a paradigm shift. The international community's criteria for evaluating talent competencies have expanded from a single dimension of specialized skills to a comprehensive competency framework encompassing cognitive abilities, expressive capabilities, and creativity. This shift also imposes new requirements on international Chinese language teaching. Integrating generative AI into international Chinese language instruction can help cultivate well-rounded individuals with positive affect, correct attitudes, and holistic intellectual development.

Specifically, the development of cognitive abilities includes the monitoring and regulation of one's own cognitive processes, as well as the understanding and adaptation to multicultural societies. This requires learners to continuously optimize their learning strategies through reflective practice, particularly in achieving knowledge transfer across intercultural contexts. Expressive capabilities must go beyond linguistic mastery to emphasize communicative adaptability grounded in cultural backgrounds—that is, the ability to dynamically adjust discourse strategies according to different cultural contexts. This places higher demands on the design of situated teaching activities in international Chinese language instruction. As generative AI gradually replaces procedural work tasks, the cultivation of creativity becomes the core value of education. In essence, creativity involves fostering learners' critical thinking and innovative problem-solving abilities that transcend established patterns.

3.3 The Need for the Development of International Chinese Language Teaching Itself

In 2024, UNESCO released AI literacy frameworks for students and teachers, respectively. These frameworks require teachers to use AI tools correctly and creatively in teaching, based on a human-centered approach. In April 2025, at the World Internet Conference, discussions on educational transformation in the AI era proposed that education should integrate generative AI with human intelligence to enhance educational quality. In May 2025, the white paper on Smart Education in China, released by the Ministry of Education of the People's Republic of China, comprehensively introduced China's philosophies, approaches, initiatives, and achievements in advancing educational digitalization and developing smart education, sharing practical experiences in educational development and transformation in the intelligent era.

AI-empowered education is a challenge that all academic disciplines will face in their future development. In recent years, international Chinese language teaching has been undergoing a critical transition from "specialization" toward "popularization, universal access, and application-orientation." This process confronts three key challenges. First, the number of Chinese language learners worldwide is increasing, yet there is a shortage of high-quality teachers, resulting in a severely imbalanced student–teacher ratio. Second, there is a contradiction between traditional teaching models and the diverse, personalized learning needs of students. Overseas Chinese language learners are trending younger and toward non-degree pursuits, with significantly increased demand for engaging and personalized learning experiences. Third, it is difficult to balance depth of cultural transmission with teaching efficiency. Existing teaching resources and methods struggle to achieve the coordinated development of language proficiency and cultural cognition within limited instructional hours. The integration of generative AI offers new possibilities for addressing these contradictions. Generative AI can generate personalized linguistic materials on demand, achieving a revolutionary breakthrough in the supply of teaching resources, and can promote a shift in classroom ecology from "teacher-centered" to "human–machine collaborative," with the teacher's role evolving toward that of a "classroom designer." AI-based language practice systems can transcend spatiotemporal constraints, providing students with on-demand answers to their questions at any time and place, while significantly increasing the volume of language input and output. Using AI as an assistive tool to empower international Chinese language teaching can better construct an educational ecosystem of "AI–human intelligence collaboration," achieve inclusive innovation, and promote educational equity and sustainable development.

4. Pathway Analysis of Generative AI-Enabled International Chinese Language Teaching

In a survey on "AI Usage" conducted with the author's participation, among 130 participants, approximately

16.2% used AI for teaching assistance, and 23.8% employed structured prompt frameworks. Only 6.9% had never used AI, and a very small minority (1.5%) reported a poor AI experience. Regarding participants' feedback and expectations for AI applications in teaching, several representative comments emerged: "AI has broad applications in teaching," "I hope to use AI to learn PPT/video creation to enrich the classroom," and "I look forward to AI teaching assistant functions." Some participants also reported that they "do not know how to use it" or "need to learn," expressing the hope that AI platforms would provide basic operation guides for beginners to alleviate anxiety about "being left behind." Generative AI has wide-ranging applications in international Chinese language teaching, which can be concretely examined from the following three aspects.

4.1 Generation of Teaching Resources

4.1.1 Assisting Teachers in Lesson Preparation

Assisting in generating lesson plans. By providing specific teaching content and a sample lesson plan to Kimi and inputting the instruction, "Based on the content of Document XX, design a lesson for students of XX grade using an XX-oriented teaching approach. The project theme is XX. The design of the teaching plan should follow the format of the second document," Kimi can generate a detailed lesson plan that includes specific teaching content, instructional stages, project activities, and teaching evaluations.

Generative AI can generate text, images, audio, video, and other resources according to teachers' needs. For example, if a teacher needs to design a lesson on the traditional Chinese festival of the Dragon Boat Festival, they need only input relevant themes and requirements into Deepseek—such as vocabulary difficulty at the HSK Level 4, key points including the origin and customs of the festival—and the system can quickly generate a passage that meets the requirements. The generated passage not only contains accurate linguistic expression and vivid descriptions but also incorporates elements of Chinese culture, including historical stories, culinary culture, and folk customs, making it both informative and engaging. For instance, "The taste of zongzi in the south and north is somewhat different; southerners prefer savory zongzi, while northerners prefer sweet zongzi." A vocabulary list is also provided at the end of the passage. When teaching vocabulary such as "dragon boat," "sachet," and "zongzi," visual aids such as images can be used. Teachers can use Doubao to generate images by inputting the instruction, "Generate a Dragon Boat Festival-themed image showing adults and children eating zongzi while watching a dragon boat race, with sachets hanging on their bodies." Finally, teachers can use Dujia or Sora to convert text into video with one click, saving considerable time that would otherwise be spent searching for suitable video materials, and enabling students to experience the Dragon Boat Festival atmosphere more intuitively. After class, teachers can find extended reading materials online and send the article link to the "AI Podcast" feature in Doubao, which will automatically generate a voice podcast of the article with standard pronunciation and natural, fluent human speech.

4.1.2 Promoting Personalized Learning: Developing AI-Integrated Textbooks

Existing textbooks have fixed content and cannot meet the personalized needs of students with varying learning speeds within the same class. Future textbook development should emphasize personalization and interactivity. With the help of generative AI, on the basis of content appropriate for the average student, additional extended content can be included. For example, more difficult exercises or extended reading materials can be converted into QR codes printed in the textbook, allowing advanced students to scan and learn on their own without feeling idle in class. This approach both accommodates the constraints of printed textbook content and meets the learning needs of more capable students.

University education should prepare students for their future career development. The "Chinese + Vocational Skills" education model has attracted widespread attention since its introduction, as it helps both international Chinese education and vocational education reach a global audience. However, currently, the development of "Chinese + Vocational" textbooks remains limited; their professionalism and suitability fall short of demand. Moreover, as society evolves rapidly, the content of older textbooks lags behind contemporary realities. Generative AI, with its powerful capabilities in data collection, analysis, and processing, can generate corresponding textbook content based on instructions. Taking Business Chinese as an example, to cultivate students' awareness of international business strategy and practical skills, as well as to deepen their understanding of China's business cultural environment, universities may offer courses such as "Cross-Border E-Commerce Practices" and "Business Etiquette." When suitable textbooks are unavailable, teachers can use generative AI to generate customized textbooks according to students' language proficiency levels and program-specific training objectives. Teachers may even adjust textbook content in real time in response to dynamic social changes to meet learning needs.

4.2 Enrichment of Teaching Models

4.2.1 The "HI + AI" Teaching Model

At present, leading universities in China have gained substantial experience in exploring the "HI + AI" teaching

model. HI (Human Intelligence) refers to human intelligence, specifically the guidance provided by teachers in the classroom, while AI refers to the various AI-based learning platforms selected by teachers. In Bloom's taxonomy of educational objectives, the cognitive domain is subdivided into six levels: memory, comprehension, application, analysis, evaluation, and creation. In the "HI + AI" teaching model, teachers integrate knowledge at the "memory and comprehension" levels into AI-mediated instruction, allowing students to engage in learner-led adaptive learning. Subsequently, training in skills at the "application, analysis, evaluation, and creation" levels becomes the focus of HI-mediated instruction, where teachers guide students in achieving higher-order learning objectives through methods such as case studies, hands-on practice, and project-based learning. This teaching model, empowered by AI, achieves a triadic collaboration among "teacher, student, and machine," making the classroom more adaptive and efficient. While enabling personalized learning, it also facilitates group collaboration, stimulates students' learning interest, and increases classroom participation.

4.2.2 Contextualized Teaching

By creating authentic linguistic contexts for students in the classroom, teachers enable students to learn and apply knowledge in context. This approach not only improves students' Chinese expression skills and increases learning engagement but also exercises their use of Chinese communicative strategies and promotes the construction of practical knowledge. Situated teaching with generative AI participation transcends previous limitations. It is not constrained by existing human knowledge frameworks; it can customize content for specific scenarios such as job interviews or business contexts, enable personalized, tiered instruction, allow repeated practice unrestricted by spatiotemporal constraints, and provide immediate feedback and data-based assessment. Taking an advanced Chinese oral course as an example, after students have mastered foundational knowledge such as vocabulary, grammar, and sentence patterns at the memory and comprehension levels, teachers can use Deepseek or Doubao to conduct AI-simulated dialogue practice. For instance, by inputting the instruction, "I am an international student studying in China. My Chinese proficiency is HSK Level 5, and I want to find a job in China. Please pretend to be an interviewer and ask me questions, simulating the interview process," students can begin practicing in an immersive context. The AI can adjust speech rate and vocabulary complexity according to the student's Chinese proficiency level (e.g., HSK Level 5), gradually introduce specialized vocabulary, and provide suggestions for improvement based on the student's responses. AI-simulated interviews eliminate the anxiety of real-life scenarios, allowing students to build confidence through repeated practice, and enhance their cross-cultural communicative competence. The AI's immediate feedback can identify cultural offenses in students' communication, and tasks such as analyzing differences in consumption habits between China and Russia can cultivate students' cultural comparison skills, facilitating their progression from "literal translation responses" to "culturally adapted responses" in interviews.

4.3 Innovation in Assessment Methods

Generative AI can automate assignment grading and learning outcome assessment while providing targeted feedback to students, greatly improving teaching efficiency and assessment accuracy. In terms of learning outcome assessment, generative AI comprehensively evaluates students' learning outcomes by synthesizing data from multiple sources, including assignment completion, classroom performance, and test scores. It can analyze students' mastery of individual knowledge points and skill areas in detail, such as vocabulary growth, improvement in grammatical application, and progress in oral expression. At the same time, it can provide specific remedial measures for weak areas, such as recommending relevant learning materials or developing targeted practice plans. This automated assessment and feedback mechanism not only saves teachers time and effort but also enables students to understand their learning status in a timely manner and adjust their learning strategies accordingly.

Generative AI can assess students' language proficiency across multiple dimensions. In addition to traditional measures of language knowledge and skills—such as reading, listening, speaking, and writing—it can evaluate students' language application ability, thinking skills, and cross-cultural communicative competence. By analyzing factors such as dialogue fluency, linguistic accuracy and appropriateness, and adaptability to different contexts in actual communicative scenarios, generative AI provides a comprehensive assessment of students' language application proficiency. Furthermore, through students' performance in group discussions or project-based tasks, it can assess their logical reasoning abilities and cross-cultural communicative competence. Generative AI enables a more comprehensive and in-depth understanding of students' learning status, identifies potential learning problems, and provides a strong basis for teachers to adjust teaching strategies and optimize teaching content, thereby better promoting students' holistic development and language proficiency improvement.

5. Challenges in AI-Empowered International Chinese Language Teaching

5.1 Technical Adaptability of Teachers and Students

In international Chinese language teaching empowered by generative AI, the role of the teacher is shifting from knowledge transmitter to learning facilitator. Nevertheless, teachers must still maintain overall control of the classroom. Currently, content generated by generative AI may exhibit issues such as stereotypes and bias, overly templated responses that lack the flexibility to accommodate authentic, individualized needs, fabricated content, or privacy violations. This necessitates that teachers manually filter and decide which content is appropriate for classroom use. When using generative AI for learning, students need to have a clear understanding of learning directions and methods to ensure effective use.

5.2 Insufficient Affective Computing of Generative AI

Although generative AI is capable of providing immediate and rapid feedback, its feedback lacks the emotional expression of a real teacher. In the classroom, teachers can adjust their teaching strategies based on students' personalities and learning states. However, can AI recognize and adapt to learners' anxiety emotions? The lack of affective capacity in AI may negatively impact students' learning motivation. Particularly when correcting errors, the "mechanical feedback" of AI can easily trigger frustration and reduce learning drive.

5.3 Diminishment of Students' Creativity

Over-reliance on AI may weaken students' ability to think independently and their creativity. Take Chinese writing as an example. Chinese is a highly complex and unique language, rich in semantics, complex grammatical structures, and profound cultural connotations, with endless variations in linguistic expression. However, the model essays generated by generative AI tend to be standardized and templated. If students rely too heavily on AI, they will find it difficult to develop their own personal linguistic style and create original content.

6. Conclusion

The empowerment of generative AI has opened new horizons for international Chinese language teaching while also posing new challenges. Various AI models are powerful and have their respective strengths, yet they also face issues such as AI hallucinations and ethical challenges. In the future, there remains considerable room for development in areas such as dialect learning, the construction of customized intelligent agents, and the widespread availability of software and hardware. As technology advances rapidly, we must persist in learning and inquiry, and look forward to more constructive outcomes from scholars in the field of generative AI-empowered international Chinese language teaching.

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