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Research on the Paradigm Reconstruction of Interpreting Pedagogy Driven by Generative AI

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Abstract: This paper explores the paradigm reconstruction of interpreting pedagogy driven by generative AI technology. With the breakthroughs of AI technologies such as ChatGPT in natural language processing, traditional interpreting education faces dual challenges of technological substitution and pedagogical transformation. Based on Kuhn's paradigm theory, the study analyzes the limitations of three traditional interpreting teaching paradigms, language-centric, knowledge-based, and skill-acquisition-oriented, and proposes a novel "teacher-AI-learner" triadic collaborative paradigm. Through reconstructing teaching subjects, environments, and curriculum systems, the integration of real-time translation tools and intelligent terminology databases facilitates the transition from static skill training to dynamic human-machine collaboration. The research simultaneously highlights challenges in technological ethics and curriculum design transformation pressures, emphasizing the necessity to balance technological empowerment with humanistic education.

Keywords: Generative AI; Interpreting pedagogy; Paradigm reconstruction; Human-machine collaboration; Technological ethics

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1. Introduction

The breakthrough advancements in generative AI technologies, exemplified by ChatGPT, have revolutionized natural language processing. On February 25, 2025, the 6th Session of the 7th Shenzhen Municipal People's Congress pioneered the adoption of InnAIO AI Translation Mega-model, China's first government-level AI-powered simultaneous interpretation system, achieving 98.6% accuracy in professional terminologies (Shenzhen Municipal Government Official Website). These developments pose an existential threat to interpreters, educators, and learners [1]. Concurrently, traditional interpreting pedagogy's overreliance on static language skill training, neglecting dynamic real-world communicative contexts, cognitive load complexities, and sociocultural embeddedness, has left students ill-prepared to navigate the uncertainties of professional scenarios. Consequently, reimagining interpreting education through technological empowerment and reconstructing entrenched pedagogical paradigms have become imperative.

2. The pedagogical application of Kuhn's paradigm theory

The concept of "paradigm" was first systematically proposed and elaborated by American philosopher of science Thomas Kuhn in his 1962 publication [2] "The Structure of Scientific Revolutions." Through this theory, Kuhn described a shared system of exemplars within an academic community, encompassing its worldview, fundamental theories, methodologies, and standards. He emphasized that scientific development is not a process of gradual accumulation but achieves holistic breakthroughs through paradigmatic revolutions. This concept has since become a core tool for analyzing shifts in research paradigms across the philosophy of science, social sciences, and even humanities.

In the field of education, the concept of "pedagogical paradigm" has been introduced by drawing on Kuhn's theory of "paradigm." In education, a pedagogical paradigm refers to the recognized and programmatic fundamental approaches, models, and structures implemented in teaching and learning during a specific period [3]. It serves as a systematic theoretical framework guiding educational practice, characterized by both the systemic nature of pedagogical theories and the practical operability of implementation. With technological advancements, pedagogical paradigms have undergone three major transformations: from Herbart's teacher-centered paradigm [4] to Dewey's student-centered paradigm [5], and further to Wolfgang Genschein's example-based teaching theory [6]. The latter emphasizes knowledge transfer through typical examples and is regarded as a practical precursor to pedagogical paradigm shifts, evolving into the current era's personalized teaching paradigm under intelligent technology. Driven by AI technologies, pedagogical paradigms are transitioning toward an "output-oriented" orientation, underscoring the value reconstruction of teaching focused on core competencies cultivation and deep understanding.

3. Traditional interpreting teaching paradigms

Traditional interpreting teaching paradigms primarily encompass three models they are language-centric instruction, knowledge construction, and skill acquisition. Language-centric instruction focuses on normative training in grammar and vocabulary; knowledge construction emphasizes explicit instruction of industry-specific terminology; and skill acquisition cultivates core competencies such as listening discrimination and note-taking through phased practice. Despite their distinct emphases, these paradigms generally suffer from issues such as neglect of nonlinear cognitive processing in authentic scenarios, homogeneity in teaching methods, and outdated teaching materials, making it difficult to fully meet the demands of the dynamic knowledge integration and flexible decision-making required in interpreting practice.

3.1. Language-oriented pedagogical paradigm

The language-oriented teaching paradigm focuses on linguistic transfer training as its core, with instructors emphasizing grammatical and lexical elements during instruction. This paradigm builds foundational interpreting competence through systematic drills in syntactic rules and vocabulary accumulation, prioritizing the standardization of linguistic forms while potentially underemphasizing the complexity of real-world communicative scenarios. A representative textbook employed in this paradigm is "A Coursebook on Interpreting," which adopts a progressive training framework from single sentences to full texts to reinforce linguistic fundamentals.

3.2. Knowledge-construction pedagogical paradigm

The knowledge construction pedagogical paradigm prioritizes explicit knowledge transmission, with instructors organizing instruction around disciplinary themes (e.g., diplomacy, international trade) to ensure mastery of domain-specific terminology and contextual knowledge. This approach employs structured methodologies such as terminology database memorization and sentence pattern template drills to shape foundational competencies. However, it creates a critical disconnect between classroom-acquired explicit linguistic knowledge and tacit knowledge implicitly absorbed through natural communicative environments [7]. Such paradigms often neglect the cultivation of interpreters' dynamic capabilities for integrating encyclopedic knowledge, contextual inference, and improvisational decision-making within authentic scenarios, thereby constraining knowledge transfer efficacy. Consequently, this instructional framework proves incompatible with the nonlinear cognitive processing requirements inherent in professional interpreting practice [8].

3.3. Skill-acquisition pedagogical paradigm

The skill acquisition pedagogical paradigm centers on interpreters' cognitive skills, with instructors guiding students through linearly progressive training that begins with foundational listening and note-taking skills and advances to progressively complex interpreting tasks (e.g., consecutive interpreting, simultaneous interpreting). This approach involves stage-by-stage cultivation of core competencies such as listening, discrimination, analysis, prediction and inference, representation, and logical restructuring. Standardized exercises (e.g., shadowing, sight translation) are employed to solidify individual skills, which are then integrated into comprehensive interpreting competence, for instance, the Guangdong University of Foreign Studies (GDUFS) model proposes a ternary knowledge structure of "language + encyclopedic knowledge + skills" for interpreters and has developed systematic sub-skill training programs. However, skill acquisition pedagogy overlooks the cultivation of nonlinear cognitive processing in authentic scenarios, such as multitask coordination and contextual reconstruction.

4. Reconstruction of pedagogical paradigms

4.1. Reconstruction of teaching subjects

Against the backdrop of the extensive application of generative AI, low-end interpreting tasks are gradually being replaced by machines, while high-end interpreters are required to master human-AI collaboration skills, emphasizing composite competencies such as terminology management and cross-cultural communication [9]. The teaching subjects in interpreting education are undergoing an ecological transformation from the binary opposition between teacher-centered and student-centered paradigms to human-AI collaborative ecosystems. This transformation does not simply abandon traditional models but, through technological empowerment, reconstructs the interactive relationships among teaching elements, forming a new teaching paradigm characterized by ternary dynamic balance among "teachers-AI-learners."

Aligned with the "Opinions on Strengthening the Construction of Digital Chinese and Promoting the Informatization Development of Language and Script" jointly issued by the Ministry of Education and two other departments (Document No. JYXH [2025] No. 1), this demand for talent drives a reorientation of interpreting pedagogy, from a traditional focus on "language conversion skills as the core" to a new direction "oriented toward human-AI collaboration capacity development and rooted in composite literacy cultivation." Teaching objectives must shift from cultivating "precise translators" to nurturing "comprehensive coordinators capable of harnessing AI tools, mastering domain-specific terminology systems, and excelling in cross-cultural communication strategies" [10].

Concurrently, the role of teachers as primary teaching subjects must evolve from knowledge transmitters to designers and guides of "human-AI collaborative scenarios." By simulating authentic high-end interpreting contexts, students are enabled to understand the strengths and limitations of AI tools through collaboration with them, thereby mastering the logic of "human-AI complementarity."

Learners also engage in self-regulated learning processes using AI-assisted metacognitive tools, actively participate in interpreting practice via simultaneous interpretation training systems and virtual learning environments, and gain more hands-on experience and reflective opportunities, facilitating a paradigm leap in interpreting education from knowledge transmission to capability development. This reconstruction represents not only an innovation in teaching models but also an inevitable response of the entire interpreting education system to the technological revolution.

4.2. Reconstruction of teaching environments

Traditional interpreting teaching environments have long relied on basic hardware such as recording devices and textbooks, employing limited technological means. Language laboratories equipped only with basic recording systems lack multimodal interactive functions, failing to simulate authentic conference scenarios. Students can only self-assess through playback recordings, without access to intelligent teaching aids like real-time speech-to-text transcription or terminological database integration. Additionally, interpreting textbooks are disconnected from industry demands, as most follow a linear "theory + material translation" structure with content lagging behind market developments. They lack dynamically updated specialized terminology, such as "tax preference" for new economic concepts or the oversimplification of "Blockchain smart contracts" as "electronic contracts." Outdated terms like "virtual simulation" for "Digital twin" persist in pre-2020 publications, while "Generative AI" is often broadly categorized as "artificial intelligence" in textbooks. The slow update cycle of teaching materials fails to keep pace with rapidly evolving market needs, and their evaluation systems prioritize linguistic accuracy over assessing interpreters' adaptive capabilities and technological application skills.

Consequently, in the AI-driven era, interpreting laboratory construction must center on the core objective of "human-machine collaboration competency cultivation." This entails integrating cloud-based real-time translation aids (e.g., InterpretBank), smart note-taking tools (e.g., Cymo Note), dynamic terminology databases (e.g., LiveDict), speech recognition systems (e.g., iFlytek L3), and machine translation engines (e.g., Tencent Simultaneous Interpreting) to supplement traditional textbooks and upgrade conventional equipment, thereby transitioning from traditional skill training to multimodal interactive scenarios [11]. Instructors should also design modular remote interpreting training programs in advance, deconstructing interpreting skills (e.g., note-taking techniques, divided attention coordination) in stages, while leveraging VR/AR virtual simulation technologies to create immersive practice environments. This approach enables students to train in highly realistic remote conference settings with AI feedback, effectively enhancing their practical competencies. Institutions such as China University of Petroleum (East China) have already begun breaking traditional environmental constraints through simultaneous interpreting lab renovations and virtual simulation training, promoting the implementation of human-machine collaborative teaching models.

These cases demonstrate that human-machine collaborative laboratories can effectively address static terminology limitations, compensate for the theoretical shortcomings of traditional classrooms, optimize terminological management efficiency, while continuously balancing technological assistance with students' autonomous decision-making capabilities. In this model, instructors focus on strategic guidance (e.g., political terminology handling), while AI handles real-time transcription and grammatical correction, ultimately constructing a "dual-teacher" (human-AI) pedagogical environment.

4.3. Reconstruction of curriculum systems

Traditional interpreting curriculum systems are facing disruptive impacts from AI technologies, with a growing contradiction between the industry's demand for "composite interpreters" and the lagging content of existing curricula. Course offerings remain dominated by "Advanced English and Translation Theory," with technical courses accounting for less than 10% of elective courses. Students spend significant time memorizing vocabulary and analyzing texts, but lack training in essential workplace skills such as localization tool application and cross-cultural project management [12]. Meanwhile, interpreting courses typically span only one to two semesters with 2 class hours per week, insufficient to cover core competencies like sight translation and simultaneous interpreting. Additionally, the "2025 Survey and Analysis Report on AI Application by Teachers" jointly released by Xueke.com and the Regional Education Professional Committee of the China Association for Educational Development Strategies on May 8, 2025, reveals digital literacy gaps among teachers: only 21% of frontline teachers are proficient in using AI grading systems, while ChatGPT-5 already supports multimodal assignment analysis. Course evaluation systems also show increasing rigidity, with inadequate technical support for formative evaluation, reliance on subjective manual reviews, and a lack of AI-assisted precision assessment mechanisms. Standardized tests fail to reflect students' ability to integrate interdisciplinary knowledge, skills, and methods or solve complex problems in real-world contexts. However, LinkedIn's "2025 Workplace Learning Report" indicates that the proportion of job positions requiring "interdisciplinary project-based capabilities" has risen to 68%.

New curriculum systems should address the mismatch between technological iteration speed and educational scenarios [9]. Teaching content must transcend pure language training by integrating practical modules such as AI-assisted interpreting tool operation, terminology database construction and dynamic management, and cross-cultural conflict mediation.

First, course objectives should adhere to the principle of "technology as a tool, education as the foundation," shifting from traditional language conversion to a composite cultivation model of "technology empowerment + intercultural communication + cognitive competence." Emphasis should be placed on strengthening students' abilities in real-time bilingual processing with AI tools, complex cognitive processing and rapid information filtering, as well as intercultural sensitivity and ethical judgment, aiming to cultivate professional interpreters capable of managing AI tools.

Under these objectives, the core interpreting curriculum modules can be structured into three dimensions: basic skills training, technology-driven modules, and interdisciplinary expansion. The basic skills training module, building on consecutive and simultaneous interpreting courses, incorporates terminology management courses. Supported by AI speech-to-text tools (e.g., iFLYTEK Hearing) and automatic terminology database extraction systems, it reinforces foundational consecutive interpreting skills. The technology-driven module includes courses related to machine translation engine debugging, remote interpreting platform operation, and digital human interaction training, with added practical content such as speech recognition transcription, machine-assisted interpreting technology, and terminology management to enhance students' digital knowledge and AI tool application abilities. The interdisciplinary expansion module covers courses on international conference organization processes and industry knowledge graph construction, leveraging knowledge management tools to build practical industry cognition.

In course evaluation, the focus should shift from traditional outcome-based grading to process review: Formative evaluation uses real-time speech analysis technology to dynamically monitor the development of core competencies such as terminology accuracy and reaction speed, combined with AI-generated personalized feedback (e.g., semantic deviation reports) to help students adjust training strategies in a timely manner [13]. Summative evaluation can adopt simulated meetings and other practical scenarios to comprehensively assess students' on-the-spot adaptability and intercultural communication effectiveness, with the advantage of providing standardized reference systems to measure phased learning outcomes. Integrating these two types of evaluation not only avoids the delayed feedback of sole summative evaluation but also overcomes the lack of result orientation in formative evaluation. Therefore, strengthening translation quality assessment for students, establishing evaluation standards and processes adapted to generative AI translation, and cultivating students' ability to evaluate AI translation results, while introducing professional evaluation tools and systems to improve the reliability and consistency of translation quality are essential [14]. Reconstruction of the curriculum evaluation system should cover three levels: First, introduce machine learning-based adaptive evaluation models that dynamically adjust evaluation criteria according to students' proficiency [15].

Second, establish a "human-AI double-blind review" mechanism where AI preliminary evaluations complement teachers' final evaluations. Third, use digital twin technology to simulate real interpreting scenarios and assess students' comprehensive performance under high-pressure conditions. The evaluation system should focus on dynamically optimizing evaluation criteria, such as integrating generative AI's self-correction capabilities into the model, while enhancing teachers' secondary judgment abilities for AI evaluation results, forming a new evaluation ecosystem of "technology empowerment + humanistic calibration."

5. Challenges in generative AI-driven curriculum systems

5.1. Techno-ethical and humanistic balance

In the process of guiding students to use generative AI for teaching and training, educators must remain vigilant against the mental inertia in interpreting thinking caused by overreliance on AI, while preserving humanistic care and critical thinking in language services [9]. Collaborative evaluation involving AI, teachers, and students also faces two potential risks:

(1) Technological dependency: Students may excessively depend on AI-generated translations and evaluations, leading to underdeveloped interpreting skills and even academic dishonesty, such as plagiarism.

(2) Technological bias: AI-generated content may contain inherent biases, which can distort students' understanding of certain issues [16].

In response, teachers should foster students' ability to think critically through language—enabling them to discern facts from viewpoints, recognize the realities revealed or obscured by language, and reflect on the relationships between language, technology, and humanity amid the integration of technical practices and translation skill development, thereby deepening their understanding of the value and significance of translation (Sun L., 2023: 170) [17] During evaluation, quantitative technical metrics (e.g., speech recognition accuracy, real-time response latency) and qualitative humanistic dimensions (e.g., handling of culturally loaded terms, nonverbal information transmission such as tone and facial expressions) must be integrated to establish a dual-track evaluation system.

Additionally, institutions should formulate and promote school-level translation ethics guidelines, clarifying the principles and norms for using generative AI translation tools. Strengthening translation quality control, user privacy protection, and intellectual property safeguards is critical. Furthermore, expanding interdisciplinary research on the policies, laws, and ethics of generative AI translation will provide actionable recommendations for national legislative bodies and industry organizations [14].

5.2. Pressure of curriculum design transformation

Traditional linear teaching models struggle to adapt to AI-driven dynamic knowledge generation, with curriculum transformation facing three major challenges: Technological iteration drives the need for curriculum content reform, yet the knowledge structure of traditional teaching staff makes it difficult to rapidly adapt to the integration of AI tools into teaching; Evaluation systems require a shift from outcome-oriented to process-oriented analysis, but mature intelligent evaluation criteria are lacking; Educational objectives are transitioning from skill transmission to advanced competency development, yet conflicts arise between course duration and the depth of cultivation. Issues such as increased teaching costs and uneven resource allocation during the transformation process further exacerbate the growing pains in educational practices. Teaching institutions need to strengthen support for AI education policies, establish information technology positions and special funds, build intelligent translation teaching environments and cloud-based platforms, and develop dynamic evaluation mechanisms to promote the integration of teachers' pedagogical and technical capabilities. Education management authorities should integrate translation education resources, construct open service platforms and certification systems, and provide customized training and guidance for teachers. Interpreting teachers must acquire educational technologies and data processing capabilities, utilize online resources for ubiquitous learning, comprehensively enhance their educational technology literacy, and dynamically adapt to digital teaching environments [18].

6. Conclusion

In the current era when generative AI technology is profoundly reshaping educational ecosystems, interpreting teaching is undergoing a critical phase of transition from traditional skill transmission to a human-AI collaborative paradigm. The three-dimensional collaborative system of "teacher-AI-learner" constructed in this study, through the organic integration of real-time feedback from intelligent translation systems and teachers' professional judgment, not only achieves a paradigmatic shift in interpreting evaluation from outcome orientation to process analysis but also cultivates learners' AI negotiation capabilities with algorithmic assistance while reinforcing the cultivation of irreplaceable humanistic literacy. The core of this educational innovation model lies in transforming AI tools into educational assets: intelligent systems undertake standardized skill training, enabling teachers to focus on the development of higher-order competencies, and guiding students to achieve an identity transformation from skill acquirers and technology users to intelligent collaborators through human-AI interaction. This model also provides a transferable methodological framework for the teaching of other language skills.

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Disclosure statement

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