

A Study of the Challenges and Professional Development Strategies for Foreign Language Teachers in the Age of Artificial Intelligence

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Abstract

As AI technologies become increasingly embedded in educational practice, foreign language teaching is experiencing substantial transformation. These developments not only provide new opportunities for teaching and learning but also place higher demands on teachers' professional competence. Against this backdrop, the present study examines several critical challenges faced by foreign language teachers, such as keeping pace with emerging knowledge, improving digital literacy, redefining their professional responsibilities, and adjusting to ongoing changes in educational contexts. Drawing on the TPACK framework and Teacher Identity Theory, the study analyzes the impact of AI on teachers' professional development and explores practical pathways for promoting sustainable professional growth. This article argues that foreign language teachers should continuously refine their knowledge frameworks, enhance the integration of technology, and promote innovation in teaching, actively adapt to evolving professional roles, and engage in lifelong learning. Meanwhile, schools and educational authorities should establish comprehensive support mechanisms to facilitate teachers' professional development. The study aims to provide theoretical insights and practical references for supporting the high-quality development of foreign language teachers in the age of artificial intelligence.

Keywords

Artificial Intelligence; Foreign Language Teachers; Professional Development; TPACK Framework; Teacher Identity

1. Introduction

In recent years, generative artificial intelligence technologies, represented by ChatGPT and DeepSeek, have developed rapidly and been deeply integrated into various domains of education and teaching, emerging as a core driving force for educational digital transformation. In foreign language education, the widespread application of intelligent translation, writing assistants, speech training systems, and

intelligent assessment technologies has not only enriched learning resources and innovated teaching models but also facilitated the shift of foreign language education from knowledge transmission to competence cultivation.

Teachers lie at the heart of educational transformation. Faced with the opportunities and challenges brought by artificial intelligence, foreign language teachers' traditional advantages rooted in knowledge accumulation and teaching experience are being challenged, and their professional competencies, occupational roles, and developmental philosophies all need to be reshaped. How to achieve proactive and sustainable professional development amid rapid technological iteration has become a critical issue for foreign language teachers.

Current research largely focuses on the effectiveness of AI applications in teaching and innovations in instructional models, while studies exploring the practical dilemmas and coping strategies of foreign language teachers from the perspective of teacher professional development remain insufficient. Accordingly, grounded in the TPACK framework and teacher identity theory, this study analyzes the core challenges confronting foreign language teachers in the AI era across four dimensions: knowledge, competence, identity, and environment. It further explores professional development pathways from four perspectives: optimizing knowledge structure, empowering teaching through technology, reconstructing role identity, and building a collaborative ecosystem. This study aims to provide a reference for foreign language teachers to adapt to the digital transformation of education and achieve high-quality professional development.

2. Theoretical Foundations

Teacher professional development refers to teachers' continuous growth in professional knowledge, teaching competence, and professional identity throughout their careers. This is more than merely acquiring knowledge and skills; it involves innovating educational principles, strengthening professional dedication, and continuously building one's professional identity. For foreign language teachers, professional development involves not only the enhancement of linguistic knowledge, pedagogical competence, and intercultural awareness, but also the capacity to adapt proactively to educational reforms and technological innovations.

With the deep integration of artificial intelligence into education, the connotation of teacher professional development has been continuously expanded. Foreign language teachers are now expected not only to possess solid disciplinary knowledge and pedagogical expertise but also to develop technological competence and innovative capabilities. Therefore, it is necessary to draw upon relevant theoretical perspectives to analyze the challenges and developmental needs of foreign language teachers in the AI era. Based on the research objectives and analytical framework of this study, the TPACK framework and Teacher Identity Theory are adopted as the primary theoretical foundations.

2.1. The TPACK Framework

With the increasing integration of information technology into educational practice, the scope of teacher professional development has expanded beyond traditional disciplinary knowledge and pedagogical skills to include technological competence and technology integration. Recognizing the increasing role of technology in teaching and learning, Mishra and Koehler established the TPACK framework to explain the knowledge required for effective technology integration. Since its introduction, the framework has been extensively utilized to investigate teacher competence and professional learning in contemporary educational environments.

Building upon Shulman's PCK theory, Mishra and Koehler expanded the conceptualization of teacher knowledge by emphasizing the role of technology in educational practice. Within this framework, successful teaching is viewed as the result of integrating subject expertise, pedagogical competence, and technological capability. Teachers are expected not only to possess a solid understanding of disciplinary content but also to employ appropriate instructional approaches and effectively leverage digital technologies to enhance learning experiences.

A central premise of the TPACK framework is that teacher professional development requires not only mastery of these individual knowledge domains but also their effective integration. Teachers can maximize the educational value of technology only when they are able to combine disciplinary knowledge, pedagogical approaches, and technological tools in meaningful ways. Consequently, TPACK emphasizes teachers' ability to apply multiple forms of knowledge in a coordinated manner to solve instructional problems rather than merely mastering isolated technologies or teaching methods.

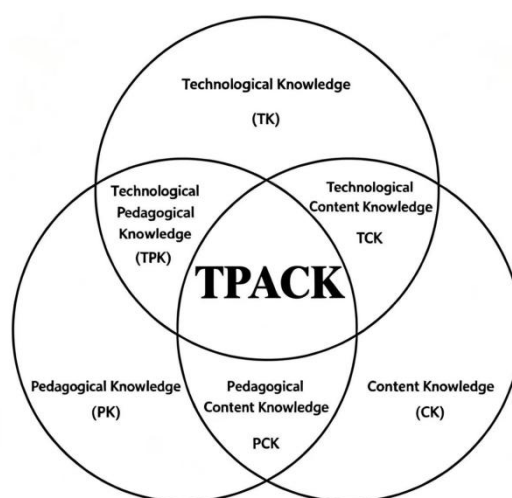


Figure 1. TPACK theoretical framework

In the context of rapid AI development, the TPACK framework provides valuable insights into the professional development of foreign language teachers. On the one

hand, AI technologies have been widely applied in language learning, intelligent translation, writing feedback, oral communication training, and learning assessment, thereby promoting continuous innovation in foreign language teaching. On the other hand, the emergence of AI has introduced new requirements for teachers' knowledge structures and professional competencies. Foreign language teachers are expected not only to possess linguistic and pedagogical expertise but also to understand the fundamental characteristics of AI technologies and their educational value, while being able to integrate them effectively into instructional design and classroom practice.

Therefore, the TPACK framework offers an important theoretical lens for examining the processes of knowledge renewal and competence development among foreign language teachers in the AI era. It also provides theoretical guidance for constructing an integrated knowledge system that combines technology, pedagogy, and disciplinary expertise.

2.2. Teacher Identity Theory

Teacher identity constitutes a crucial dimension of teacher professional development and refers to teachers' understanding and recognition of their professional roles, occupational values, and developmental trajectories. It reflects not only teachers' perceptions of who they are and what kind of teachers they aspire to become, but also their understanding of educational missions and professional responsibilities. Teacher identity directly influences teachers' professional commitment, instructional practices, and motivation for continuous development, making it a significant area of inquiry within teacher education research.

Existing studies suggest that teacher identity is not fixed; rather, it is a dynamic and evolving construct shaped by educational contexts, sociocultural environments, and individual professional experiences. As educational reforms and teaching practices continue to evolve, teachers continuously renegotiate their understanding of professional roles and responsibilities, thereby constructing new professional orientations and developmental goals. Consequently, teacher identity is both an outcome of professional development and a driving force that sustains teachers' ongoing growth.

The rapid advancement of artificial intelligence is profoundly transforming traditional educational ecosystems and exerting a significant influence on teacher identity. As AI increasingly participates in activities such as knowledge acquisition, learning support, and assessment, teachers are no longer viewed solely as knowledge transmitters. Instead, they are gradually assuming new roles as learning facilitators, resource integrators, curriculum designers, and value guides. Such transformations require teachers to reassess their professional significance and redefine their roles within emerging educational environments.

Overall, Teacher Identity Theory helps explain the underlying dynamics of changing

teacher roles in the AI era. It provides an important theoretical perspective for analyzing teacher identity transformation, professional commitment, and professional development, while also laying a theoretical foundation for the subsequent discussion of the challenges and developmental pathways of foreign language teachers in the age of artificial intelligence.

3. Challenges to the Professional Development of Foreign Language Teachers in the Age of Artificial Intelligence

Although AI creates new opportunities for language education, it also poses significant challenges to the professional development of foreign language teachers. The rapid integration of AI technologies has transformed traditional teaching practices and professional expectations. These challenges are mainly reflected in four dimensions: professional knowledge, professional competence, professional identity, and the professional environment.

3.1. Challenges in Professional Knowledge: The Gradual Erosion of Traditional Knowledge Advantages

For a long time, the professional strengths of foreign language teachers have been largely built upon extensive linguistic knowledge and accumulated teaching experience. In traditional educational settings, teachers functioned not only as knowledge transmitters but also as primary providers of learning resources. However, with the widespread adoption of generative AI tools such as ChatGPT and DeepSeek, the ways in which knowledge is accessed and utilized have undergone significant changes. Students can now obtain vocabulary explanations, grammatical analyses, text translations, and writing suggestions rapidly and conveniently, thereby reducing teachers' traditional advantage as the principal source of knowledge.

More importantly, the development of artificial intelligence has introduced new requirements for teachers' knowledge structures. In addition to mastering disciplinary and pedagogical knowledge, foreign language teachers are increasingly expected to understand the fundamental principles, operational mechanisms, and educational implications of AI technologies. In reality, however, some teachers remain at the level of basic tool utilization and lack a comprehensive understanding of how AI systems function, their limitations, and their potential risks. As a result, they may encounter difficulties in critically evaluating and effectively utilizing AI-generated information in educational contexts.

Furthermore, AI technologies continue to evolve at an unprecedented pace, accompanied by continuous changes in educational concepts, instructional approaches, and learning resources. If teachers fail to update their knowledge structures in a timely manner, a gap may emerge between their professional expertise and the demands of contemporary educational practice. Consequently,

achieving the effective integration of disciplinary knowledge, pedagogical knowledge, and technological knowledge has become one of the most significant challenges facing foreign language teachers in the AI era.

3.2. Challenges in Professional Competence: Insufficient Digital Literacy and Technological Application Capacity

The emergence of artificial intelligence has redefined the concept of teacher competence. Beyond traditional capabilities such as instructional design, classroom management, and learning assessment, teachers are now expected to possess digital literacy, technology integration competence, and data-informed decision-making abilities. Nevertheless, many foreign language teachers continue to face considerable challenges in effectively incorporating AI technologies into their teaching practices.

On the one hand, although generative AI tools and intelligent learning platforms have become increasingly accessible, many teachers use these technologies primarily for basic tasks such as information retrieval, material preparation, and content generation. The integration of AI into instructional design, classroom interaction, and assessment practices remains relatively limited. The mere presence of technology in the classroom does not automatically lead to pedagogical innovation; a substantial gap often remains between technology adoption and meaningful instructional transformation.

On the other hand, some teachers still possess a relatively narrow understanding of how AI can enhance teaching and learning. When confronted with innovative instructional models such as flipped classrooms, project-based learning, and human-AI collaborative learning, they may continue to rely heavily on teacher-centered instructional approaches. Consequently, the transformative potential of technology to facilitate student-centered learning and promote deeper engagement is not fully realized.

3.3. Challenges in Professional Identity: The Reconstruction of Teacher Roles

The influence of artificial intelligence extends beyond teaching methods and learning environments; it also profoundly affects teachers' perceptions of their professional roles and identities. Under traditional educational paradigms, teachers were often regarded as authoritative sources of knowledge, and their professional value was largely derived from their expertise and instructional authority. However, as AI technologies provide learners with multiple avenues for accessing information and knowledge, the traditional knowledge-based authority of teachers is gradually being reshaped.

These transformations have generated varying degrees of professional anxiety and identity-related uncertainty among some teachers. Given the remarkable efficiency

of AI in tasks such as language translation, text generation, and learning support, some educators may question the uniqueness and future relevance of their professional contributions. Such concerns can lead to uncertainty regarding career development and weaken teachers' confidence in their professional roles.

At the same time, the role of teachers is increasingly shifting from that of knowledge transmitters to learning facilitators, resource coordinators, and value-oriented mentors. However, not all teachers have successfully completed this transition. Some continue to struggle with redefining their professional positions within AI-supported educational environments and lack a clear understanding of how their roles should evolve in response to technological change.

3.4. Challenges in the Professional Environment: Inadequate Support Systems

Teacher professional development depends not only on individual effort but also on the availability of supportive institutional and social environments. The enhancement of foreign language teachers' professional competencies in the age of artificial intelligence requires coordinated participation from schools, teacher-training institutions, educational authorities, and other stakeholders. Nevertheless, existing support systems remain insufficient in several respects.

One prominent issue is the mismatch between teacher training programs and actual instructional needs. Many professional development initiatives focus primarily on introducing technological tools, while providing relatively limited guidance on how these technologies can be effectively integrated into specific foreign language teaching contexts. As a result, teachers often find it difficult to translate training experiences into practical classroom applications.

In addition, many educational institutions are still in the exploratory stage regarding the development of intelligent teaching resources, technological infrastructure, and evaluation mechanisms. Comprehensive systems capable of supporting teachers' long-term professional growth in digitally transformed educational environments have yet to be fully established.

Therefore, the challenges confronting the professional development of foreign language teachers in the AI era arise not only from individual-level factors but also from broader institutional and environmental conditions. Building a comprehensive support system characterized by multi-stakeholder collaboration and continuous professional learning opportunities has become a crucial task for promoting the high-quality development of foreign language teachers.

4. Pathways for the Professional Development of Foreign Language Teachers in the Age of Artificial Intelligence

To address the challenges brought by artificial intelligence, foreign language teachers need to continuously adapt to technological and educational changes.

Professional development in the AI era requires the joint improvement of knowledge, competence, professional identity, and environmental support. The following sections discuss several major pathways for achieving this goal.

4.1. Optimizing Knowledge Structures and Strengthening Technology Integration Awareness

In response to the profound transformations brought about by artificial intelligence in foreign language education, a primary task for teachers' professional development is the renewal and reconstruction of their knowledge structures. Traditionally, the professional knowledge base of foreign language teachers has centered on linguistic knowledge, pedagogical knowledge, and cultural knowledge. While this knowledge system adequately supported teaching in conventional educational settings, the widespread adoption of generative AI technologies has fundamentally altered the knowledge foundations required for effective teaching. Artificial intelligence has not only transformed the ways in which knowledge is accessed but has also reshaped the processes of knowledge production and dissemination. Students can now rapidly obtain abundant language-learning resources through intelligent technologies, while teachers are increasingly expected to assume new responsibilities, including information evaluation, resource integration, and learning facilitation. Under such circumstances, reliance solely on traditional disciplinary knowledge is no longer sufficient to meet the demands of intelligent education. Foreign language teachers must actively expand their technological knowledge and develop an integrated knowledge structure that combines content knowledge, pedagogical knowledge, and technological knowledge. Importantly, updating knowledge structures does not imply diminishing the importance of disciplinary expertise. On the contrary, in an era characterized by rapid technological advancement, a strong disciplinary foundation becomes even more essential. A comprehensive understanding of linguistics, intercultural communication, and theories of foreign language teaching has always been the cornerstone of effective teaching practice. At the same time, teachers should actively familiarize themselves with emerging AI technologies, including their developmental trends, operational principles, and educational applications.

4.2. Empowering Teaching Through Technology and Enhancing Pedagogical Innovation

The rapid development of artificial intelligence has generated new expectations regarding teachers' professional competencies. Technological advancement has transformed not only instructional tools but also educational philosophies, teaching approaches, and learning processes. Consequently, one of the key priorities for the professional development of foreign language teachers is the enhancement of digital literacy and AI-related competencies, enabling them to utilize technology effectively

to support teaching and learning.

Although many teachers have already begun experimenting with generative AI tools in instructional contexts, their applications often remain limited to tasks such as preparing teaching materials, collecting resources, and generating content. To fully realize the transformative potential of AI, teachers must further develop their technology integration competence and incorporate AI throughout the entire instructional process, including lesson planning, classroom implementation, and learning assessment.

In practical teaching contexts, AI technologies can support resource development, learning-task design, and personalized learning experiences. For instance, generative AI can be employed to create authentic language-learning scenarios, design differentiated learning activities, and provide timely feedback, thereby enhancing student engagement and promoting individualized learning. Such applications contribute to the development of more interactive, flexible, and learner-centered educational environments.

Moreover, the vast amount of learning data generated through intelligent educational systems creates opportunities for data-informed instruction. Teachers should gradually strengthen their capacity to interpret and analyze learning analytics in order to identify students' learning characteristics, monitor learning progress, and respond to individual needs more effectively.

At the same time, teachers must remain aware of the potential limitations and risks associated with AI-generated content, including issues related to accuracy, bias, and ethical concerns. Therefore, cultivating critical thinking and innovative awareness is equally important. Teachers should guide students in using AI technologies responsibly and critically, helping them develop the ability to evaluate information rather than passively accept machine-generated outputs. In this sense, teachers in the AI era should not merely function as technology users but also as designers, evaluators, and innovators of technology-enhanced learning experiences.

4.3. Facilitating Role Transformation and Reconstructing Professional Identity

Beyond knowledge renewal and competence enhancement, one of the most significant challenges confronting foreign language teachers in the AI era concerns the reconstruction of professional identity. As access to knowledge becomes increasingly diversified, teachers are no longer the sole source of information for learners. Consequently, the traditional authority of teachers based primarily on knowledge possession is gradually being redefined. Under these circumstances, teachers need to reconsider their professional positioning and actively adapt to emerging educational roles.

Role transformation begins with a shift in educational philosophy. Traditional classrooms often emphasized teacher-centered instruction and knowledge

transmission, whereas intelligent learning environments place greater emphasis on learner autonomy, active participation, and the development of higher-order thinking skills. As a result, teachers must gradually move from focusing on what to teach toward understanding how students learn. Their responsibilities increasingly involve designing meaningful learning experiences, organizing learning resources, facilitating collaborative inquiry, and supporting students' lifelong learning capabilities.

Furthermore, foreign language teachers should actively embrace the role of educational innovators. By exploring emerging instructional models such as smart classrooms, blended learning, and human-AI collaborative learning, teachers can promote deeper integration between artificial intelligence and language education. Such efforts contribute not only to instructional improvement but also to the broader transformation of educational practices.

It is important to recognize that although artificial intelligence can efficiently perform certain knowledge-based and procedural tasks, education extends far beyond the transmission of information. Education is fundamentally concerned with human development, value formation, and personal growth. In areas such as emotional support, humanistic care, cultural inheritance, ethical cultivation, and value guidance, teachers continue to possess irreplaceable advantages. Therefore, foreign language teachers should maintain a balanced perspective toward technological change, recognizing AI as a supportive tool rather than a substitute for professional expertise.

By actively engaging in the reconstruction of their professional identity, teachers can enhance their sense of professional commitment and self-efficacy. This identity reconstruction provides a lasting source of motivation for teachers' professional development and enables them to redefine their professional value in an increasingly technology-intensive educational environment.

4.4. Improving Support Mechanisms and Fostering a Collaborative Development Ecosystem

Teacher professional development is not solely an individual endeavor; it is also a collective process supported by institutional, social, and policy-level resources. The successful professional development of foreign language teachers in the age of artificial intelligence requires coordinated efforts among schools, educational authorities, teacher education institutions, and technology providers. Establishing a supportive and collaborative professional development ecosystem is therefore essential for facilitating teachers' adaptation to educational digital transformation.

Schools should serve as key providers of support for teacher professional development. On the one hand, educational institutions need to strengthen the construction of intelligent teaching platforms and digital resource systems, thereby providing the necessary technological infrastructure for AI-enhanced teaching

practices. On the other hand, schools should improve teacher evaluation systems by incorporating indicators such as digital literacy, technological competence, and instructional innovation into professional assessment frameworks. Such reforms can encourage teachers to engage more actively in educational digitalization initiatives.

Meanwhile, teacher training programs should be continuously refined to better address teachers' practical needs. Rather than focusing exclusively on the operation of technological tools, professional development programs should place greater emphasis on cultivating teachers' capacity to integrate AI into foreign language teaching effectively. Through activities such as case-based learning, classroom observation, action research, and collaborative professional inquiry, teachers can develop practical competencies that directly support instructional innovation.

In addition to institutional support and formal training opportunities, the establishment of professional learning communities is equally important. Professional development in the AI era increasingly depends on collaborative learning, resource sharing, and collective problem-solving. Through regular teaching discussions, collaborative research projects, online professional networks, and shared resource platforms, teachers can exchange experiences, disseminate best practices, and reduce the challenges associated with individual experimentation.

Furthermore, educational authorities, universities, and research institutions should strengthen cooperation in developing and sharing high-quality educational resources, conducting research on AI-enhanced teaching, and providing long-term professional support for teachers. Only through the collaborative participation of multiple stakeholders can a sustainable professional development ecosystem be established. Such an ecosystem will not only support the continuous growth of foreign language teachers but also contribute to the high-quality development of foreign language education in the age of artificial intelligence.

5. Conclusion

The rapid advancement of artificial intelligence is profoundly reshaping foreign language education while bringing both opportunities and challenges to teachers' professional development. Against the backdrop of educational digital transformation, teacher development has expanded beyond disciplinary knowledge and pedagogical competence to include technological literacy, professional identity construction, and supportive professional environments.

Grounded in the TPACK framework and Teacher Identity Theory, this study examines challenges across four dimensions: professional knowledge, competence, identity, and environment. While AI enriches instructional resources and expands teaching innovation, it also imposes new demands on knowledge renewal, digital competence, role transformation, and professional support systems.

To address these challenges, foreign language teachers should optimize their knowledge structures, strengthen technology integration capabilities, and enhance pedagogical innovation. They also need to embrace role transformation and reconstruct professional identities in human-AI collaborative settings. Moreover, sustainable professional growth requires collective support from schools, policymakers, and teacher education institutions, which provide essential resources, digital infrastructure, and professional learning opportunities.

Four Dimensions	Core Challenges	Targeted Development Strategies
Professional Knowledge	Diminished traditional knowledge advantages and inadequate technological knowledge	Construct an integrated AI-TPACK knowledge system
Professional Competence	Insufficient digital literacy and superficial use of AI technologies	Integrate AI into the whole teaching process and carry out data-driven instruction
Professional Identity	Professional identity anxiety and vague role orientation	Reconstruct teachers' core identity centered on educational cultivation
Professional Environment	Imperfect institutional supporting mechanisms	Establish a multi-stakeholder collaborative development ecosystem

Table 1. Challenges, Targeted Development Strategies and Responsible Stakeholders for Foreign Language Teachers

In conclusion, artificial intelligence serves not only as a powerful driving force behind educational transformation but also as an important catalyst for the professional growth of foreign language teachers. By continuously improving knowledge systems, competency frameworks, and professional support mechanisms, and by actively exploring innovative forms of human-AI collaborative education, foreign language teachers can enhance their professional value and make meaningful contributions to the high-quality development of foreign language education in the digital age.

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