

School-based Professional Development and Peer Collaboration: Exploring Pathways for the Development of Digital Literacy among College English Teachers in the AI Era

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Abstract

With the integration of artificial intelligence technologies into the field of education, enhancing the digital literacy of university English teachers has become a critical issue in adapting to contemporary changes. This study focuses on two practical pathways—school-based professional development and peer collaboration—exploring their synergistic effects and implementation mechanisms in fostering the development of teachers' digital literacy. By reviewing relevant theories and existing literature, this paper constructs a digital literacy development framework that integrates school-based organizational support and peer collaborative learning. It emphasizes continuous growth in technological application capabilities through collective discussions, case sharing, and collaborative design activities within authentic teaching contexts. Practice demonstrates that this approach effectively helps teachers overcome technophobia, strengthens their confidence and ability to integrate AI tools into English teaching, thereby significantly improving instructional outcomes and enhancing students' language learning experiences. The study further indicates that institutionalized school-based support and an open peer culture are essential foundations for ensuring the sustainable operation of this pathway, offering actionable references for universities to promote teacher professional development in the AI era. Future research may delve into the localized adaptation of this pathway across different institutional contexts and its long-term impacts.

Keywords

School-based Professional Development; Peer Collaboration; College English Teachers; Digital Literacy; AI Era

1. Research Background

The rapid development of artificial intelligence technology and its profound reshaping of the educational landscape have brought both new challenges and opportunities to the field of English teaching in higher education. In recent years,

emerging tools represented by generative artificial intelligence have introduced personalized and intelligent support to language instruction, while simultaneously raising more urgent demands for teachers' digital literacy. Traditional teacher development models, such as short-term intensive training programs, often yield limited results due to their disconnection from specific teaching contexts, hindering teachers' ability to effectively and creatively integrate advanced technologies into their daily practices and internalize them as sustainable pedagogical competencies (Jin et al., 2025). In this context, exploring more effective and sustainable pathways for teacher professional growth has become increasingly critical (Ge & Liu, 2025).

School-based professional development and peer collaboration, as two teacher development mechanisms deeply embedded in school-based practices, offer promising approaches to addressing these challenges. School-based professional development emphasizes continuous and systematic inquiry into authentic teaching problems within the institutional setting, while peer collaboration focuses on experience sharing, cooperative exploration, and mutual support among teachers based on equitable relationships. In the age of artificial intelligence, the synergy between these two mechanisms holds the potential to build a supportive ecosystem for digital literacy development—one that not only responds to technological changes but also fosters teachers' intrinsic motivation (Richards & Farrell, 2005).

This study seeks to systematically investigate how school-based professional development and peer collaboration interact to enhance the digital literacy of college English teachers, analyzing their underlying implementation mechanisms and practical outcomes. The findings aim to provide actionable insights for higher education institutions to promote teacher professional development in the digital era.

This research carries both theoretical and practical significance. Theoretically, it contributes to enriching and deepening the literature on teacher professional development, particularly in the domain of digital literacy, by clarifying the interplay between institutional support structures and teacher-led collaborative learning (Mann & Walsh, 2017). Practically, the outcomes may inform the design of teacher development programs and the cultivation of supportive teaching-research cultures for institutional administrators, while also offering guidance for frontline English teachers to overcome barriers in technology integration and enhance pedagogical innovation. Ultimately, this study aspires to support the comprehensive improvement of teachers' digital literacy, advance the quality of English language education, and better facilitate students' language learning and holistic competency development—thereby contributing to foreign language teaching reform in an age of deepening human-AI integration.

2. Theoretical Foundations and Literature Review

2.1. Core Conceptual Definitions: School-Based Professional

Development, Peer Collaboration, and Teacher Digital Literacy

To delve into the role of school-based professional development and peer collaboration in enhancing the digital literacy of university English teachers, it is essential to first define these three core concepts clearly. These concepts form the theoretical foundation of this study and delineate the specific scope of subsequent discussions.

School-based professional development refers to organized, planned, and sustained professional learning and research activities conducted primarily within the school where teachers are employed. It focuses on addressing practical issues encountered in school development and teaching practice, with its core characteristic being "school-centered, school-oriented, and school-based." This emphasizes grounding teachers' professional development in authentic teaching contexts and organizational culture. In the era of artificial intelligence, the connotation of school-based professional development has expanded to include not only traditional activities such as collective lesson planning, classroom observation, and peer feedback but also new forms like data analysis using intelligent teaching platforms and cross-temporal and spatial collaborative teaching research through virtual teaching and research groups. The goal is to establish an internal support system that enables teachers to continuously adapt to technological advancements (Ge Fuhong & Liu Qingtang, 2025).

Peer collaboration is a key practice that ensures the effective implementation of school-based professional development. It emphasizes teachers' mutual professional growth through continuous dialogue, collaboration, experience sharing, and problem-solving based on principles of equality, trust, and sharing. As research indicates, cooperative and inquiry-based peer collaboration is a fundamental approach to fostering teachers' professional development (Richards & Farrell, 2005). In the context of digital literacy development, peer collaboration transcends simple technical guidance, evolving into a dynamic "learning community." Within this community, teachers can collectively explore the pedagogical potential of AI tools, collaboratively design technology-integrated teaching strategies, and promptly exchange solutions for challenges encountered in technology use. This transforms individual experiences into collective wisdom, effectively reducing anxiety and isolation related to technology application.

Teacher digital literacy is a multidimensional, comprehensive competency system. It encompasses not only operational skills with digital devices and software (e.g., intelligent speech evaluation systems, AI writing assistance tools, and big data learning analytics platforms) but also critical thinking and practical abilities for instructional design, implementation, assessment, and reflection in digital environments. Specifically, it requires teachers to discern and integrate high-quality digital educational resources, design and implement technology-supported innovative teaching models, utilize data analysis to understand student learning and

optimize instructional decisions, while also possessing basic awareness in areas such as digital ethics and information security (Fu Guanghuai & Chen Cong, 2025). As artificial intelligence becomes deeply integrated into education today, teacher digital literacy is particularly crucial, as it directly determines whether teachers can transform cutting-edge technologies into effective teaching productivity, thereby improving students' learning experiences and outcomes (Wang Yuemei, 2025).

2.2. Review of the Current Research Status of Teachers' Professional Development and Digital Literacy in the AI Era

Entering the era of artificial intelligence, both the connotation and extension of teachers' professional development have undergone profound changes. The traditional training model, which focuses on knowledge imparting and skill operation, has become difficult to cope with the challenges brought about by the rapid iteration of technology. Current research generally holds that teachers' professional development must shift from "technical training" to "quality cultivation", emphasizing the development of teachers' comprehensive abilities to integrate, innovate and apply digital technologies to optimize teaching in real, complex and dynamic teaching situations. Digital literacy has thus become a core dimension of teachers' professional development. It goes beyond mere operational skills and encompasses multiple aspects such as digital resource identification, technology-integrated instructional design, data-driven decision-making, and digital ethics awareness.

Research indicates that teachers' belief in digital literacy, that is, their recognition of the value of technological education and confidence in its active application, is the key driving force for the transformation of their teaching practice (Wang Yuemei, 2025). In this shift, the significance of school-based training and peer assistance has been re-examined and emphasized. Scholars have found that isolated development divorced from specific school cultures, teaching scenarios and teacher communities often has limited effects and is difficult to sustain. Therefore, the research perspective has gradually focused on how to build a professional development support system based on schools and relying on the teacher collaboration community. For instance, some studies have confirmed through the construction of virtual teaching and research rooms that a cross-temporal and spatial teacher collaboration network can effectively expand the boundaries of teaching and research, and promote the enrichment of teaching methods and the improvement of teaching abilities (Ge Fuhong and Liu Qingtang, 2025). This development path based on the community provides teachers with a platform for continuous dialogue, resource sharing and collaborative problem-solving, making the process of enhancing digital literacy more contextual and practical. For the specific group of college English teachers, existing research has explored the specific paths and obstacles to the development of digital literacy. Research generally focuses on the

differences within the teaching population in terms of technology acceptance and application ability, such as the "digital divide" that may be brought about by factors like age and gender.

To this end, scholars advocate the establishment of diversified teacher mutual assistance mechanisms, such as encouraging young teachers with high digitalization levels to pair up with middle-aged and elderly teachers with rich teaching experience, to achieve complementary advantages of technological empowerment and experience inheritance (Fu Guanghuai, Chen Cong, 2025). This kind of peer assistance based on the school-based environment is believed to significantly narrow the ability gap among teachers, stimulate collective wisdom, and jointly explore innovative applications of generative artificial intelligence tools in specific teaching links such as English writing and oral assessment (Jin et al., 2025). Current research has reached a consensus: in the era of artificial intelligence, the development of digital literacy for college English teachers should not be a simple accumulation of technologies, but a systematic project involving the renewal of concepts, the reshaping of culture and the innovation of mechanisms. Future research needs to further delve into how to organically integrate the institutionalized support of school-based training with the open culture of peer assistance, and construct a sustainable development path that can not only respond to technological frontiers but also be rooted in teaching practice and stimulate teachers' intrinsic motivation.

3. Construction of School-based training and peer Assistance Paths for the Development of Digital Literacy of College English Teachers in the AI Era

3.1. Digital Literacy Development Model Based on School-based Training: Objectives, Contents and Implementation Strategies

Based on the actual work of English teachers in colleges and universities, the essence of the digital literacy cultivation model based on campus-based training lies in the in-depth integration of teachers' professional growth with the daily teaching practice of schools and the inherent requirements of technological innovation. This model aims to assist college English teachers in calmly coping with the teaching changes brought about by artificial intelligence through a systematic internal organization and support mechanism, and to achieve a continuous and solid improvement in their digital literacy.

Specifically, the development goals of this model can be refined into three dimensions: In the cognitive dimension, it is dedicated to helping teachers more deeply understand the value of digital technology in the field of education, establish the belief of actively integrating technology, and resolve possible technological anxiety or rejection. In terms of the ability dimension, emphasis should be placed on enhancing teachers' practical operational capabilities in skillfully applying various

artificial intelligence tools in real classroom environments, such as intelligent voice assessment systems, AI writing tutoring tools, and learning data analysis platforms, for course design, teaching implementation, and effect evaluation. In terms of organizational culture, the aim is to create a school-based teaching and research atmosphere that advocates collaboration, encourages innovation, and promotes resource sharing, making the development of digital literacy a common vision and daily action for the teaching team (Ge Fuhong and Liu Qingtang, 2025). To achieve these goals, the content planning of school-based training must closely align with the actual context of the deep integration of artificial intelligence and English teaching. This includes but is not limited to: organizing teachers to collectively study and deeply interpret authoritative standards such as "Digital Literacy for Teachers", and clearly grasping the path of ability development; Special topic discussions and workshops will be held on topics such as the in-depth functional exploration of intelligent teaching platforms, the innovative application of generative AI in writing and oral teaching, and personalized teaching strategies based on data. Through practical activities such as collective lesson preparation, collaborative teaching plan design, construction of school-based test question banks, and development of intelligent assessment resources, theoretical cognition is transformed into practical and executable teaching plans. Particularly crucial is that the training content should be derived from the real predicaments that teachers encounter in the teaching field, such as how to use AI tools to provide students with targeted writing revision suggestions, or how to analyze the learning situation data generated by the intelligent platform to dynamically adjust the teaching progress, so as to ensure that the training activities have clear pertinence and practical value (Jin et al., 2025).

An effective implementation path is the core to ensure the true implementation of the school-based research and training model. First of all, the school should formulate a systematic overall plan for school-based research and training, and form a high-level guidance team composed of subject leaders, technical backbones and teaching administrators to be responsible for the overall planning and guidance of research and training activities. Secondly, it is necessary to establish and improve a regular training system, making collective discussions, sharing of teaching cases, classroom observations and reflection exchanges and other activities regular arrangements, so as to form a stable and continuous professional development rhythm. As Richards & Farrell (2005) emphasized, effective peer assistance depends on a structured cooperative framework. Teachers can be encouraged to proactively raise the difficulties they encounter during the process of technology integration. The research and training team can jointly "diagnose" and analyze them, form solutions, and then return to the classroom for practical verification, thereby establishing a virtuous cycle of "identifying problems - concentrated discussion-classroom practice - summary and reflection".

In addition, the existing resources of the school should be fully explored and utilized.

For instance, by making use of the school's existing recording and broadcasting systems, virtual teaching and research rooms or smart classrooms and other facilities, an environment for teachers to get close to technology and engage in hands-on practice should be provided, so that the training activities can extend from theoretical discussions to real operations. Finally, great importance should be attached to the transformation and sharing of the research and training achievements. By building a digital teaching resource library within the school and regularly holding exhibitions, evaluations and exchanges of teaching innovation cases, the individual exploration experiences of teachers can be accumulated into organizational wisdom at the school level. This will continuously consolidate the foundation of school-based research and training and provide continuous support for the dynamic optimization of subsequent research and training activities. (Fu Guanghuai, Chen Cong, 2025).

3.2. The Application of Peer Collaboration Mechanisms in Enhancing Digital Literacy: Forms, Processes, and Effectiveness Evaluation

Among the various pathways to enhance digital literacy, mechanisms for mutual support among peers demonstrate a rich diversity of practical forms. The key lies in leveraging equal and cooperative relationships among teachers to transform technological knowledge into practical pedagogical skills within real classroom settings. Primary manifestations include thematic discussions focused on instructional content, hands-on training sessions targeting specific technology applications, and one-on-one mentoring or peer coaching. For example, university English teachers can form professional learning communities around topics such as "Innovative Applications of Generative Artificial Intelligence in English Writing Instruction," enabling them to collaboratively explore technological functionalities, design teaching activities, and share practical classroom experiences (Jin et al., 2025). This collaborative model, rooted in authentic teaching challenges, can significantly boost teachers' engagement and sense of ownership. As scholars have noted, such reflective communities of practice can effectively promote deep learning and professional growth among educators (Mann & Walsh, 2017).

In the context of rapidly evolving AI technologies, one-on-one mentoring becomes particularly vital. Younger teachers, who are often more adept with digital applications, can assist their more experienced colleagues in mastering emerging educational tools, while senior teachers can impart pedagogical wisdom and classroom management expertise. This reciprocal exchange facilitates a fusion of complementary strengths, enabling teachers to collectively overcome specific difficulties encountered when integrating technology into instruction (Fu & Chen, 2025).

4. Implications and Future Directions

This study, through an in-depth analysis of the synergistic role of school-based professional development and peer collaboration in fostering the digital literacy of university English teachers in the AI era, yields the following key findings.

First, school-based professional development, which is institutionally grounded and oriented toward authentic teaching challenges, provides crucial organizational support and a realistic learning context for the growth of teachers' digital literacy. Through institutionalized mechanisms such as collaborative lesson planning, thematic workshops, and teaching case sharing, technology learning becomes tightly integrated with daily English teaching practices. This integration effectively helps teachers overcome unfamiliarity and apprehension toward emerging technologies, thereby enhancing their confidence and skills in utilizing AI tools in their teaching.

Second, an egalitarian and open peer collaboration mechanism is the core pathway for deepening school-based professional development and realizing its intended outcomes. By establishing teacher learning communities that engage in sustained collaboration and experience exchange regarding technology exploration, curriculum design, and problem-solving, the absorption and application of digital knowledge are accelerated. Furthermore, such communities foster a supportive environment that provides emotional backing and strengthens professional identity. The research indicates that a dual support pathway, combining "institutional scaffolding" and "collaborative peer engagement," can effectively facilitate teachers' transition from passive technology users to proactive agents of pedagogical innovation. The conclusions of this study offer valuable insights for higher education institutions aiming to promote the professional growth of English teachers. Institutional leaders should prioritize cultivating a supportive school-based teaching and research culture, integrate digital literacy development into overall institutional planning, and provide corresponding resources and policy support. For instance, forming regular cross-disciplinary and cross-generational teacher support teams is recommended, encouraging partnerships between experienced senior faculty and technology-savvy junior faculty to facilitate knowledge exchange and intergenerational learning. Simultaneously, existing smart teaching platforms and virtual teaching-research offices should be fully utilized to extend the spatial and temporal scope of school-based development, organizing blended online and offline collaborative activities around themes like "AI-Enhanced Innovation in English Language Teaching."

On an individual level, teachers should actively engage in peer support networks, transforming daily challenges related to technology integration into subjects for collective inquiry, and continually reflecting on and refining their teaching practices through collaboration.

Looking ahead, this study suggests several promising directions for future research. As AI technologies continue to advance, the very definition and requirements of teacher digital literacy will keep evolving. Subsequent research could investigate

how school-based and peer-supported models can adapt flexibly to these changes—for example, by exploring how generative AI tools might assist in the design of professional development activities or in supporting teacher reflection. Furthermore, universities vary significantly in terms of resources, disciplinary emphases, and institutional cultures. Future studies could delve deeper into the localized implementation strategies and practical effectiveness of the developmental pathway proposed here across different types of higher education institutions. Finally, the ultimate goal of enhancing teacher digital literacy is to improve student learning outcomes. Longitudinal research tracking the sustained impact of school-based and peer-collaborative models on student language proficiency development, learning motivation, and other relevant factors would provide a more comprehensive evaluation of the educational significance of this approach.

In conclusion, in an era marked by the deepening integration of AI and education, constructing a sustainable, institutionally grounded, and peer-supported professional development ecosystem is of profound and lasting importance for elevating the quality of university English language teaching and cultivating high-achieving professionals prepared for the future.

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