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Digital Competence Enhancement for English Teachers in Shanxi Universities: Current Status, Challenges, and Strategic Pathways

Xiaomei Zhang[1,2], Nurhasmiza Sazalli[1], Miskam, Nuraqilah Nadjwa[1]

[1]Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Malaysia,

[2]Department of Foreign Languages, Lyuliang University, Lvliang, China

Corresponding Author Email: xiaomei.z@graduate.utm.my

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Abstract

The rapid advancement of digital technologies has profoundly transformed educational paradigms, necessitating the enhancement of teachers' digital competence as a cornerstone for successful educational digitalization. This study investigates the current status, challenges, and strategic pathways for improving digital competence among English teachers in Shanxi universities, China. Utilizing a mixed-methods approach—including questionnaire and interview—the research evaluates teachers' digital competence across five dimensions: Professional Development, Digital Resource Utilization, Digital Teaching Practices, Student Empowerment, and Scientific Research. Findings reveal that while teachers exhibit relatively high proficiency in professional development and digital resource integration, significant gaps persist in scientific research capabilities. Challenges such as insufficient training, policy-practice disparities, and resource allocation inequities are identified. Drawing on international frameworks like DigCompEdu and localized strategies, this paper proposes actionable pathways, including the establishment of dynamic digital competence standards, diversified training programs, policy reinforcement, school-based professional development, and international collaboration. The study contributes to both theoretical and practical discourses on educational digitalization, offering insights for higher education reform.

Keywords: Digital Competence, English Teachers, Higher Education, Shanxi Universities, Educational Digitalization

Introduction

The global digital revolution has fundamentally reshaped educational systems, positioning digital competence as an essential capability for teachers navigating 21st-century learning environments. In China, the Education Power Construction Plan (2024–2035) identifies digital transformation as a strategic national priority, with educators serving as key agents in promoting technology-driven pedagogical reform. For English teachers in higher education, this shift entails not only mastering digital tools but also integrating them meaningfully into

language teaching, fostering students' digital literacy alongside linguistic proficiency (Feng & Sumettikoon, 2024).

Despite growing policy attention, regional disparities continue to challenge the equitable development of digital competence across China. Shanxi Province—a relatively underdeveloped region—faces significant barriers in aligning its higher education system with national digitalization goals. Prior studies have pointed to critical deficiencies in digital infrastructure, inconsistent training provisions, and limited institutional support, particularly in English language education. These gaps hinder teachers' ability to innovate, engage students effectively, and participate in broader academic networks.

Understanding the current state of English teachers' digital competence in Shanxi and identifying pathways for improvement is therefore both urgent and necessary. Enhancing teacher digital competence is not only vital for improving teaching quality and student outcomes but also crucial for advancing regional educational equity and national development goals. This study responds to this need by providing an in-depth, evidence-based examination of digital competence among English teachers in Shanxi universities.

The significance of this research lies in its potential to inform policymakers, university leaders, and teacher educators about the specific challenges and strategic opportunities in digitally empowering the English teaching workforce. By grounding its analysis in internationally recognized frameworks such as DigCompEdu and contextualizing findings within Shanxi's unique educational environment, this study offers both theoretical insights and practical recommendations for sustainable digital competence enhancement.

The objectives of the study are to:
Assess the current digital competence levels of English teachers in Shanxi universities.
Identify the challenges to developing digital competence in this group.
Propose evidence-based strategies to bridge the identified gaps.
Through a mixed-methods approach, this research contributes to the growing discourse on educational digitalization, offering targeted solutions for improving teacher readiness and institutional capacity in the digital era.

Literature Review

Conceptualizing Digital Competence

Digital competence, often interchangeably termed "digital literacy," has evolved from a narrow focus on technical skills to a holistic construct encompassing cognitive, social, and ethical dimensions. Eshet's (2004) seminal framework delineated five survival skills for the digital age: photo-visual literacy (interpreting graphical information), reproduction literacy (remixing digital content), branching literacy (navigating hypermedia), information literacy (evaluating online resources), and socio-emotional literacy (ethical online interactions). Subsequent frameworks, such as the European Union's DigCompEdu (2017), expanded this scope to include pedagogical integration, emphasizing educators' roles in designing digitally enhanced learning environments.

The distinction between digital competence and digital literacy remains debated. While some scholars treat them synonymously (Ferrari, 2013), others argue that competence implies

actionable mastery, whereas literacy denotes foundational understanding (Bawden, 2008). For this study, digital competence is defined as the integrated ability to critically and ethically select, adapt, and apply digital tools to achieve pedagogical, professional, and research goals. This definition aligns with the ISTE Standards (2016), which position educators as "designers," "facilitators," and "leaders" in digital ecosystems.

Recent scholarship underscores the dynamic nature of digital competence, necessitating continuous adaptation to emerging technologies like AI and virtual reality (VR) (Wu et al., 2023). However, critics caution against technocentric approaches, advocating for balanced attention to socio-cultural and ethical dimensions (Selwyn, 2021).

Digital Competence Frameworks

Globally, digital competence frameworks have been institutionalized to guide teacher training and policy. The EU's DigCompEdu (2017), for instance, provides a six-domain model spanning professional engagement, digital resources, and empowering learners. Singapore's Transforming Education through Technology 2030 Masterplan exemplifies national alignment with such frameworks, embedding digital competence into pre-service teacher education and professional development (Li, 2024). These initiatives emphasize collaborative, practice-oriented training, such as Finland's "digital coach" programs, where mentors support schools in addressing technology-integration challenges (Niemi et al., 2021).

In China, digital competence has gained prominence through policies like the Education Power Construction Plan (2024–2035), which prioritizes "smart education" and teacher upskilling. However, implementation remains uneven. Studies highlight urban-rural divides, with elite universities in Beijing and Shanghai outpacing inland provinces like Shanxi in digital infrastructure and training access (Yan & Yu, 2023). For example, only 34% of rural teachers in Shanxi reported access to AI-driven platforms, compared to 89% in Shanghai (Chen et al., 2024). Cultural factors also play a role: Confucian traditions emphasizing hierarchical knowledge transmission may conflict with student-centered digital pedagogies (Su et al., 2021).

Localized adaptations of global frameworks are critical. For instance, Wu et al. (2023) proposed a "4C model" (Competence, Curriculum, Collaboration, Culture) for Chinese educators, advocating for hybrid training that blends online modules with school-based mentorship. Such strategies acknowledge China's unique socio-technical landscape while leveraging international best practices.

Digital Competence in EFL Education

Digital competence is pivotal in EFL education, where technology bridges linguistic and cultural gaps. Tools like AI-powered language apps enable personalized learning, while virtual exchange programs connect students with global peers (Çelik & Karaca, 2022). Research demonstrates that digitally competent EFL teachers enhance student engagement, autonomy, and intercultural awareness (Jones, 2022).

Yet, challenges persist. A meta-analysis by Chen et al. (2024) revealed that only 22% of Chinese EFL teachers regularly use advanced tools like VR for immersive language practice, citing limited training and institutional support. Similarly, Hsu (2021) identified "tool-first, pedagogy-last" tendencies, where teachers prioritize software proficiency over pedagogical

innovation. For example, PowerPoint remains the dominant tool in EFL classrooms, while interactive platforms like Padlet or Flipgrid are underutilized.

Cultural and curricular constraints further complicate digital integration. China's standardized testing system, which emphasizes rote memorization, discourages experimentation with student-centered digital methods (Zhang & Wang, 2023). Additionally, ethical concerns—such as data privacy in AI-driven assessments—require nuanced navigation (Selwyn, 2021).

While extensive research exists on digital competence in Western contexts, fewer studies explore its application in China's regional universities, particularly in EFL education. Shanxi's socio-economic and educational dynamics—characterized by resource disparities and cultural inertia—remain understudied. This study thus highlights the need for context-specific strategies that address both global trends and local realities.

Methodology

Research Design

This study adopts a mixed-methods approach, combining quantitative survey and qualitative interview to evaluate EFL teachers' digital competence across five dimensions derived from DigCompEdu and localized adaptations and then proposes strategies for improving it.

Participants

This study focuses on university EFL teachers in Shanxi Province, China. The sample selection criteria are as follows:1) In-service English Teachers: Participants must be currently employed English teachers in universities or vocational colleges within Shanxi Province. 2) Teaching Experience: Teachers are required to have at least one year of English teaching experience to ensure they possess a certain level of understanding and insight into teaching practices. 3) Disciplinary Scope: The study includes both general English teachers and specialized English teachers to comprehensively reflect the current state of digital competence across different teaching contexts. 4) Geographical Distribution: The sample covers universities in various regions of Shanxi Province, including cities such as Taiyuan, Lvliang, and Xinzhou, to ensure the representativeness and broad applicability of the research findings.

The sample comprises English teachers from higher education institutions within Shanxi Province. Using convenience and snowball sampling methods, a total of 119 valid questionnaires were collected, with 108 remaining after applying the screening criteria. The sample reflects various demographic factors, including gender, age, professional title, educational background, and institutional level, thereby providing a comprehensive representation of the digital competencies of English teachers across different types of universities in Shanxi Province.

Data Collection and Analysis

A 5-point Likert scale questionnaire was used to assess teachers' digital competence levels. The questionnaire serves as a primary data collection tool in this study, aiming to quantitatively analyze the current state of digital competence among English teachers in Shanxi universities. The digital competence questionnaire is adapted from the European DigCompEdu framework and the Digital Competence Scale for Teachers in Higher Education (DCSTHE) (Wang & Chu, 2023), with an added "scientific research" construct to better align

with the actual work of higher education English teachers. The quantitative component is based on survey data and is conducted using SPSS 27.0 for descriptive statistics which involves analyzing the overall level of teachers' digital competence by calculating measures such as mean, standard deviation, and frequency distribution. These statistics help reveal teachers' performance across different dimensions.

Interview is another important data collection method in this study, aiming to delve into strategies in enhancing digital literacy through in-depth discussions. The interview subjects are 10 representative English teachers. The interviews are semi-structured to ensure flexibility and depth of content. Each interview lasts 30-45 minutes, and the content were recorded and transcribed into text for subsequent analysis. The qualitative data employs content analysis. Through coding and categorizing interview content, key themes and patterns in the process of enhancing teachers' digital literacy are identified. This method aids researchers in deeply understanding teachers' needs, obstacles, and perspectives on the application of digital technology, thereby providing rich contextual information for the study's conclusions.

By utilizing quantitative and qualitative research methods, this study aims to comprehensively reveal the current state of digital competence among English teachers in Shanxi universities and provide a scientific basis for constructing pathways to improvement.

Results

This section synthesizes the empirical findings from the quantitative data, offering an integrated analysis of the current digital competence levels among English teachers in Shanxi universities.

To assess the digital competence levels of English teachers in higher education in the areas of Professional Development, Digital Resource Utilization, Digital Teaching Practices, Student Empowerment, and Scientific Research, we calculated the mean and standard deviation. A five-point Likert scale (1= "Strongly Disagree" to 5= "Strongly Agree") was used to evaluate teachers' digital competence. The higher the mean score, the higher the level of teachers' digital competence.

Overall, based on the sample data of teachers, the average digital competence score of the surveyed teachers was 3.95, with a standard deviation of 0.459, indicating that the overall digital competence level was not high. Table 2 presents the mean scores and standard deviations of English teachers in higher education concerning digital competence and its five dimensions. The following section provides a detailed descriptive analysis of English teachers' perceptions of each aspect of their digital competence.

Table 2
Descriptive statistics of digital Competence of EFL teachers in Shanxi universities

Construct	N	M	SD	Max	Min
Digital Competence	108	3.95	0.459	4.97	2.76
Professional Development	108	4.16	0.528	5	2.33
Digital Resource Utilization	108	4.17	0.538	5	2.33
Digital Teaching Practices	108	3.93	0.598	5	2.14
Student Empowerment	108	3.92	0.58	5	2.13
Scientific Research	108	3.59	0.769	5	1

From the descriptive analysis of Professional Development, the highest mean score was 4.4, while the lowest was 3.94. Teachers demonstrated strong competency in utilizing digital platforms for communication and continuous learning. Since all domains were at a similar level, the differences in mean scores were not significant. This suggests that English teachers in Chinese higher education generally perceive their professional growth positively. Among them, "Using different digital channels to enhance communication with learners and colleagues" was identified as the strongest ability, with 50% of teachers selecting "Strongly Agree." The lowest-rated item was "Using digital technologies to enhance the quality of collaboration among team members," where most teachers chose "Agree." Interview data revealed that while teachers actively engaged in online training, institutional support for collaborative projects—such as cross-departmental digital initiatives—remained limited. One interviewee noted: "We lack structured platforms to share digital teaching resources across departments. Most collaborations happen informally, which limits scalability."

The second construct in the questionnaire was Digital Resources Utilization. The overall mean for this construct was 4.17, with a standard deviation of 0.538, showing that English teachers generally perceive their digital resource competence as relatively high. Teachers demonstrated competence in protecting sensitive content (M = 4.38, SD = 0.680), which is crucial in maintaining ethical standards in digital education. However, the lower mean score for evaluating digital teaching strategies (M = 3.9, SD = 0.735) suggests a need for improvement in reflective practices. Qualitative insights attributed this to a lack of training in data-driven pedagogy. For example, only 17.6% of teachers reported systematically analyzing student performance data to refine teaching methods.

Digital Teaching Practices was the third dimension of the English teachers' digital competence questionnaire. Descriptive analysis shows that this dimension had a lower mean score than the first two dimensions. The highest mean was found in Item 1 (M = 4.38, SD = 0.637), with 45.4% of teachers choosing "Agree" and 46.3% choosing "Strongly Agree," indicating that 91.7% of teachers believed they could use various digital resources in the classroom to support teaching. Regarding digital competence related to assessing student learning with digital tools, the mean scores of 5 items were all below 4, suggesting that teachers need to focus on improving their skills in this area, particularly in "Using digital technologies to help students plan, record, and monitor their own English learning process." While a significant majority of teachers felt confident in using various digital resources to support teaching, their competence related to assessing student learning with digital tools indicate areas for growth. Despite high proficiency in basic tool usage, weaknesses emerged in advanced applications. Only 15.7% of teachers employed digital tools to help students monitor their learning progress. Interviews highlighted infrastructural barriers: "Our classrooms have smart boards, but training on adaptive learning platforms is rare. Many of us rely on trial-and-error."

The fourth dimension of the digital competence questionnaire related to Student Empowerment. The overall mean score for this dimension (M = 3.92, SD = 0.58) was lower than the previous three dimensions, with challenges noted in providing personalized learning opportunities using digital technologies. Items had relatively high mean scores, indicating that teachers were able to consider and address potential practical or technical difficulties when assigning digital English homework and encouraged students to create digital English content. The lowest mean score was for Item 2: "I use digital technologies to provide personalized English learning opportunities for students, such as offering different digital tasks to meet individual learning needs, preferences, and interests," suggesting that English teachers found it challenging to accommodate the diverse learning needs of students in English learning. While 62% of teachers addressed technical difficulties in digital assignments, personalized learning strategies scored lowest (M=3.70). Only 16.7% tailored tasks to individual student needs. This aligns with broader critiques of China's standardized education system, where large class sizes and rigid curricula hinder differentiation.

The final dimension of the digital competence questionnaire was Scientific Research. This dimension revealed the most significant gaps. The overall mean score was 3.59, with a standard deviation of 0.769, indicating that the scientific research aspect of teachers' digital competence was at the lowest level. Especially for Item 3 (M=3.3, SD=1.121) and Item 4 (M=3.41, SD=1.094), the results indicate that English teachers urgently need to enhance their digital competence in scientific research, such as creating their own research accounts, publishing research findings in open-access journals, and making their research data as publicly available as possible. Additionally, they need to improve their digital competence related to Item 6 (M=3.52, SD=1.081), which involves using project application systems to apply for research projects. Over 55% of teachers lacked familiarity with open-access publishing platforms, and only 28.7% utilized digital tools for collaborative research. An interviewee explained: "Publishing in international journals requires technical skills we were not trained in. Many colleagues still prefer traditional methods."

In summary, while English teachers in Shanxi Province exhibit strengths in various aspects of digital competence, there are notable areas for improvement, particularly in evaluating digital teaching strategies, assessing student learning with digital tools, providing personalized learning opportunities, and engaging in digital research activities.

Challenges Faced by English Teachers in Shanxi Universities

The teaching profession, particularly in the realm of English language education, is fraught with multifaceted challenges. Recent survey and interview data have illuminated several critical areas where educators encounter significant obstacles:

Lack of Competence in Reflective Practices

Reflective practice is pivotal for teachers aiming to evaluate and enhance their instructional methodologies. However, many educators struggle with effectively integrating reflection into their routines. This difficulty often stems from a limited understanding of reflective processes and a lack of structured opportunities to engage in meaningful reflection. The absence of mentorship and guidance further exacerbates this issue, leaving teachers without the necessary tools to critically assess and improve their teaching practices. Consequently, the potential for professional growth and improved student outcomes remains underutilized.

Challenges in Assessing Student Learning

Accurate assessment of student learning is a cornerstone of effective education. Teachers frequently face challenges in designing and implementing assessments that truly capture student understanding and progress. Factors contributing to this challenge include a lack of training in diverse assessment methodologies and an overreliance on traditional testing formats that may not align with contemporary educational objectives. Moreover, large class sizes and time constraints hinder the ability to provide personalized feedback, further diminishing the effectiveness of assessments. This situation often leads to a misalignment between assessment outcomes and actual student learning needs.

Accommodating Diverse Learning Needs

Classrooms today are increasingly heterogeneous, encompassing students with varied linguistic backgrounds, learning styles, and abilities. Teachers often find it challenging to address this diversity effectively. The primary obstacles include insufficient training in differentiated instruction techniques and a lack of resources to support diverse learners. Additionally, rigid curricula and standardized testing pressures can limit the flexibility teachers have to adapt lessons to meet individual student needs. This inadequacy can result in some students not receiving the support necessary to thrive academically, thereby perpetuating educational inequities.

Difficulties in Applying for Research Projects

Engagement in research projects is essential for teachers' professional development and the advancement of educational practices. However, many educators encounter significant barriers when attempting to undertake research initiatives. These barriers include a lack of familiarity with research methodologies, limited access to academic resources, and insufficient institutional support. Time constraints due to heavy teaching loads further impede teachers' ability to engage in research activities. Without adequate support and resources, teachers may feel discouraged from pursuing research opportunities, limiting their professional growth and the potential for innovation in teaching practices.

Insufficient Training

Continuous professional development is crucial for teachers to stay abreast of educational advancements and refine their skills. However, many educators report inadequate access to training programs that address their specific needs. This insufficiency is often due to budgetary constraints, a lack of locally available programs, and limited time allocated for professional development within the school schedule. The absence of targeted training opportunities hampers teachers' ability to implement effective instructional strategies and adapt to evolving educational demands.

Policy-Practice Disparities

There is often a disconnect between educational policies and classroom realities. Teachers may find that policies are formulated without sufficient input from practitioners, leading to mandates that are impractical or misaligned with actual classroom conditions. This disparity can result in frustration and decreased morale among teachers, as they struggle to reconcile policy requirements with the needs of their students. Furthermore, frequent policy changes without adequate support for implementation can lead to confusion and inconsistency in educational practices.

Resource Allocation Inequities

Equitable distribution of resources is fundamental to providing quality education for all students. However, disparities in resource allocation often leave some schools, particularly those in marginalized communities, at a disadvantage. These inequities manifest in various forms, including outdated or insufficient teaching materials, inadequate technological infrastructure, and substandard physical facilities. Such conditions hinder effective teaching and learning, exacerbating educational inequalities. Addressing these disparities requires a concerted effort from policymakers, educational leaders, and communities to ensure that all students have access to the resources necessary for academic success.

In conclusion, addressing these challenges necessitates a multifaceted approach that includes targeted professional development, inclusive policy formulation, and equitable resource distribution. By tackling these issues, the educational community can work towards creating an environment where both teachers and students can thrive.

Strategies for Enhancing the Digital Competence of English Teachers

Enhancing the digital competence of English teachers in higher education is crucial for adapting to modern educational environments. Based on the current digital competence levels of English teachers in Shanxi, results from the interview and best practices from both domestic and international contexts, the following strategies are proposed:

Establish Clear Digital Competence Standards

To effectively improve the digital competence of English teachers in higher education in Shanxi, it is essential to establish clear digital competence standards. These standards not only help define the skills teachers should possess in the digital age but also serve as a foundation for training and assessment (Falloon, 2020).

Internationally, frameworks such as the European Union's "Digital Competence Framework for Educators" (DigCompEdu) provide detailed descriptions of the skills and knowledge educators need in the digital era (Su et al., 2021). Shanxi's digital competence standards should be tailored to the specific needs of English language teaching in higher education. For example, they should emphasize the integration of multimedia resources, the operation of online teaching platforms, and the innovative application of digital tools in language learning (Amin & Paiman, 2022; Liang, 2022).

Given the rapid evolution of digital technology, these standards must be dynamic and adaptable. Schools should conduct regular evaluations and updates to ensure their relevance. During these evaluations, factors such as student feedback, teachers' practical applications, and the latest trends in educational technology should be considered (Wu et al., 2023). For instance, as artificial intelligence (AI) and virtual reality (VR) become more prevalent in education, these technologies should be incorporated into the digital competence standards to ensure that teachers are proficient in utilizing them to enhance teaching quality (Docter et al., 2024).

Implement Diverse Training Programs

Several successful international programs for developing teachers' digital competence highlight the importance of practice-oriented training, collaborative learning, and strong

support systems (Chen et al., 2024; Reisoglu, 2021). The following approaches can be adapted for English teachers in Shanxi.

Training programs should emphasize real-world applications of digital technology in teaching. For example, the Dutch "Data Team Project" provides a valuable model (Hubers et al., 2018). Schools can appoint data coaches to guide teachers in solving key educational challenges by setting goals, collecting and analyzing data, and implementing instructional actions (Decabooter et al., 2024). Additionally, task-based or project-driven training can be introduced. A practical example is the "Digital Storytelling" workshop, where teachers collaboratively develop a topic, collect and analyze materials, creatively integrate arguments, critically evaluate and refine their work, and ultimately share and present their digital stories (Yu & Wang, 2025). This approach enhances their ability to integrate digital tools into their teaching practices effectively.

Establishing teacher learning communities fosters experience-sharing and collaboration (Ohayon, 2022). Effective learning communities require multi-level support. School administrators should respect and support teachers' needs, empowering them with decision-making autonomy. This fosters an atmosphere of equality, respect, and trust. For instance, at the beginning of training programs, researchers, school leaders, and experienced teachers can collaboratively define training topics and agendas to align on shared goals. Schools should establish reward and accountability systems to encourage teachers' active participation. Rewards can recognize teachers' efforts in professional development, while clear guidelines help maintain a positive training environment.

Periodic team-building exercises and collaborative projects can strengthen interpersonal relationships, promote knowledge exchange, and create an open, inclusive, and supportive learning environment, enhancing team cohesion and collective problem-solving abilities (Kwon, 2024). Access to adequate technical support and resources is essential to ensuring the success of training programs. International best practices highlight the importance of comprehensive support systems for digital competence development.

Schools should provide stable internet connections, advanced digital equipment, and professional technical support teams to ensure teachers can effectively use various digital tools and platforms. In addition, institutions should offer rich digital resources, including online courses, educational software, and virtual labs, to support teachers in integrating digital technology into their teaching (Zhao, 2025). By implementing these strategies, higher education institutions in Shanxi can significantly enhance the digital competence of English teachers, equipping them with the necessary skills to thrive in an increasingly digital educational landscape.

Strengthening Policy Support and Guidance

Policy support is a crucial safeguard for enhancing teachers' digital competence (Rustandi et al., 2024). In the context of digital transformation, improving the digital competence of English teachers in higher education in Shanxi Province requires strong policy support to ensure that teachers can adapt to digital teaching environments and promote high-quality education and teaching.

Incentive policies should be introduced to encourage teachers to actively participate in digital competence training and applications. Specific measures include establishing special reward funds to recognize and reward teachers who excel in improving their digital competence (Michos et al., 2022). For example, a "Outstanding Digital Teaching Teacher" award can be introduced, accompanied by material incentives and honorary certificates to boost teachers' enthusiasm. Additionally, an evaluation and incentive mechanism for digital competence enhancement should be established, integrating digital competence into teacher performance assessment systems to encourage the active application of digital technology in teaching.

Necessary financial support should be allocated to digital competence enhancement projects to ensure their smooth implementation (Li et al., 2023). Government departments and universities should increase investment in these projects, setting up special funds to support teacher training in digital competence, the development of digital teaching resources, and related research initiatives. For example, teachers could receive financial support to attend domestic and international digital competence training or receive grants for teaching reform projects related to digital technology. Furthermore, universities should improve infrastructure conditions, establish clear standards for digital equipment allocation, and enhance the supervision of digital equipment usage.

Establishing a School-Based Training Model

Exploring a school-based training model tailored to institutional contexts can effectively enhance teachers' digital competence (Chen et al., 2024). This model can provide more targeted and practical training support based on teachers' specific needs and the school's teaching environment.

Training programs should be designed based on teachers' varying needs. Since digital competence requirements differ among teachers, training content should be targeted and flexible. For beginners, training can focus on fundamental digital technology operations and applications. For more experienced teachers, advanced training on topics such as integrating artificial intelligence into teaching and incorporating virtual reality technology can be offered. A continuous learning mechanism should be established to encourage teachers to keep updating their digital technology knowledge. Enhancing digital competence is an ongoing process that requires long-term institutional support. Schools can build digital training platforms to optimize training content and delivery methods while providing teachers with extensive online learning resources (Alshammary & Alhalafawy, 2023). For example, regular online seminars, specialized lectures, and workshops can be organized, inviting experts to share the latest digital technology applications and teaching experiences. Teachers should also be encouraged to take online courses to stay updated on new digital technologies and pedagogical approaches.

Strengthening International Exchanges and Cooperation

In the context of rapid global digital development, strengthening international exchanges and cooperation is a vital strategy for enhancing the digital competence of English teachers in higher education in Shanxi Province. Learning from international best practices can broaden teachers' perspectives and foster innovation in teaching methodologies and practices.

Teachers should be encouraged to participate in international digital competence enhancement projects to learn from advanced experiences. Many countries and regions have implemented extensive teacher digital competence programs, which provides structured training and practical opportunities for teachers (Reisoglu, 2021; Méndez et al., 2023). Universities in Shanxi Province can organize English teachers to engage in similar international projects through online courses, seminars, and workshops to enhance their digital technology application and teaching innovation skills.

Collaboration with international educational institutions should be established to conduct joint training and research initiatives. By partnering with globally recognized education institutions, universities, and enterprises, Shanxi's higher education institutions can introduce advanced digital education resources and technologies, providing teachers with a broader learning platform.

By establishing similar partnerships, universities in Shanxi Province can launch joint training programs, invite international experts to deliver lectures and provide guidance, and organize teachers to participate in international academic exchanges and research collaborations. Strengthening international exchanges and cooperation will enable English teachers in Shanxi's universities to gain exposure to cutting-edge digital technologies and teaching concepts worldwide. Moreover, they can continuously enhance their digital competence through practice, better adapt to digital teaching environments, and contribute to the high-quality development of English education in higher education institutions.

Conclusion

Shanxi's English teachers possess strong foundational digital skills but require systemic support to achieve transformative pedagogical practices. By addressing training gaps, policy inconsistencies, and cultural resistance, Shanxi can bridge the digital divide and align with global educational standards. Future studies should track the longitudinal impact of these strategies, particularly in rural and non-elite institutions.

The results underscore the importance of targeted professional development programs, institutional support, and policy-driven initiatives to enhance teachers' digital competence. Given the rapid advancements in educational technology, future research should explore the integration of emerging technologies, such as artificial intelligence, and investigate the impact of self-directed learning on digital competence development. These insights can inform strategies for fostering a more digitally proficient teaching workforce, ultimately improving the quality of English education in higher education institutions.

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