Contemporary Education Frontiers, 2026, Volume 4, Issue 7
https://bbwpublisher.com/journal/CEF
Online ISSN: 3029-1860
Print ISSN: 3029-1879

Intelligent Educational Literacy of Primary School English Teachers: Current Status and Improvement Strategies

Ying Guo*, Weidong Zhang, Yanli Zhang

School of Foreign Languages, Tangshan Normal University, Tangshan 063000, Hebei, China

Corresponding author: Ying Guo, 17399799329@163. com

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Against the backdrop of artificial intelligence empowering basic education, primary school English teachers' intelligent educational literacy refers to teachers' comprehensive ability to implement teaching activities with the support of intelligent environments and technologies in English instruction, which consists of four dimensions: awareness and attitude, knowledge and skills, teaching application, and ethics. This study conducted a questionnaire survey with a sample of 328 primary school English teachers to investigate the current status and influencing factors of their intelligent educational literacy. The results indicate that teachers' overall level of intelligent educational literacy is moderate, presenting a structural imbalance characterized by "high awareness and ethics but insufficient knowledge, skills, and teaching application". Besides, there is a disconnect between teacher training and classroom practice, restricting the effective transformation of training outcomes. Accordingly, this study proposes targeted optimization strategies. Centering on the improvement of practical application ability, it integrates teachers' independent learning with external institutional guarantees, develops discipline-adaptive intelligent teaching resources, and constructs an interactive mechanism linking professional training with classroom practice, so as to effectively promote the sustainable improvement of intelligent educational literacy among primary school English teachers.

Keywords: Artificial intelligence; Intelligent educational literacy; Primary school English teachers; Teacher training; Teaching application

Online publication: July 26, 2026

1. Introduction

Artificial intelligence technology is deeply penetrating the field of basic education, and the objectives, content, methods, and assessment of primary school English teaching are consequently facing systematic reconstruction. The Ministry of Education's Digital Literacy of Teachers professional standard explicitly identifies "digital teaching research and innovation" as a core element of the teacher literacy structure [1],

while UNESCO's AI Competency Framework for Teachers places the "creation" dimension at the top of its competency standards [2]. This signifies that the role of teachers is transitioning from technology users to educational innovators. However, as teachers transition from traditional knowledge providers to facilitators of AI-enhanced learning, they may experience tensions in redefining their professional roles [3]. Against this backdrop, the intelligent educational literacy of primary school English teachers—namely, the comprehensive ability of teachers to effectively utilize intelligent environments and intelligent technologies in English teaching—has become a key variable determining the quality of the intelligent transformation of English language teaching. Nevertheless, progress at the practical level is not encouraging. Tension exists between the speed of technological updating and the inertia of the teaching system, resulting in intelligent technologies often remaining at a superficial level of application in daily classrooms. A recent global survey, which included over 450 schools and universities, revealed that fewer than 10% of them have established institutional policies or formal guidance regarding the use of generative AI applications [4]. Based on this, the study aims to reveal the realistic pattern and obstructive factors of primary school English teachers' intelligent educational literacy, providing empirical evidence for constructing subject-adapted, tiered, and categorized improvement paths.

2. Literature review

In terms of existing research, scholars have optimized the theoretical frameworks of intelligent educational evaluation systems in the knowledge-economy era [5]. Empirical studies have further explored teachers' intelligent teaching practices. Kazmaci confirmed that teachers' AI knowledge influences the sustainable integration of classroom AI application, with their beliefs and attitudes acting as key mediating factors [6]. In practice, primary and secondary school teachers present a feature of "concepts taking precedence while practice lags" in digital teaching innovation [7]. Relevant overseas studies also identify teachers' AI competencies based on the TPACK framework [8]. Meanwhile, the teacher intelligent literacy evaluation system [9] and the EQUIP framework [10] provide reliable theoretical and measurement support for this study. Existing studies have limitations in research subjects, depth and practical pertinence, lacking targeted exploration of primary school English teachers' intelligent educational literacy. Accordingly, this study focuses on such teachers to explore their literacy status and bottlenecks, providing empirical and practical references for the intelligent development of primary school English education.

3. Research design

3.1. Questionnaire development

Drawing on existing research findings, the Questionnaire on Primary School English Teachers' Intelligent Educational Literacy was developed. The questionnaire comprises two parts. The first part, from the perspective of primary school English teachers' self-perception, explores the current developmental level of their intelligent educational literacy. The second part investigates the preparatory actions and strategies teachers adopt to enhance their own intelligent educational literacy.

Table 1. Questionnaire Framework

Primary Indicators	Secondary Indicators	Observation Items
Intelligent educational literacy	Intelligent Educational Value Perception	Actively follow cutting-edge developments in AI; be willing to try emerging technologies; hold an open attitude toward technological transformation.
	Intelligent Educational Role Orientation	Understand the role of AI in English teaching; rationally allocate human-AI division of labour.
Intelligent Educational Knowledge and Skills	Intelligent Education Ontological Knowledge	Grasp the basic concepts of artificial intelligence and big data; understand the principles of personalized recommendation and intelligent assessment.
	Intelligent Education Conditional Knowledge	Gain access to and use a variety of intelligent educational products; proficiently apply AI to design English teaching activities.
	Intelligent Education Practical Knowledge	Possess data analysis capabilities; be able to troubleshoot common technical malfunctions.
Intelligent Educational Application	Intelligent Educational Teaching Competence	Construct AI-blended classrooms; design AI-integrated English courses; generate personalized learning resources; formulate interactive strategies for AI-assisted classrooms.
	Intelligent Educational Evaluation Competence	Implement intelligent dynamic assessment; conduct comprehensive quality evaluation with the aid of AI.
	Intelligent Educational Student-cultivating Competence	Integrate moral education via intelligent platforms; strengthen teacher-student emotional bonds with technology.
	Intelligent Educational Professional Development	Collaborate via AI-supported teaching research platforms; track personal teaching growth; update knowledge by utilizing AI resource repositories.
Intelligent Educational Ethics	Intelligent Educational Ethical Perception	Uphold the essential goals of education; adjust strategies in accordance with individual differences.
	Intelligent Educational Ethical Behavior	Comply with data privacy regulations; guard against risks of technological over-reliance; guide students to use AI appropriately; foster students' awareness of technological ethics.

3.2. Research participants

The participants of this survey were primary school English teachers. The selection of respondents followed three principles. First, diversification of school types, including urban, county-town, township and rural primary schools. Second, diversification of teacher profiles, covering teachers with varying teaching experience, ages, professional titles and educational backgrounds. Third, diversification of regional distribution, aiming to include teachers from all prefecture-level cities. The questionnaire was distributed, completed and collected online. A total of 331 responses were retrieved. After screening and data cleaning, 328 valid questionnaires were retained, yielding an effective response rate of 99. 09%. Among the valid samples, there were 25 male teachers and 303 female teachers; 61 teachers from urban schools, 138 from county-town schools, 48 from township schools and 81 from rural schools. In terms of teaching experience: 5 teachers with 0–5 years, 33 with 6–10 years, 83 with 11–15 years, 54 with 16–20 years, and 153 with over 21 years of service. For age groups: 36 teachers aged 26–35, 215 aged 36–45, 76 aged 46–55, and 1 teacher aged 56 or above. Regarding professional titles: 38 Junior-Grade Teachers, 245 First-Grade Teachers and 45 Senior Teachers. As for educational attainment: 16 held college diplomas, 297 bachelor's degrees, and 15 master's degrees. A total of 183 teachers had received AI-related training, while 145 had not.

3.3. Reliability and validity test of the questionnaire

Cronbach's α reliability test was performed on the questionnaire data using SPSS statistical software. The overall reliability coefficient of the questionnaire was 0.949. The coefficients for the four dimensions, namely intelligent educational awareness and attitude, knowledge and skills, application, and ethics, were 0.916, 0.933 , 0.956, and 0.916, respectively, indicating satisfactory reliability of the questionnaire. KMO and Bartlett's tests were further conducted to examine validity. The KMO value was 0.942, which was greater than 0.8, and Bartlett's test of sphericity was significant ($p < .001$). These results demonstrated good validity of the survey data.

4. Results

4.1. Overall status of primary school English teachers' intelligent educational literacy

This study explored primary school English teachers' intelligent educational literacy from four dimensions: awareness and attitude, knowledge and skills, application, and ethics. Survey data revealed that the scores of all four dimensions fell within the positive range, though the mean scores were not high, and substantial differences existed across dimensions. Primary school English teachers obtained relatively high scores in intelligent educational awareness and attitude, suggesting that they have recognized the importance of intelligent educational literacy in the AI era. Their scores for intelligent educational ethics were also high, indicating sound ethical awareness. Nevertheless, teachers achieved moderate scores in intelligent educational knowledge and skills and relatively low scores in intelligent educational application.

Table 2. Overall Status of Primary School English

First-level Indicators	Awareness and Attitude	Knowledge and Skills	Application	Ethics	Overall Literacy
Mean	4. 10	3. 28	2. 71	4. 03	3. 53
Standard Deviation	0. 86	0. 82	1. 18	0. 87	0. 78

4.1.1. Status of intelligent educational awareness and attitude

The mean score of primary school English teachers' intelligent educational awareness and attitude was 4.10. Approximately 83. 6% of the teachers believed that artificial intelligence would exert a significant impact on English teaching. Proper application of AI technology could reduce teachers' workload and improve the effectiveness and efficiency of primary school English classrooms. Around 74. 3% of the teachers held the view that they should enhance their own intelligent educational literacy under the current circumstances and attach importance to learning skills related to "AI + English education". It can be concluded that primary school English teachers have fully recognized the significance of teachers' intelligent educational literacy in the AI era and generally hold positive attitudes toward "AI + English education".

4.1.2. Status of intelligent educational knowledge and skills

For the dimension of intelligent educational knowledge and skills, primary school English teachers obtained an average score of 3. 28. This result shows that teachers' mastery of intelligent educational knowledge was unsatisfactory, with deficiencies in understanding basic AI concepts and principles as well as solving practical application problems. Many teachers reported that the intelligent educational technologies they mastered were mostly multimedia-assisted instruction. Although they frequently employ platforms such as iFLYTEK, Jianying and DeepSeek for teaching, their understanding of AI technology remains superficial.

In particular, relatively low scores were obtained for the items "I possess basic data analysis capabilities" (3.14) and "I can troubleshoot common technical malfunctions" (3.17), indicating that teachers encounter substantial difficulties in data analysis and technical troubleshooting.

4.1.3. Status of intelligent educational application

Intelligent educational application constitutes the core of intelligent educational literacy. The survey results showed that the mean score of primary school English teachers' intelligent educational application was 2.71, falling between "Neutral" and "Disagree". Specifically, the item "I use intelligent tools to generate personalized learning resources" scored 2.80, "I integrate moral education through intelligent platforms" scored 2.76, and "I strengthen teacher-student emotional bonds via technological means" scored 2.75. These figures suggest that teachers have made certain attempts in resource generation, moral education integration and emotional connection building. Nevertheless, the scores for "I track my personal teaching competence growth trajectory through intelligent systems" (2.53), "I have implemented dynamic assessment supported by intelligent technologies" (2.64), and "I have formulated AI-assisted classroom interaction strategies" (2.66) indicate that primary school English teachers generally perceive themselves as incompetent in applying AI technologies to English teaching assessment, classroom interaction and professional development. They still lack the capacity to develop and innovate with AI technologies.

4.1.4. Status of intelligent educational ethics

In terms of intelligent educational ethics, primary school English teachers had an average score of 4. 03. Among the questionnaire items, "I uphold the essential goals of education in teaching" scored 4. 08, "I strictly comply with regulations for the protection of students' data privacy" scored 4. 05, "I guard against safety risks caused by technological over-reliance" scored 4. 03, "I guide students to use AI tools appropriately" scored 4. 02, and "I foster awareness of technological ethics in teaching" scored 4. 01. All these scores fell within the positive range, demonstrating that primary school English teachers generally have well-developed awareness of intelligent educational ethics.

4.1.5. Practices for improving intelligent educational literacy

Primary school English teachers have two pathways to enhance their intelligent educational literacy: self-directed improvement and school-organized development. Survey data revealed that approximately 73.6% of teachers keep abreast of current developments and trends in artificial intelligence via online resources and WeChat official accounts. Around 63.2% actively participate in AI educational technology training organized by educational authorities, schools or teaching departments. However, only 49. 4% have taken an active part in educational and teaching reform research themed "AI + Education". Regarding the improvement of their intelligent educational literacy, teachers' cognitive indicators are markedly higher than their behavioral indicators, suggesting that the transformation from cognition to practice still takes time.

4.2. Difference analysis of primary school English teachers' intelligent educational literacy

A cross-differential analysis of primary school English teachers' intelligent education literacy against their teaching experience, age, professional title, educational background, geographic region, training experience and frequency of technology use reveals that primary school English teachers show no significant differences in the dimensions of intelligent education awareness and attitudes as well as ethics, whereas significant

differences exist in the dimensions of knowledge and skills and practical application.

4.2.1. Analysis of differences by teaching experience

One-way ANOVA was performed with the scores of the four dimensions of primary school English teachers' intelligent education literacy as dependent variables and different teaching experience groups as the independent variable. The results indicate that for primary school English teachers with varying lengths of teaching experience, no significant differences were found in the dimensions of intelligent education awareness and attitudes and ethics, while significant differences were identified in knowledge and skills and practical application ($P < 0.05$). Teachers with 6–15 years of teaching experience attained significantly higher levels of intelligent education literacy than those with 0–5 years and more than 21 years of teaching experience, presenting an inverted U-shaped trend.

4.2.2. Analysis of regional differences

One-way ANOVA was conducted with the scores of the four dimensions of primary school English teachers' intelligent education literacy as dependent variables and location groups (urban, county, township and rural areas) as the independent variable. The data show that primary school English teachers from different regions exhibited no significant differences in the dimensions of intelligent education awareness and attitudes and ethics, but significant differences were observed in knowledge and skills and practical application ($P < 0.05$). Teachers in urban and county areas demonstrated significantly higher intelligent education literacy than their counterparts in townships and rural areas.

4.2.3. Analysis of training-related differences

An independent-samples t-test was adopted, taking the four dimensions of primary school English teachers' intelligent education literacy as dependent variables and participation in AI training as the independent variable. The results suggest that apart from the dimensions of intelligent education awareness and attitudes and ethics, there were significant differences in knowledge and skills and practical application between teachers who had received AI training and those who had not ($P < 0. 05$). Teachers with relevant training experience achieved significantly higher intelligent education literacy than untrained teachers.

4.2.4. Analysis of differences by usage frequency

One-way ANOVA was carried out with the scores of the four dimensions of primary school English teachers' intelligent education literacy as dependent variables and different technology usage frequencies as the independent variable. The data demonstrate that significant differences existed across all dimensions except intelligent education awareness and attitudes and ethics ($P < 0.05$). The scores of primary school English teachers' intelligent education literacy rose along with increased usage frequency: never used (2.98) < occasionally used (3.42) < moderate use (3.63) < frequently used (3.85) < used daily (4.12).

5. Strategies for improving primary school English teachers' intelligent educational literacy

5.1. Prioritizing the improvement of intelligent educational application competence

According to the survey, primary school English teachers hold relatively positive attitudes and adequate

perceptions toward intelligent education yet show deficiencies in relevant knowledge and practical application. Therefore, priority should be given to accumulating intelligent educational knowledge and enhancing application competence. Teachers' intelligent educational knowledge should focus on practical know-how, while the improvement of application competence should center on intelligent subject-specific teaching capacity and self-directed professional development.

5.2. Taking self-directed development as the fundamental pathway for enhancing intelligent educational literacy

First, primary school English teachers should shift from passive learning ("I am required to learn") to active learning ("I want to learn"), uphold the philosophy of lifelong learning, voluntarily attend lectures, training sessions, site visits and seminars on AI + English education, and join curriculum-teaching and research communities for AI-empowered English instruction. Second, they should move from indiscriminate learning to selective learning. Many teachers experience AI-related anxiety. They may learn selectively based on their prior knowledge and disciplinary background. Following the principle of "being able to use" and "learning what is necessary", teachers can achieve an adaptive level of intelligent educational literacy.

5.3. External support as a strong guarantee for the development of intelligent educational literacy

First, institutional arrangements for literacy improvement should be strengthened. Schools shall incorporate intelligent educational literacy into teachers' professional development and strengthen relevant assessment in new-teacher induction, professional title promotion, merit evaluation and awards. Second, prepare supportive environments for intelligent education. Build infrastructure for online-offline blended teaching, create learning environments catering to personalized learning for teachers and students, and establish developmental environments to foster teachers' capacity for designing intelligent teaching contexts and developing smart curriculum resources. Third, organize targeted activities for literacy enhancement. The survey shows that young teachers, teachers in urban and county-town schools, and teachers with prior training enjoy advantages in age, resources and training. They may take the lead in organizing learning, research and teaching reform activities themed on AI + English education.

5.4. Enhancing adaptation to the English subject

Develop AI toolkits tailored for primary school English teaching, such as AI oral proficiency assessment, AI graded reading, AI situational dialogue and AI grammar correction. A repository of teaching cases should also be provided to lower the threshold for teacher application. Particular attention should be paid to developing AI-enabled formative assessment tools to address the challenges reflected in low-scoring items such as "intelligent dynamic assessment" (2.64) and "comprehensive quality assessment" (2.67).

5.5. Establishing a mutual-promotion mechanism of "usage-training"

Integrate training with daily practice by assigning a "30-day post-training usage task". Teachers are required to apply newly learned tools in regular instruction and submit lesson examples. Schools may set up an "AI teaching application point system" linked to teaching-research assessments. Meanwhile, special introductory training on AI tools can be designed for the 17 teachers who have never used AI tools, so as to reduce barriers to entry.

6. Conclusion

In conclusion, primary school English teachers must possess adequate intelligent educational literacy to effectively improve the efficiency of English teaching and cultivate high-quality innovative talents suited to the demands of the AI era. Nevertheless, due to insufficient sensitivity of schools and teachers to social changes, primary school English teachers currently exhibit noticeable deficiencies in the overall quality of their intelligent educational literacy.

Looking ahead to the reform of primary school English teaching in the artificial intelligence era, teachers should strive to advance their intelligent educational literacy from the dimensions of awareness, knowledge and competence. On this basis, they should continuously refine and optimize their English teaching practices. In response, schools should respect the overall developmental needs of primary school English teachers and fully account for individual differences related to teaching experience, geographical location, training background and other factors. Correspondingly, supportive measures, including institutional design and environment construction, should be reformed.

Funding

2025 University-level Research Project (Discipline Development) of Tangshan Normal University, "A Survey Study on Primary School English Teachers' Intelligent Educational Literacy in the AI Era" (Project No.: 20251123100); Hebei Provincial Education Science "14th Five-Year Plan" 2024 General Project, "Research on Practical Paths of Digital Transformation in Junior High School English Teaching Oriented to Core Competencies" (Project No.: 2404503)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Ministry of Education of the People's Republic of China, 2022, Digital Literacy of Teachers, visited on June 2, 2023, https://www.gov.cn/zhengce/zhengceku/2023-02/21/5742422/files/284e9526cd2c4076ac2479a88e02a555.pdf.

[2] UNESCO, 2024, AI Competency Framework for Teachers, visited on June 2, 2025, https://unesdoc.unesco.org/ark:/48223/pf0000391104.

[3] Chounta I-A, Bardone E, Raudsep A, et al., 2022, Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support Their Practice in Estonian K-12 Education. International Journal of Artificial Intelligence in Education, 32(3): 725–755.

[4] UNESCO, 2023, AI Competency Framework for Teachers and School Students. AI Pioneers Partners, visited on June 2, 2025, https://aipioneers.org/unesco-ai-competency-framework-for-teachers/.

[5] Huang S, Guo M, Zhang S, 2024, Research on the Construction and Optimization of the Educational Evaluation System of Intelligent Educational Technology in the Context of Knowledge Economy. Journal of the Knowledge Economy, 15(4): 1–22.

[6] Kazmaci A, Cek K, Altinay F, et al., 2025, Influence of Theoretical and Practical Artificial Intelligence Knowledge

on the Primary School Teachers' Sustainable AI Integration Ability: Mediating Effects of Beliefs and Attitudes. Frontiers in Psychology, 16: 1628557.

[7] Zheng ZY, Fan QZ, 2026, Investigation and Cultivation Path of Digital Teaching Innovation Ability of Primary and Secondary School Teachers. Curriculum, Teaching Material and Method, 46(3): 152–159.

[8] Keunjae K, Kyungbin K, 2023, Exploring the AI Competencies of Elementary School Teachers in South Korea. Computers and Education: Artificial Intelligence, 4.

[9] Zheng ZY, Song NQ, 2023, Research on the Construction of the Evaluation Index System of Primary and Secondary School Teachers' Intelligence Education Literacy. China Educational Technology, 2023(12): 75–83.

[10] Daher R, 2025, Integrating AI Literacy into Teacher Education: A Critical Perspective Paper. Discover Artificial Intelligence, 5(1): 217.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.