DIGITAL LITERACY ENHANCEMENT STRATEGIES FOR PRIMARY AND SECONDARY SCHOOL TEACHERS

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ABSTRACT

Against the backdrop of the global digital transformation of education, where technologies such as artificial intelligence, big data, and cloud computing are reshaping teaching models and educational ecosystems, teachers' digital literacy has evolved into a core indicator that directly reflects educational quality and equity. As the primary implementers of basic education, primary and secondary school teachers serve as the critical link between digital technologies and classroom practice; their proficiency in digital literacy not only determines the depth of integration between digital tools and teaching activities but also influences the effectiveness of educational digitalization in fostering students' innovative thinking and lifelong learning abilities.This paper systematically explores the connotation and constituent dimensions of primary and secondary school teachers' digital literacy, analyzes the current status and prominent problems of teachers' digital literacy in China (such as unbalanced development, insufficient application capacity, and imperfect support systems), and constructs a multi-dimensional enhancement strategy system from the perspectives of training optimization, resource support, evaluation incentives, and collaborative governance. The research aims to provide actionable practical paths for enhancing primary and secondary school teachers' digital literacy, thereby accelerating the high-quality development of basic education digitalization. Additionally, it seeks to offer valuable references for educational digital transformation in similar contexts globally, contributing to the advancement of equitable and quality education in the digital era.

Keywords: Digital Literacy, Primary and Secondary School Teachers, Enhancement Strategy

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INTRODUCTION

In the context of the rapid development of global digital technology, educational digitalization has become a key driving force for promoting educational reform and development. The "Action Plan for Improving National Digital Literacy and Skills" clearly points out that strengthening the cultivation of teachers' digital literacy is an important task to promote educational modernization. Primary and secondary education, as the foundation of the national education system, its digital transformation is directly related to the overall quality of national education and the cultivation of innovative talents.

Teachers, as the core subject of educational activities, their ability to master and apply digital technology not only affects the efficiency of classroom teaching but also determines the effect of students' digital literacy cultivation. However, at present, primary and secondary school teachers in China still face many challenges in the process of improving digital literacy, such as the disconnection between digital skills and teaching practice, the uneven distribution of digital resources between urban and rural areas, and the lack of systematic training mechanisms.

This paper takes primary and secondary school teachers as the research object, focuses on the practical demands of educational digitalization, explores the path of digital literacy enhancement, and strives to provide theoretical reference and practical guidance for promoting the comprehensive improvement of primary and secondary school teachers' digital literacy.

CONNOTATION AND DIMENSIONS OF PRIMARY AND SECONDARY SCHOOL TEACHERS' DIGITAL LITERACY

Definition of Core Concepts

The concept of digital literacy has evolved with the development of technology. Early studies (Gilster, 1997) defined it as the ability to use digital tools to acquire and process information. With the deep integration of digital technology and education, the connotation of teachers' digital literacy has been continuously enriched.

According to the "Teachers' Digital Literacy" issued by the Ministry of Education of China (2022), primary and secondary school teachers' digital literacy refers to the comprehensive ability of teachers to effectively use digital technology to carry out teaching activities, improve teaching quality, and promote students' all-round development in the context of educational digitalization. It is not only a single technical operation ability but also a comprehensive quality integrating digital awareness, technical skills, teaching application, and social responsibility.

Constituent Dimensions

Combining domestic and international research results, the digital literacy of primary and secondary school teachers mainly includes the following core dimensions:

Digital awareness: The ability to recognize the value of digital technology in education, including the awareness of applying digital tools to optimize teaching, the awareness of digital education equity, and the sensitivity to the development of digital technology.

Digital technology knowledge and skills: The ability to master basic digital tools and technologies, such as operating computers, interactive whiteboards, and online teaching platforms, and using software for content production (e.g., courseware making, video editing).

Digital teaching application ability: The ability to integrate digital technology into teaching design, classroom implementation, and academic evaluation, such as designing blended teaching activities, carrying out personalized teaching based on data analysis, and using digital resources to enrich teaching content.

Digital social responsibility: The ability to abide by digital ethics and norms, including protecting students' data privacy, guiding students to use digital tools rationally, and respecting intellectual property rights of digital resources.

Digital professional development ability: The ability to continuously learn and improve digital literacy, such as actively participating in digital training, exploring new digital teaching methods, and sharing digital teaching experiences.

CURRENT SITUATION AND PROBLEMS OF DIGITAL LITERACY OF PRIMARY AND SECONDARY SCHOOL TEACHERS

Overall Development Level

In recent years, with the promotion of national education digitalization policies, the digital literacy of primary and secondary school teachers in China has been continuously improved. A survey shows that more than 80% of teachers can use basic digital tools (such as office software, online teaching platforms) in daily teaching, and most teachers recognize the positive role of digital technology in improving teaching efficiency.

However, the overall level of digital literacy still shows the characteristics of "basic proficiency but insufficient depth". For example, most teachers are limited to simple applications such as playing courseware and assigning online homework, but lack the ability to deeply integrate digital technology with subject teaching (e.g., using data analysis to diagnose students' learning difficulties, designing project-based learning activities with digital tools).

Main Disparities

Regional disparities: There is a significant gap in digital literacy between teachers in urban and rural areas. Urban teachers have more access to high-quality digital resources and training opportunities, and their application ability of advanced digital technologies (such as artificial intelligence teaching tools) is significantly higher than that of rural teachers. Rural teachers are restricted by factors such as backward hardware facilities and unstable network conditions, which affect the improvement of their digital literacy.

Group disparities: Young teachers (under 35 years old) have obvious advantages in digital technology acceptance and application compared with older teachers. Teachers of science and engineering subjects (such as information technology, mathematics) are more proficient in using digital tools than those of liberal arts subjects (such as Chinese, history).

Subject disparities: Teachers of information technology, English and other subjects have higher frequency and depth of using digital technology, while teachers of traditional subjects such as Chinese and history have relatively single application scenarios of digital technology, mostly staying in the stage of auxiliary teaching.

Key Problems

The training system is not targeted enough: Most of the existing digital literacy training adopts a "one-size-fits-all" model, lacking classification and stratification design. The training content is more focused on technical operation, and the integration with subject teaching practice is insufficient, resulting in the phenomenon of "learning but not using".

Digital resources are not well adapted: Although a large number of digital educational resources have been built nationwide, there are problems such as repetition, low quality, and poor adaptation to local teaching needs. Especially in rural and remote areas, the shortage of localized digital resources (such as teaching resources suitable for local culture and students' cognitive characteristics) is prominent.

The evaluation and incentive mechanism is imperfect: At present, there is no unified standard for the evaluation of teachers' digital literacy in primary and secondary schools. The evaluation index is mostly focused on the use frequency of digital tools, lacking an assessment of the effect of digital technology integration in teaching. The incentive mechanism is insufficient, and teachers' enthusiasm for improving digital literacy is not fully mobilized.

STRATEGIES FOR ENHANCING DIGITAL LITERACY OF PRIMARY AND SECONDARY SCHOOL TEACHERS

Constructing a Hierarchical and Classified Training System

Carry out baseline assessment: Before training, evaluate teachers' digital literacy level according to factors such as region, age, subject, and teaching experience, and establish a "digital literacy file" for teachers to clarify the training needs of different groups.

Design differentiated training content: For rural teachers, strengthen the training of basic digital skills and the application of online teaching platforms to solve the problems of hardware and network restrictions; for older teachers, adopt "peer guidance" and "one-to-one assistance" to improve their acceptance of new technologies; for subject teachers, carry out thematic training on "digital technology + subject teaching" (e.g., how to use digital tools to carry out inquiry teaching in science courses, and how to use digital resources to carry out situational teaching in Chinese courses).

Innovate training models: Combine online and offline training. Online rely on national and local smart education platforms to provide standardized courses (such as digital teaching theory, tool operation); offline carry out school-based research activities (such as collective lesson preparation, demonstration classes) to promote the transformation of training results into teaching practice.

Optimizing Resource Support and Environment Construction

Strengthen infrastructure construction: Increase investment in digital hardware for rural and remote schools, upgrade multimedia classrooms and network facilities, and ensure that every teacher has access to basic digital teaching equipment and stable network services.

Build high-quality and adaptive resource banks: Integrate national, local, and school-level digital resources, focus on developing localized and subject-specific digital resources (such as digital textbooks suitable for regional education characteristics, micro-courses recorded by excellent teachers), and establish a resource update mechanism to ensure the timeliness and applicability of resources.

Promote resource sharing and mutual assistance: Build a regional digital literacy sharing platform for primary and secondary school teachers, encourage urban excellent teachers to share digital teaching cases and resources with rural teachers, and carry out online collaborative teaching and research activities to narrow the regional gap.

Improving Evaluation and Incentive Mechanisms

Formulate multi-dimensional evaluation indicators: Refer to the "Teachers' Digital Literacy" standard, design evaluation indicators covering digital awareness, application ability, teaching effect, and professional development, and adopt a combination of self-evaluation, peer evaluation, student evaluation, and school evaluation to comprehensively assess teachers' digital literacy.

Integrate evaluation results into teacher management: Include digital literacy evaluation results into teacher performance assessment, professional title evaluation, and excellent selection, and increase the weight of digital teaching innovation achievements to form a clear guidance.

Establish incentive mechanisms: Commend and reward teachers who have made outstanding achievements in digital teaching, summarize and promote their experience, and set up "digital teaching innovation awards" to stimulate teachers' enthusiasm for exploration.

Promoting School-Based Practice and Collaborative Development

Strengthen school-based research on digital teaching: Schools should take the initiative to organize teachers to carry out research on the integration of digital technology and curriculum, set up special research groups (such as "big data in teaching evaluation application group", "smart classroom construction group"), and solve practical problems in digital teaching through collective exploration.

Promote cooperation between schools and external institutions: Strengthen cooperation with universities, educational technology enterprises, and research institutions. Universities can provide theoretical guidance and training support, enterprises can provide technical services and tool support, and form a collaborative development pattern of "schools, universities, and enterprises".

Cultivate digital teaching backbones: Select teachers with high digital literacy as backbones, give them training and funding support, and let them play a leading role in the school to drive the overall improvement of teachers' digital literacy.

PRACTICAL VALUE OF THE RESEARCH

The research on the enhancement strategy of primary and secondary school teachers' digital literacy is of important practical significance for promoting educational digitalization and improving the quality of basic education.

At the policy level, the proposed strategies are in line with the requirements of national policies such as the "Action Plan for Improving National Digital Literacy and Skills" and "Teachers' Digital Literacy", which can provide operable implementation paths for local education departments to implement policies and promote the landing of "Internet + Education" action plans.

At the educational equity level, by narrowing the regional and group gaps in teachers' digital literacy, it can promote the balanced distribution of high-quality digital educational resources, help rural and remote areas share high-quality educational resources, and promote educational equity.

At the teacher development level, the strategies of hierarchical training and school-based practice can help teachers overcome the fear of digital technology, improve their ability to adapt to educational digitalization, and promote their professional growth.

At the student development level, teachers with high digital literacy can better guide students to use digital tools rationally, cultivate students' digital thinking and innovation ability, and lay a foundation for students' development in the digital era.

CONCLUSION

Enhancing the digital literacy of primary and secondary school teachers is a core task in promoting the digital transformation of education and achieving high-quality development of basic education, and it is also an inevitable requirement to respond to the national strategy of educational modernization. Currently, the overall digital literacy of primary and secondary school teachers in China is characterized by "meeting basic competence standards but lacking advanced application capabilities". The problem of unbalanced development across regions, groups and subjects is prominent, and at the same time, there are systemic challenges such as the lack of targeting in training systems, insufficient resource adaptability and imperfect evaluation mechanisms. These issues not only reflect the complexity of the in-depth integration of digital technology with education and teaching, but also highlight the urgency of building a literacy improvement system that conforms to local realities.

This study proposes four integrated strategies: (1) a hierarchical training system with differentiated content to merge digital skills with subject teaching; (2) optimized resource support, including rural infrastructure investment, localized digital resources, and urban-rural sharing; (3) multi-dimensional evaluation mechanisms integrating digital literacy into teacher assessments to boost motivation; and (4) school-based practice and "school-school-enterprise" collaboration to foster collective progress.

It is worth noting that enhancing the digital literacy of primary and secondary school teachers is not a single technical innovation but a systemic reform involving educational concepts, teaching models, and management mechanisms. The implementation of strategies must be

based on the actual situation of regional educational development—for example, eastern regions can focus on integrating new technologies such as artificial intelligence into teaching, while central and western regions need to prioritize addressing resource balance and basic capacity building—to avoid a "one-size-fits-all" approach. At the same time, it is essential to always focus on student development, ensuring that digital technology serves the improvement of teaching quality and the achievement of educational goals.

Future research can further verify the applicability of different strategies in various schools through empirical tracking, refine special plans for groups such as special education teachers and teachers in small-scale schools. Ultimately, through continuous exploration and dynamic adjustment, a long-term mechanism with both scientificity and operability will be formed, providing solid teacher support for China's educational digital transformation and contributing Chinese experience to global educational equity and quality improvement.

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