

The Logical Starting Point, Realistic Dilemma and Path Selection of Digital Literacy Improvement of Rural Teachers in Primary and Secondary Schools

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Abstract: With the swift advancement in information technology, digital literacy has emerged as a cornerstone of teachers' pedagogical capabilities, yet it remains underappreciated. Presently, most individuals' understanding of digital literacy is confined to the operational use of electronic devices, which hinders addressing challenges that impede the enhancement of teachers' digital literacy. These challenges include systemic educational barriers, inadequate campus infrastructure, limited teacher proficiency in digital tools, and the urban-rural digital divide. This paper centers on enhancing the digital literacy of rural primary and secondary school teachers. It provides a concise analysis from three perspectives: theoretical foundation, practical obstacles, and strategic approaches. To address these issues, the paper suggests several measures to refine policies and infrastructure, boost teachers' digital application skills, and narrow the urban-rural digital gap. By leveraging policy frameworks for guidance, ensuring adequate school support and resources, and fostering teacher awareness, the goal is to elevate the digital literacy of rural educators. This will better align with the demands of modern education and contribute significantly to the revitalization of rural education.

Keywords: Rural teachers; Digital literacy; Digital divide

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1. Introduction

The report to the 20th CPC National Congress underscores the importance of continuously accelerating the development of a high-quality education system and implementing the strategy of revitalizing the nation through science and education. Notably, for the first time, the report includes "promoting the digitalization of education," which further clarifies and outlines the future trajectory of educational digitalization. As key drivers of this reform, the digital literacy of primary and secondary school teachers is crucial soft power for advancing the digital transformation of education. It serves as vital support for building a high-quality education system and

cultivating top-tier talent ^[1]. To enhance the digital literacy of rural primary and secondary school teachers, it is essential to expedite research, development, and promotion of digital learning tools, facilitate teachers' digital transformation, and provide fresh momentum for the advancement of rural education ^[2].

2. Logical starting point

2.1. Correct guidance of policies and regulations: building the rule of law foundation for education reform

The concept of "Teacher Digital Literacy" delineates the precise meaning of digital literacy for educators and outlines evaluation standards across various dimensions. It comprehensively explains key concepts such as digital awareness and application, providing a clear framework and strategic blueprint to enhance the digital literacy of rural teachers ^[3]. The incentive structures established by diverse policies motivate teachers to independently improve their digital skills, fostering enthusiasm and cultivating a positive learning environment.

Policies and regulations play a crucial role in enhancing the digital literacy of rural teachers. They serve not only as a guide but also as a means to reinforce supervision and assessment. By referring to a scientific and well-structured evaluation framework, regular assessments should be conducted to identify issues promptly and implement appropriate strategies for improvement. This establishes the legal groundwork for educational reform, fosters a supportive environment for boosting rural teachers' digital capabilities, and acts as a strong catalyst for the advancement of rural education in the digital age ^[4].

2.2. School support and input: laying the material foundation for educational innovation

The study reveals that schools, serving as the central hub for rural teacher development, offer a range of resources that can shape the perspectives and attitudes of rural teachers, thereby enhancing their digital literacy ^[5]. As a key component of the "systematic process of learning and teaching interaction," the educational environment underscores the significance of infrastructure in fostering the joint growth of teachers and students. Stable internet connectivity, modern multimedia classrooms, and intelligent teaching tools form the foundation, providing robust support for rural teachers to access resources, engage in diverse student interactions, and collaborate with peers. When schools possess adequate physical resources and advanced digital technology, they can implement relevant digital education programs, significantly bridging the gap between rural teachers and digital advancements. Throughout this process, rural teachers who initially exhibited resistance or lacked enthusiasm toward digital technology are likely to change their views upon witnessing the superior teaching outcomes and positive classroom dynamics facilitated by these technologies.

2.3. The awakening of teachers' individual consciousness: the inner motivation to stimulate educational change

The enhancement of individual awareness among teachers pertains to rural educators' proactive recognition and intrinsic motivation to elevate their digital literacy. This represents a psychological condition wherein rural teachers acknowledge the significance of digital literacy for their professional growth and strive to enhance their digital competencies and knowledge. By fostering this mindset, rural teachers can more effectively leverage digital resources, boost their teaching proficiency, and develop a stronger sense of efficacy in information-based instruction, thereby creating a positive feedback loop ^[6]. For instance, AI algorithms can be utilized to analyze student learning data, assess classroom progress, identify knowledge gaps, and implement targeted instruction.

Such innovations not only augment teachers' instructional capabilities but also facilitate greater academic advancement for students while promoting the digital literacy of rural educators.

3. Realistic dilemma

3.1. Obstacles to development: Obstacles in the educational mechanism inhibit the development of rural education

At present, China's education mechanism conforms to the national conditions and meets the needs of social and economic development and socialist construction, but there is still room for improvement in the education system, among which the fairness and balanced development of educational resources is the most prominent issue. The research shows that there is an imbalance in the allocation of educational resources, and most of them tend to be in the economically developed areas. First-tier cities, with their strong economic strength and sound development foundation, attract a large number of high-quality education resources. In contrast, rural areas with weak productivity face problems such as a lack of funds and equipment, and generally poor network conditions.

In the face of unevenly distributed educational resources, rural teachers struggle to enhance their digital literacy awareness. This challenge not only restricts their access to new educational technologies and methodologies but also diminishes their enthusiasm for professional development. Survey findings reveal that rural teachers participate in digital education technology training far less frequently compared to their urban counterparts, with many continuing to rely on conventional teaching approaches. Consequently, this limits their capacity for innovation and practical application in the classroom. Over time, such circumstances not only impede teachers' professional growth but also reduce the likelihood of students receiving high-quality education. This highlights that systemic barriers are significantly hindering the advancement of rural education, thereby restraining its overall development.

3.2. Weak foundation: Campus infrastructure shortcomings restrict the construction of digital education

With the advancement of information technology, digital education has emerged as a novel educational paradigm and has seen rapid promotion and application. Nonetheless, inadequate campus infrastructure, particularly the deficiencies in critical infrastructure, has significantly hindered the progress of digital education and the enhancement of rural teachers' digital literacy. Given the relatively lower economic conditions in most rural regions, there is insufficient funding to acquire advanced information technology equipment for schools. Additionally, the outdated equipment on campus cannot be replaced or upgraded promptly, resulting in a suboptimal information infrastructure.

In this scenario, rural teachers have long faced the challenge of insufficient digital resources, which manifests in two primary issues. First, many teachers lack the inclination to utilize smart devices and have not adopted the educational philosophy that emphasizes effectively integrating digital technology into their teaching practices. Second, while some teachers are proficient in information technology, inadequate school infrastructure prevents them from achieving a deeper integration of technology with their teaching, despite their willingness. These challenges highlight how underdeveloped campus infrastructure has become a significant barrier hindering the enhancement of rural teachers' digital literacy and the advancement of digital education in rural areas.

3.3. Lack of ability: Lack of teachers' application ability hinders the improvement of digital literacy

Digital application involves teachers' proficiency in utilizing digital technology resources to conduct educational activities, encompassing the entire process of teaching design, implementation, academic assessment, and collaborative education ^[7]. This aspect is not only a central reflection of teachers' digital literacy but also a crucial component in achieving effective digital education ^[8]. Given their significant role as key participants and facilitators in teaching, enhancing teachers' digital literacy plays a vital role in improving overall education quality.

The insufficient digital application skills among teachers have emerged as a significant barrier to enhancing their digital literacy. While 99.8% of the nation's 309,000 compulsory education schools now meet basic requirements, the utilization of technological resources remains inconsistent ^[9]. Despite the widespread adoption of modern educational technologies like the Xiwo whiteboard system and online learning platforms, rural teachers often struggle to maximize the educational benefits of these intelligent tools and boost teaching efficiency and quality. This is primarily due to a lack of professional technical guidance and training resources. Consequently, rural teachers are less inclined to use smart equipment in their teaching, which diminishes their motivation and capacity to optimize and innovate in the classroom. Ultimately, this hinders the development and promotion of their digital literacy.

4. Path selection

4.1. Promoting development: Integrating educational resources and optimizing their allocation and application

The challenges posed by educational mechanism barriers hinder the enhancement of digital literacy among rural teachers, yet these obstacles are not insurmountable. According to the Opinions on Deepening the Reform of the Education System and Mechanism, education should hold a strategic priority for development, with comprehensive reforms across the education sector being emphasized. In the era following poverty alleviation, boosting the digital literacy of rural teachers has emerged as crucial for revitalizing rural education. It also represents a significant approach to reducing both the digital divide and the disparity between urban and rural education ^[10–11]. Given the uneven allocation of educational resources, a dual-track strategy—combining online and offline efforts—is necessary to dismantle these institutional barriers.

First, there should be the establishment of an online platform dedicated to sharing educational resources. Leveraging information technology to distribute high-quality educational materials to other regions and implementing a blended “online-offline dual-teacher teaching” model represents an efficient approach to address the deficiencies in basic education within remote areas ^[12]. This platform disseminates top-tier resources to primary and secondary schools nationwide, facilitates the cross-regional sharing of educational resources via digital libraries, enables teachers to access diverse instructional materials and professional growth resources, and compensates for the imbalanced distribution of educational assets. Second, the offline implementation of the “school cluster operation model” is recommended. Regional collaboration in education serves as a practical strategy to enhance the integration of educational resources and foster educational equity ^[13]. The successful experience of Shiliyihai Primary School in Hubei Province demonstrates the viability of this framework. This model capitalizes on the exemplary and guiding influence of prestigious schools, utilizing their radiating impact to drive surrounding campuses, thereby achieving close collaboration between well-established and under-resourced schools.

4.2. Compaction foundation: The construction of information facilities, the construction of the digital campus

As a critical component of the nation's new infrastructure, the development of modern educational infrastructure serves as the primary catalyst for advancing educational reform and also forms a crucial foundation for enhancing the digital literacy of rural teachers. Considering the two scenarios among rural teachers, namely, "choosing not to use available resources" and "willing to use but lacking access," two corresponding strategies can be adopted to address these issues effectively.

To address the challenge of "inability to use under certain conditions," it is crucial to prioritize teacher training. Initiatives such as "digital salons" and exchange-sharing sessions should be implemented to enhance teachers' digital literacy and ignite their enthusiasm for learning. Importantly, the objective of these training programs should focus on equipping teachers with the ability to effectively apply digital tools, teaching them not just the basics but also how to adapt and innovate with technology in real-world teaching scenarios. This approach ensures that teachers can proficiently integrate digital methods into their lessons, thereby improving overall educational outcomes, rather than merely going through the motions of training. The government bears the crucial role of boosting capital investment, refining the allocation of educational resources, and establishing and executing pertinent policies to ensure robust support and safeguards for the sustainable advancement of education. As the primary entities responsible for educational implementation, schools should promptly adhere to these policies, enhance their campus infrastructure, develop a "digital campus" framework, and offer an excellent digital ecosystem for educators.

4.3. Building capacity: upgrading teachers' skills and deepening digital literacy

The report to the 19th CPC National Congress highlighted the significance of online education and established higher requirements for teachers' digital literacy. As leaders in the classroom, teachers must align with the rapid advancements of the digital age and continuously enhance their proficiency in digital tools, guided by progressive educational philosophies. This can be achieved through several key approaches:

To enhance teachers' digital literacy, a multi-faceted approach should be adopted. Firstly, establishing a comprehensive incentive system with multiple indicators can positively motivate teachers to embrace the role of "digital educators" and promote the collaborative creation and sharing of high-quality digital resources.

Secondly, leveraging opportunities such as professional and curriculum development, various forms of digital literacy training can be provided for teachers through national and provincial programs, fostering a positive environment for digital teaching^[14]. This will enable rural teachers to experience the tangible benefits of digital classrooms, accept digital teaching methods, and cultivate a passion for digital education. Some regions have initiated activities that integrate digital literacy education and teaching for primary and junior middle school teachers. These activities encourage mutual observation, learning, and exchange, creating an interdisciplinary and cross-sectional learning platform for educators across all school levels^[15]. In this process, primary school teachers can gain insights into more advanced teaching methods from their junior middle school counterparts, while junior middle school teachers can adopt innovative teaching ideas from primary school educators. Through mutual observation, teachers can better understand the diverse needs of students, refine their teaching strategies, and learn from one another. Furthermore, it is essential to strengthen classroom instruction and digital media application skills to foster continuous professional development and embody the principle of "lifelong learning."

5. Summary

With the emergence of artificial intelligence such as ChatGPT and Sora, improving the digital literacy of rural teachers is not only the key to promoting their development and improving the quality of rural education, but also an important measure to build a digital China and a powerful education country. With the help of artificial intelligence, rural teachers can break the regional barrier, gain dividends for themselves and their students in the digital age, and improve their digital literacy and teaching level. At the same time, with the help of digital education, we can promote educational equity and bridge the digital gap between urban and rural areas. “Practice is the only criterion for testing truth.” Rural teachers should embrace digital technology with a proactive attitude and continue to innovate teaching methods to add momentum to the vigorous development of rural education.

Disclosure statement

The authors declare no conflict of interest.

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