

Opportunities, Dilemmas and Alleviation Paths for the Development of Rural Teachers under the Educational Digital Transformation

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Abstract: In the context of the continuous advancement of educational digitization, the education system is witnessing a wave of comprehensive digital reform and innovation. As far as the development of rural education is concerned, empowering teachers' development with digital technology is not only a historical opportunity that cannot be missed but also a challenging issue of the era. How to rely on digital technology to promote the professional growth of rural teachers and explore effective paths for teachers' professional development that are in line with the actual situation in rural areas has become a core problem that urgently needs to be solved in the revitalization of rural education. This study deeply analyzes the practical dilemmas faced by the development of rural teachers, fully grasps the development opportunities brought about by digital transformation, and explores effective paths for the professional development of rural teachers in the context of educational digital transformation from four dimensions: the balanced allocation of digital resources, the implementation of actions to enhance digital literacy, the coordinated guarantee by multiple entities, and the effective implementation of digital policies. It injects new vitality into the professional development of rural teachers and provides strong support for the realization of the goal of rural revitalization.

Keywords: Digital Transformation of Education, Rural Teachers, Teachers' Development, Development Paths

1. Introduction

Under the wave of global digitization, China is vigorously promoting the construction of a Digital China, attaching unprecedented importance to digital transformation, with the digital transformation of education being in a core position. The report to the 20th National Congress of the Communist Party of China clearly states, "Advance the digitalization of education and build a learning society and a learning-oriented country where everyone engages in lifelong learning," which points out the direction for the development of the education cause. The Key Points of the Ministry of Education's Work in 2022 also strongly emphasize implementing the strategic action of educational digitization and accelerating the digital transformation and intelligent upgrading of education. The digital transformation of education is of inestimable value for promoting educational modernization, constructing a fair and high-quality education system, and cultivating innovative talents that meet the needs of the times.

Rural education, being an essential and inalienable part of China's educational fabric, is of vital importance in attaining educational equality and driving rural revitalization through its digital transformation. Rural teachers, without a doubt, serve as the cornerstone in propelling this digital transformation within rural education. However, they are beset by a wide array of arduous challenges. Prominent among these are the uneven distribution of educational resources and the scarcity of educational materials, which severely impede their educational undertakings.

In light of the ongoing momentum of educational digital transformation, it is of great practical significance to re-assess the professional roles of rural teachers. This involves a comprehensive and meticulous analysis of the difficulties and opportunities they face in their professional growth. By actively exploring transformative strategies, seizing the opportunities presented by digital development, and charting practical and effective paths for their professional development, we can enhance the quality of rural education. This, in turn, will significantly accelerate the modernization process of rural education, contributing to the overall development of rural areas.

2. Opportunities

Educational digital transformation involves integrating digital technologies into all aspects of the education sector. It propels educational organizations to innovate and transform in a comprehensive manner, including shifting teaching paradigms and organizational structures. This transformation changes the model from supply-driven to demand-driven, enabling high-quality and equitable education and supporting lifelong learning, thus fostering a favorable educational ecosystem^[1]. In the context of educational digital transformation, when probing into the professional development of rural teachers, be it from a technological or an educational vantage point, both the content and modalities of their professional growth are subject to change in tandem with the shifting era backdrop and the evolving demands of professional development. Digital technology has surmounted the spatio-temporal constraints inherent in education, thereby reconfiguring the cognitive framework regarding the professional development of rural teachers^[2]. Provides multiple development opportunities for the professional development of rural teachers.

2.1 Digital resources promote the balanced development of rural teachers

In the context of educational digital transformation, the resources for teachers' professional development are characterized by diversity, timeliness, and precision. These resources can alleviate the workload of rural teachers and effectively promote their balanced development.

From the perspective of educational resource supply, educational resources in the intelligent era are more diverse, and the resource supply is more timely. The supply models also exhibit diversity and richness, and the resource supply paths supported by intelligent technologies are becoming increasingly precise. Regarding the types of educational resources in the intelligent era, the intelligent educational resources related to the professional development of rural teachers generally include three categories: teacher resources supported by technology, curriculum and teaching resources combining virtual and real elements, and process-generated self-study resources.

Intelligent technologies can optimize the effective supply of these three types of resources. For example, the online classrooms of renowned teachers and dual-teacher classrooms in smart learning environments can help rural teachers promptly learn new concepts and methods from renowned and excellent teachers. The curriculum resources that combine virtual and real elements enable rural teachers to experience different types of teaching media in a timely manner. Generative resources can provide what is needed in a timely manner during the professional development process of rural teachers, rather than pushing resources generated according to preset arrangements. By providing rural teachers with the resources they truly need during their professional development, the balanced development of rural teachers' professions can be promoted.

2.2 The digital teachers' community enhances the development awareness of rural teachers

In the face of the requirement in the "Opinions on Comprehensively Deepening the Reform of the Construction of the Teaching Staff in the New Era" by the state, which is to "adapt to new technological changes such as informatization and artificial intelligence", rural teachers also need to understand the relevant knowledge of artificial intelligence technology, master the basic professional theoretical knowledge of technology integration, and possess the development awareness and ability of human-machine collaboration. Due to the limitations of the geographical location where rural teachers are located, it is not easy to organize offline teaching and research communities. However, with the use of intelligent technology, interactive methods such as convenient and flexible human-machine dialogue and inter-personal connection can be achieved, thus also being able to form a good intelligent learning community.

Through person-to-person dialogue within the community, rural teachers can observe that other outstanding teachers actively respond to the requirements for teachers' professional development in the context of digital transformation and take the initiative to plan their own professional development. By learning from the practices of outstanding teachers, rural teachers can awaken their own professional development awareness. On the other hand, human-machine dialogue forces rural teachers to take the initiative to learn the professional skills of human-machine collaboration and form a proactive awareness of professional development.

Comprehensive information literacy and intelligent education literacy are increasingly becoming important professional qualities for teachers in the context of educational digital transformation. Cultivating the intelligent literacy of rural teachers enables them to have a positive attitude and self-

awareness to cope with the intelligent era, ensuring that rural teachers do not fall behind in professional development.

2.3 Digital platforms support the training of rural teachers

In the intelligent era, the optional paths for the professional development of rural teachers will be more diverse. There are not only the conventional face-to-face training paths but also the autonomous and flexible learning methods provided by relying on intelligent interconnection technologies. Immersive virtual reality and augmented reality simulation educational software can construct real teaching scenarios and contexts. At the same time, it can solve the problem that rural teachers are unable to participate in offline technical training. Rural teachers can simulate teaching scenarios in mirror classrooms and continuously improve their technical application ability and the ability to carry out teaching in collaboration with machines in the new "virtual-real co-existing" teaching environment.

Intelligent technology also supports the accurate profiling of rural teachers' professional development. Big data and multimodal technologies can support the assessment of rural teachers' basic characteristics and their existing capabilities in the early stage. They can collect multimodal data such as physiological, psychological, and behavioral data of rural teachers during the learning and development process, comprehensively evaluate and analyze the current stage level of rural teachers, formulate more suitable personalized training programs for them, and use adaptive learning push to achieve the matching of supply and demand. This promotes the assessment, diagnosis, and dynamic adjustment of rural teachers' professional development.

3. Dilemmas

Intelligent technology has transformed teachers' ideological concepts, identity recognition, and their understanding of teaching and learning. It has impacted the original roles and status of the teaching profession, putting forward more stringent requirements for rural teachers in terms of professional qualities, work, and life. At the same time, the state has introduced a series of policy documents to support the development of rural teachers, endowing rural teachers with more important roles and status. However, this has further given rise to a series of problems such as uneven teacher development, mainly including the following three aspects:

3.1 The scarcity of digital resources leads to uneven development of rural teachers

The digital transformation of education has exacerbated the gap in professional development between urban and rural teachers, which is mainly manifested in terms of basic equipment. Due to the geographical location of rural schools, although the informatization equipment in most rural schools has been gradually improved, it mainly consists of computers and projectors. The construction of network live broadcast equipment and cloud live broadcast platforms in informatized teaching is relatively incomplete or rarely used. At the same time, the existing educational informatization equipment in rural schools has problems such as damage, aging, and lagging. The channels for equipment maintenance and renewal are not smooth, and the technical maintenance and repair are even more difficult to guarantee.

Most rural teachers are located in remote areas with underdeveloped economies, where the informatization conditions are relatively backward, thus restricting their professional development. In addition, there is also the problem of insufficient funds for the professional development of rural teachers. The "Report on the Development of Rural Education in China 2019" points out that the investment in training funds to support the professional development of rural teachers is insufficient. The proportion of training funds in public funds is 2.93%, which is lower than the national policy requirement of not less than 5%. The insufficient investment in education funds makes it difficult to achieve the sustainability of rural teachers' professional development. For individual rural teachers who lack professional development communities, it is even more difficult to improve their professional qualities to cope with the development of the intelligent era.

3.2 The excessively high digital costs lead to the limitation of the development of rural teachers

The professional development of rural teachers involves different subjects such as rural schools, students, teachers, and parents. Along with the digital transformation of education comes the increase in the professional development costs of each subject.

Firstly, rural schools bear the increased costs of infrastructure required for education and teacher training. With the informatization of school development nationwide, due to the geographical location of rural schools, the network bandwidth in some rural areas is limited, resulting in poor network quality. Schools need to invest more human and material resources to improve the network environment to ensure that students have a better learning experience. In addition, a series of measures in the process of digital transformation, such as adding training quotas to increase the training opportunities for rural teachers, enriching the training content and forms, and paying real-time attention to the feedback after training, have all increased the costs of rural school teachers' professional development. Secondly, the digital transformation of education has changed the learning methods of the educated. Students learn online, and their homework is uploaded by taking photos and graded by teachers online to reflect their completion status. This form not only increases the costs of family education but also the costs of teachers' professional development. Finally, the paid resources during the construction of the resource platform also increase the costs of rural teachers' professional development, reducing the enthusiasm of rural teachers for professional development.

3.3 The insufficient offline training leads to the relatively low information literacy of rural teachers

The accelerated development of educational digital transformation has propelled school education into the era of digital education, and new requirements have been put forward for the professional skills of rural teachers. In addition to possessing traditional educational and teaching abilities, rural teachers should also learn digital knowledge, master digital technologies, and enhance their own application abilities and innovative capabilities of digital technologies.

Judging from the current practice of the professional development of rural teachers as a whole, it is often limited to providing them with some teaching methods, skills, or theoretical knowledge in education, or training on some educational technology contents. Although these contents are helpful for the development of rural teachers, there is still a certain gap when compared with the overall requirements for teachers' professional levels in the context of educational digital transformation.

The professional abilities of rural teachers are relatively weaker. Later, due to the constraints of geographical location and traditional concepts, rural teachers have fewer opportunities to participate in training. For some training on new concepts and technologies, urban backbone teachers are preferentially selected to participate. For example, in the training of STEAM education and maker education, urban backbone teachers who already have practical conditions are often given priority. Rural teachers rarely receive such training, so they are unable to upgrade their teaching professional skills that keep pace with the development of the times.

4. Approaches

Digital technology serves as the foundation for the digital transformation of education. It is also a crucial factor in optimizing the allocation of rural teachers' resources, standardizing the behaviors of rural teachers, and resolving the existing issues in the professional development of rural teachers^[3]. In recent years, the integration of education and digital technology has become an important driving force in the process of educational reform. How to address the challenges brought about by digital transformation, seize the opportunities of digital transformation, and explore the professional development paths for rural teachers has become a key link in achieving the goal of high-quality development of rural education.

4.1 Optimize the allocation of rural educational resources to promote balanced development

In 2018, the Ministry of Education issued the "Action Plan for Education Informatization 2.0", pointing out the importance of open and shared resource platforms for achieving education informatization^[4]. Digital technology resources are the fundamental guarantee for the professional development of rural teachers, including the network system, capital investment, and human resources investment.

Firstly, improving the rural network system and popularizing high-quality networks are powerful guarantees for the professional development of rural teachers. Currently, rural schools have basically met the requirements for network-based teaching. Ensuring smooth rural networks and building a network system with both quantity and quality to provide good network communication support for teachers' professional development is not only a prerequisite for the professional development of rural teachers but also an important support for the implementation and application of digital technologies.

Secondly, increasing capital investment in digital technologies to ensure the effective supply and use of intelligent devices in rural schools. In the context of educational digital transformation, how rural teachers can use digital technologies to narrow the gap in professional development between urban and rural teachers has become a common understanding among the government, schools, and teachers. Through government funding, rural self-financing, and social donations, etc., the effective supply of intelligent devices in rural schools can be fully guaranteed, reducing the cost of using digital technology devices and providing equipment guarantees for the professional development of rural teachers. Thirdly, ensuring the supply of human resources. The government and schools can promote the professional development of rural teachers in a point-to-area manner by improving the construction of the digital intelligent system, establishing rural experimental bases, and ensuring the supply of technical personnel.

4.2 Enhance the intensity of rural teachers' training and improve teachers' professional qualities

Digital technology will reshape the digital ability structure of rural teachers and improve their digital literacy. The improvement of digital literacy depends on the digital technology environment, and rural teachers enhance their digital technology competence in this environment. Teachers' digital competence refers to having the knowledge and operational ability of information technology, including technical ethics awareness, technical ethics, technical thinking, and the design and implementation ability of learning models based on technical authenticity. Improving digital literacy by enhancing teachers' digital competence is an important task for the professional development of rural teachers in the context of educational digital transformation.

Firstly, implement the digital education concept throughout the entire process of rural teachers' education and teaching. Improve the digital curriculum system, enhance rural teachers' awareness of digital technology development, and improve their ability to distinguish data information. Offer free digital technology training courses through online platforms to create a good digital ecological environment for rural teachers. In addition, rely on digital technology training centers to ensure equal digital technology training opportunities for rural teachers. Secondly, make full use of resource platforms to learn digital technology theoretical knowledge, strengthen rural teachers' practical application ability of digital technology, internalize digital theories in the mind and externalize them in actions. Thirdly, strengthen the psychological quality of rural teachers and relieve their psychological pressure. Revise and improve relevant laws and ethical norms, enhance the moral and legal literacy of the public in the digital age, ensure that the data of rural teachers and students are not misused or violated, and improve digital literacy to standardize the professional development behaviors of rural teachers.

4.3 Increase the scale of investment in rural education funds to ensure teachers' treatment

Material treatment serves as the economic guarantee for the smooth promotion of rural teachers' professionalization. Compared with spiritual support, material incentives are the most direct and effective for people.

Firstly, it is necessary to ensure the steady increase and timely payment of rural teachers' salaries. In some rural areas of our country, an effective supervision system should be implemented to avoid and put an end to the situation where local governments or relevant institutions embezzle rural teachers' salaries or delay payment due to lack of funds. Attention should be paid and issues should be dealt with in a timely manner, and the abuse of power must be avoided. Secondly, steadily improve the salary treatment of rural teachers. According to the actual situation of each region, the standard of living allowances for rural teachers should be raised, and efforts should be made to transform the negative effects brought by the environmental disadvantages for rural teachers into compensation in salary treatment, so as to balance the treatment between urban and rural teachers.

Therefore, under the background of the country's strong support for education, local governments must make great efforts to improve teachers' living and working environments, formulate transparent and effective supervision systems, and effectively solve the problems that teachers are reluctant to go to and stay in rural schools in remote and underdeveloped areas.

4.4 Strengthen the policy support for rural teachers and maintain the continuity of relevant policies

Educational policies are put forward based on the current situation and prospects of educational development in different historical contexts. Their purpose is to address the existing practical problems in education and gain insights into the future trends of educational practice^[5]. Firstly, clarify the

objectives of rural teachers' professional development in the context of educational digital transformation. The objectives of teachers' professional development vary across different historical backgrounds and educational stages^[6]. The objective of rural teachers' professional development in the context of educational digital transformation is to deepen the integration and innovation of digital technology and teachers' professional development.

Through the introduction and implementation of relevant policies, the goal of rural teachers using digital technology to develop their own professional knowledge, enhance their professional abilities, and cultivate professional emotions can be achieved. Secondly, refine the specific contents of rural teachers' professional development and put forward targeted and actionable measures. Incorporate digital technology into the professional standards for teachers, and elaborate on the relevant aspects of professional development concepts and teachers' ethics, professional knowledge, professional abilities, and digital technology, so as to improve the digital competence of rural teachers in their professional development. Thirdly, carry out the supervision and implementation work in the later stage of the policies. Policy texts serve as the theoretical foundation, and only by combining theory with practical skills can the role of educational policies be fully realized. Therefore, for the professional development of rural teachers, it is necessary to establish and continuously improve the accountability and rectification mechanism on the basis of implementing relevant policies, so as to fully leverage the actual effectiveness of rural teachers' professional development in the context of educational digital transformation.

5. Conclusion

The advent of the digital age inevitably propels the education sector towards digitalization. The digital transformation of education brings brand-new challenges and opportunities to the professional development of rural teachers. This transformation is not only an inevitable move for rural education to adapt to the development trend of the digital age and meet the challenges of the times, but also an innovative practice of the deep integration of rural teachers' professional development and digital technology. At present, in order to promote the professional development of rural teachers with the help of educational digital technology and meet the new requirements for the professional development of rural teachers in the new era, we need to adhere to the correct development direction, understand the actual situation of rural teachers' professional development, and fully grasp the dividends brought by the digital transformation of education. Specifically, we should effectively implement policies related to digital technology, optimize the allocation of digital resources, coordinate multiple stakeholders to build a cooperation mechanism, and make every effort to promote the digital construction of rural education resources. Use digital means to lead the professional development of rural teachers, continuously improve the professional quality of rural teachers, and strive to open a new chapter in the professional development of rural teachers in the context of educational digital transformation.

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