Demand Mechanism, Information Barriers, and Comprehensive Approaches for the Development of Rural Education in the Context of Educational Digitalization

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Abstract. Amidst the contemporary digital era, the push for digital technology utilization, the genuine need for equitable high-quality education, and the rigorous digital literacy standards present both vast opportunities and challenges for rural education. Yet, rural education grapples with hurdles like the urban-rural digital gap, a deficiency in digital skills, inadequate infrastructure, and deep-seated teaching ideologies. Given these circumstances, channeling superior educational resources to foster urban-rural synergy, holistically elevating digital acumen among rural educators and pupils, fortifying the rural digital foundation, and reshaping traditional pedagogical perspectives stand out as potent strategies for rural educational advancement.

Keywords: Rural education; Education digitization; Educational development.

1. Introduction

The history of modern education shows that a new generation of educational change centred on digital technology has begun to penetrate all areas of education.China's Education Modernisation 2035 indicates that accelerating the transformation of information-based education is one of the strategic tasks in the construction of today's era, and has a crucial practical significance. The key to digitisation of education lies in the effective application of digital tools to education. The unique implementation of the classroom guided by the idea of digital education, the use of contemporary educational technology and contemporary teaching methodologies to carry out instruction, in order to support the enhancement of educational quality and efficiency.Huai Jinpeng, the minister of education, emphasized that the education system should use General Secretary Xi Jinping's crucial directives on rural revitalization as a model and play a significant role in digitalization in support of the strategy.Digital technology may successfully support the reform and innovation of the rural education mode, which is a crucial component of modernizing the country's educational system[1].

2. Demand Mechanism for Digital Development in Rural Education

From a grass-roots perspective, Chinese society is vernacular. Its roots lie in the countryside. Rural construction, as a basic livelihood project in China, can provide a fairer and better systematic guarantee to meet the growing material and spiritual cultural needs of rural people. Moreover, it is an important part of the realisation of the dream of a strong education nation. For the first time, the report on the Report of the 20th National Congress of the Communist Party of China integrated education, science and technology and human resources into a "trinity". Digital transformation of education has become a trend in the convergence of education and digital technology, which known as the key point for the current and future education enhancement, and the main way for science and technology to empower the education reform and support the high-quality .Under the overall impetus of the widespread use of digital technologies in education, Rural education is inevitably affected by the overall environment. The current integration of digital technologies into education has received sustained attention and impetus, mainly combining technology and science education, through flexible and inclusive development and use, students are provided with personalized and specialized educational resources to achieve the best learning results. Digital technology can break the limitations of time and space, and to a certain extent make up for the lack of rural educational resources. Due to

geographical disparities, the development of education in urban and rural areas is uneven, and access to educational resources is disparate.Digital technologies offer new opportunities to enhance the development of rural education, where knowledge and skills are acquired mainly through textbooks and life experiences.The presentation of digital educational resources has made education possible at all times and in all places.Digital technology and resources can build a digital education platform for rural education, make up for the shortcomings of rural education, accelerate the narrowing of the gap between rural and urban education, and realise the upgrading and leapfrogging of rural education development. Digital literacy is the basic requirement for talents in the digital age, As the "reserve army" of national construction, the level of students' informatisation literacy is directly related to the process of China's modernisation and its ability to participate in international competition.When education flourishes, the youth flourish, and when the youth flourish in the countryside, the countryside flourishes.By introducing digital technology to the countryside, rural students can also be exposed to new things outside and learn about the latest developments in society. At the same time, the creation of an information-based educational environment can also help students develop digital thinking and develop their own information literacy.

3. Information Barriers to the Digital Development of Rural Education

3.1. The Urban-rural Digital Divide as An Information Barrier to Rural Education Development

As there is a wide variation in the level of economic and social development in different places, this has led to a gap in the allocation of digital education resources between urban and rural schools, and even the emergence of a digital divide.Rural areas are affected by economic level, geographical distance and other factors, and there is a great deal of variability in their configuration and use of digital technology in education.At present, the smart classroom and digital classroom are more commonly used in urban schools, while the development and construction of the countryside in digital education is lagging behind, and there are certain difficulties in the application of its digital resources, which, to a certain extent, impedes the development of rural education.In addition, there is a degree of disparity between the rich and the poor in rural and urban areas.Due to the level of economic development, villages have shortcomings in terms of teacher qualifications and infrastructure development, and rural children's access to and demand for information technology products and services are affected.For example, against the background of inadequate economic conditions and lack of technology, rural students have a more homogeneous ability to acquire information and a lower ability to process information, which, to a certain extent, also contributes to the information divide between urban and rural students.As a result, this has led to a certain amount of resistance in the process of promoting the joint construction and sharing of urban and rural educational resources, leading to a slow process of synergistic development of urban and rural education, and to the urban-rural digital divide becoming an information obstacle to the development of rural education.

3.2. Lack of Digital Literacy as A Capacity Barrier to Rural Education Development

Digital education enhancement in villages has placed higher demands on teachers' digital literacy.Due to the rural teachers and students of the concept of digital education is still stuck in the campus Internet access and multimedia teachers at the primary stage, that the Internet, multimedia applications equal to the digitalisation of education, the formation of the concept of "digital".There is still confusion about the ways and means and understanding of the integration of digital technologies into education.How to promote the implementation of rural education development has become a challenge.In an era of technology encirclement, the effective use of information technology in education and teaching cannot be simply transplanted, but requires teachers to have an in-depth understanding of the principles of the relevant technology to enhance their awareness and practical skills The lack of digital literacy among rural students is another stumbling block to the development of rural education.In the digital age, digital lifestyles, forms of interaction and forms of technology

are changing the standards of talent in the new era.Students can access the Internet platform for independent learning through mobile phones, computers and other devices, which requires students to have good digital literacy and excellent ability to use digital technology.However, rural students are relatively information-obstructed, leading to a lack of information literacy, which hinders the digital competence of rural students and the development process of rural education.

3.3. Inadequate infrastructure as a resource barrier to rural education development

With the promulgation of the Education Informatisation 2.0 Action Plan, the educational infrastructure has been transformed from the traditional physical schools, teachers, laboratories and libraries and other places of learning to the Internet and electronic devices.The current use of educational technology in education has facilitated digital education.Due to the limited investment in education in rural education, rural schools are scattered, the education infrastructure is still in its infancy, and hardware and software construction is backward. For example, teachers and students do not have enough computer equipment, the number of computer rooms is not sufficiently equipped, the school digital system is old, and there is insufficient funding for digital campus construction.Although digital resources and platforms have been constructed in some villages, the level of sharing is low and the phenomenon of "information islands" exists, leading to inefficient use of educational resources.

3.4. The consolidation of teaching concepts as an ideological obstacle to the development of rural education.

The concept of education in keeping with the times is a strong guarantee for the digital development of rural education and plays an important role in promoting the growth and development of children.The entrenched traditional concept of education is an ideological obstacle to the development of rural education.Due to the poor geographical location of many rural areas, it takes more time to accept new ways in terms of concepts, and fixed production and living habits and education levels lead to the persistence of current solidified values, thus resulting in deviations in educational concepts.In this environment, schools and families have less contact with digital technology and vague cognition, which to a certain extent imprisons the development of rural children, and this cognitive structure and educational concepts have been passed down and continued in rural areas for a long time, forming a strong ideological foundationAs a result, they find it challenging to invest in cash and equipment and are unwilling to adopt continually evolving educational conceptions. This has made it difficult to further develop digital concepts and has slowed their adoption in the modern era of education.This phenomena leads to a reduction in educational quality as well as in the effectiveness of conceptual updating, which impacts the continued implementation of rural education by limiting options for rural children's development and raising the educational bar.

4. Digital Development Strategies in Rural Education: A Comprehensive Approach

As we transition into the digital age, rural education must adapt swiftly to the new demands and challenges this transformation entails. This process includes integrating high-quality educational resources to bolster coordinated urban-rural development, advancing the digital proficiency of rural educators and students, and refining the digital infrastructure in these areas. Simultaneously, we must reassess, and update entrenched educational paradigms and address the persistent issues impeding the digital development of rural education. Doing so will provide technology support for the digitization of rural education.

4.1. Integrating High-Quality Educational Resources to Encourage Balanced Urban-Rural Development

By leveraging integrated applications like 5G and AI-powered education, we can further the melding of education technology with teaching in rural settings. This integration will ensure an equitable distribution of educational resources between urban and rural locales, facilitating the creation and sharing of premium rural education resources. To close the digital divide in urban-rural education, the government, corporations, and schools must work together to create a resource-sharing mechanism. It is possible to create subject-specific instructional resources by combining digital technologies with online teaching tools. A digital education resource library will be created as a result of this collaboration, encouraging resource sharing on many levels.

By bringing top-notch educational resources and superior teachers from developed regions into rural areas, we can ensure that rural students gain maximum access to high-quality education, thereby achieving balanced urban-rural development. Schools can encourage digital campuses, utilizing advanced technology to generate superior teaching environments and management systems. For instance, Yizhou in Guangxi has established a micro-class platform tailored to local needs. This platform offers varied, personalized services for teachers and students through online courses, allowing students to acquire fundamental knowledge and skills using digital technology and continuously broadening their knowledge and thinking patterns.

The platform is also employed to facilitate teacher-student interaction. Furthermore, constructing an urban-rural educational development community helps establish a reciprocal flow mechanism between urban and rural regions. This setup provides a platform for rural and urban teachers and students to interact and learn from each other. They can share premium educational resources and experiences on this platform, amalgamate and optimize high-quality educational resources in urban and rural locales, and compensate for any educational resource deficiencies. Educational resources like "Famous School Network Class" and "Special Delivery Class" can partly introduce high-quality education to rural areas, bridging resource gaps, and thus enhancing educational standards.

4.2. Comprehensive Advancement of Digital Proficiency among Rural Teachers and Students

Teacher competency significantly influences the quality of rural education. We must increase the allocation of designated admissions in teacher-training colleges to infuse rural schools with new talent and stabilize the rural teaching workforce. During teacher training, we should heighten digital literacy requirements, incorporate digital components into curriculum teaching, and foster the formation of a high-quality teaching team for the contemporary era. Rural teachers can also participate in inter-school alliances, public welfare funds, rural-focused education projects, and other online courses to pool resources from different sectors, thus facilitating balanced, high-quality educational development in rural areas.

Addressing student digital literacy, rural communities must continually adapt to the evolving talent requirements of our era. Emphasis should be placed on cultivating digital literacy among rural students, such as enhancing their information technology skills through IT courses and the integration of technology into other disciplines. Such measures will foster digital literacy and facilitate the continuous development of students into prospective talents that meet the demands of the intelligence era.

4.3. Enhancing and Refining Digital Infrastructure in Rural Areas

To improve the quality and capability of rural education, digital infrastructure development is encouraged in rural areas. Government agencies and educational institutions that are relevant must recognize the importance and necessity of investing in digital infrastructure, stay current on technological advancements, and assure enough funding. It is advisable to hire specialized professionals to evaluate and carry out on-site surveys of rural digital infrastructure, offer workable solutions, and hasten the development of digital infrastructure.Advancing rural education necessitates not just the establishment of physical schools but also the transmission of digital learning resources.

The accessibility and communicability of digital learning resources allow for a more equitable distribution, enabling rural students to enjoy superior education.

4.4. Innovating Approaches and Overcoming Traditional Teaching Paradigms

The digitization of rural education is inextricably linked to educational ideologies, necessitating proactive measures for improvement. The educational philosophies of schools and families directly impact the propensity and investment in children's digital education, indirectly influencing educational outcomes. Progressive, enlightened educational ideologies correlate with higher academic achievement. Acceptance of new ideologies during the education process will influence how schools and families perceive traditional and digital education. We must continually reform traditional educational ideologies, emphasize the importance of digital technology in education, and help individuals understand the positive impact of digital education. Deep consideration of digital educational practices can break the conceptual boundaries between traditional and digital education, and encourage the acceptance of digital education among rural stakeholders. Inviting relevant experts to remotely supervise digital classrooms can help rural schools and families appreciate the benefits of digital education, fostering a conducive digital education culture and ensuring the sustainable development of rural education.

5. Conclusion

5.1. Prioritize Digital Education in the Strategic Planning of Rural Education

Education's public product attributes dictate that the government has a considerable responsibility, particularly at lower levels where these attributes are more pronounced. As economic development accelerates, many cities have become digital education front-runners, a trend rural education should adopt. Predominantly focused on compulsory education, rural education's momentum largely stems from government support. Therefore, the government must reinforce guidance, refine and enforce policies to ensure that technology enhances the digitization of rural education, and establish systematic, precise, and standardized policy mechanisms. The government should create high-level plans for digital education in rural regions, provide pertinent policy directives, prioritize content preparation, ensure the right conditions for technology-enhanced rural education, and set up a complete system for rural digital education.

When the country formulates related digital education policies, it should strategically plan, devise scientific policies to advance the digital evolution of rural education, and accentuate policy support for weaker areas. Improved and actionable policies in line with the actual developmental stage of rural areas are essential. Simultaneously, funding should be increased, particularly for education in impoverished rural areas, to promote the development of technologies like the internet and big data. A precise digital education empowerment plan should be developed based on the distinct conditions of different rural areas, addressing obstacles hindering the digital evolution of rural education, clarifying key issues and challenges, enhancing the empowerment effect, and allocating urban and rural resources via big data for technological resources.

5.2. Establish and Publicize Exemplary Models of Digital Rural Education

In advancing digital rural education, the development and promotion of typical models that can be emulated are beneficial. As expected primary educators, rural teachers often display gaps in their ability levels. Many have never engaged with novel foundations and are unfamiliar with updated educational paradigms, knowledge systems, and digital structures. Given these difficulties, promoting conventional methods is a workable strategy to improve digital rural education. Educational resource platforms, educational data mining, and educational expert systems can all be used to create examples of digital rural education. Based on an examination of the actual needs for rural education, expert groups can be developed that include both domestic and international education specialists. They are able to pinpoint the key problems and turning points to create realistic and replicable application cases.

Different rural areas can develop more suitable digital models for local education development levels according to actual conditions and initiate collaborations and exchanges with educational technology companies. For instance, computer vision technology can be applied in physical education to recognize and process students' body movements, thereby assessing the standardization and efficacy of student actions.

In course teaching, the development of related course detection software can assist students in problem-solving, generating learning material, gamified learning, homework detection, and personalized tutoring. Uploading this data to the teacher's end facilitates data visualization, thereby offering personalized and targeted teaching for rural students, resulting in a transformative impact on education.

5.3. Advocate for the Specialized Development of Digital Rural Education

The advancement of digital rural education should resonate genuinely with rural regions, utilizing local culture and customs as the foundational source of educational development. This approach will ensure the effective establishment of rural culture based on each area's regional characteristics, economic foundations, and traditional culture, infusing these vital elements into rural educational activities. In the development of curriculums and teaching plans, high-quality local cultural resources should be utilized to create a distinctive digital rural education.

Moreover, rural education should cultivate a characteristic digital education distinct from city schools. While contemporary digital technology and resources should be employed, rural education should emphasize individuality, with small class teaching offering evident advantages during this developmental process. For instance, given the fewer number of students, technology usage can be more extensive among students, facilitating precise teaching and catering to individualized educational developmental needs.

In order to accomplish high-quality development of rural education, rural digital education should essentially introduce distinctive digital resources and technology from many aspects such as development principles, development aims, and development models.

In an era of rapid digital technology advancement, traditional educational concepts and methods are insufficient to meet the demands for high-quality talent cultivation. This reality necessitates timely reforms in rural education to build a digital education system aligned with the current educational development trend. The use of digital technology can revolutionize teaching models in rural education, aiding rural areas in nurturing high-quality talents.

References

[1] The Ministry of Education coordinates the revitalization of rural education and the revitalization of rural areas through education [EB/OL] (2021-12-23) [2023-7-16]

[2] Han Xiaofan. The Connotation, Value Implication, and Practical Path of Technology Empowering Rural Education Revitalization [J]. Modern Education Management, 2023, No.394 (01): 118-128. DOI: 10.16697/j.1674-5485.2023.01.012

[3] Chen Chen. Educational Digital transformation, enabling the realistic path of coordinated development of urban and rural education [J]. Journal of Hebei Energy Vocational and Technical College, 2023,23 (02): 40-43

[4] Qiu Lijian, Liu Xuezhi. Revitalization of Rural Education in the Age of Artificial Intelligence: Opportunities, Challenges, and Countermeasures [J]. Education Academic Monthly, 2023, No.370 (05): 47-53. DOI: 10.16477/j.cnki.issn1674-2311.2023.05.006

[5] Zhou Ye. The connotation, value and path of high-quality development of rural school education [J]. Journal of Shanxi University (Philosophy and Social Sciences Edition), 2023,46 (02): 100-109

[6] Fang Xu, Kai Wenhui. The Dilemma and Countermeasures of Artificial Intelligence Supporting Rural Education Revitalization [J]. Yuejiang Academic Journal, 2023,15 (02): 144-153+175. DOI: 10.13878/j.cnki.yjxk.20221205.001

[7] Lu Qiang. The Practical Logic, Realistic Conflicts, and Future Trends of Integrating Technology into Teaching [J]. Research on Electronic Education, 2016,37 (02): 10-17. DOI: 10.13811/j.cnki. eer. 2016.02.002

[8] Liu Chengxin, Xu Xuanqing. Research on the urban-rural differences in the allocation of basic education informationization resources: A case study of the development of education informationization in Shandong Province during the "Tenth Five Year Plan" period [J]. Research on Electronic Education, 2008, No.179 (03): 18-22

[9] BACA A,KORNFEIND P.Stability analysis of motion patterns in biathlon shooting[J].Human movement science,2012,31(2):295-302.