Research on Educational Informatization Empowering Home-School Co-Parenting of Left-Behind children
A Study Based on Left-Behind Children in Rural China

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Abstract. Rural left-behind children is a special group derived from the urban–rural dual system in China. As the main position of education, family and school co-education is of great significance to the physical and mental health development of left-behind children. Under the background of the needs of the times, practical requirements and policy guidance, the construction of education informatization is necessary to give energy to the cooperation between family and school in educating left behind children. The empowerment of educational informatization can not only break the limitation of time and space, reflect the value of education, enrich the home-school life of left-behind children, but also realize its own deep construction and break through the bottleneck of development. In the face of many practical difficulties such as conservative education ideas, backward information resources and decentralized cooperation patterns, we should explore the path of practice from three aspects to seek new linkage of home-school cooperation and realize the new development of left-behind children: clarify the concept of home-school cooperation and fit the connotation of education; update the form of home-school cooperation and create an information exchange platform; summarize the practical experience of home-school cooperation and establish a comprehensive security mechanism.

Keywords: education informatization · left-behind children · home-school cooperation

1 Introduction

In China, uneven development and economic incentives are encouraging farmers to move to cities in search of better job opportunities, even though they often face uncertain environments and limited access to social services [1]. This urban–rural dual gap in China has spawned a huge group of rural left-behind children. Left behind children refer to minors under the age of 16 whose parents work outside the home or one of whom works outside the home and the other is unable to supervise [2]. By 2020, the number of left-behind children in compulsory education in China has reached 5.60136 million [3]. Left behind children generally lack stable family environment and stable teachers'

attention, which greatly affects the physical and mental health of them [4]. At the same time, scholars have also repeatedly called on China to pay close attention to and protect the rights and interests of left-behind children, such as formulating intervention policies for left behind families and improving school education [5]. Obviously, the education of left behind children has become an important social issue related to social stability and educational equity.

Home-school co-parenting is obviously an effective solution. As the main field of child-rearing, the cooperation between family and school plays an important role in the healthy development of children. In order to better help left-behind children, schools and families need to establish a unified goal to ensure the quality of their learning, cultivate their independent learning ability and promote their all-round development [6]. However, due to a variety of time and space constraints, parents and teachers of left-behind children are obviously unable to maintain continuous and close contact and communication.

With the advent of educational information age, we see a new hope to solve the above predicament. Educational informatization refers to the process of making general use of modern information technology in education, developing educational resources and optimizing educational process, so as to cultivate and improve students' information literacy and promote the modernization of education [7]. In the twenty-first century, the rapid development of information construction in the world has had a significant impact on the field of education, and has swept the field of education with its unique advantages. With the development of education information age, home-school cooperation has entered a new stage and been endowed with a new connotation of the times. At the same time, it also provides a new opportunity to solve the education problems of left-behind children. With the trend of educational informationization. The important educational issue of home-school co-education for left-behind children has ushered in a new good news, and we can have new expectations for its function and role.

2   The Context of Question

2.1   Needs of the Times: the Advent of the Era of Global Education Informatization

Information technology is deeply influencing the production and life of human beings with strong development power. Since its appearance, it has played an increasingly important role in the field of education. From the original use of its computing power only to the present, information technology has completely become a new driving force to change the form of education and promote the development of education. "Internet + " education and "AI + " education have already become a new educational trend. From a worldwide perspective, many international organizations and developed countries are stepping up the implementation of the strategic plan of information education. For example, as one of the world's powerful countries, the United Kingdom has deeply tapped the potential of education given by the information technology era from the aspects of teacher management, education burden reduction and community participation [8], and has achieved outstanding educational results, which further confirms and demonstrates the huge transformation of information technology on education and teaching.

Education researchers, schools, teachers and parents have seen the demand of the era of education informatization, and look forward to the release of the potential of education informatization [9]. It is particularly necessary and urgent to make good use of the theme of educational informatization to seek a breakthrough in educational practice when the whole world is marching towards the era of informatization.

2.2 Practice Requirements: the Practice of Home-school Cooperation Requires Information Technology Support

In 2020, a rare epidemic disease broke out in the world, and the emergence of the COVID-19 affected people's life safety, lifestyle and mental health. In the epidemic era, home learning and online learning have become a new form of education. Students and parents almost live together all the time. Teachers cannot pay close attention to each student's learning status as usual. Home-school cooperation has become an important way to ensure the online learning quality of students and promote the comprehensive development of quality. However, at present, the use of Internet welfare and intelligent communication equipment has not played its due role in supporting education. The use of information technology in the practice of home-school cooperative education is only limited to the information transmission of class groups, most of which is a kind of one-way communication [10]. The home-school cooperation without the support of modern information science and technology obviously cannot meet the educational needs of high-quality family-school cooperative education practice, and the practice problem of the closed family-school cooperative education pattern has not been properly solved. How to maintain and improve the quality of education to the greatest extent, optimize the practice mode of home-school collaborative education, and respond to the practical requirements of home-school cooperation under the complex background of the times has become a strategic issue that needs urgent consideration in world education.

2.3 Policy Guidance: Requirements for Education Informatization 2.0 Construction and Special Legislation for Family Parenting

As early as 2015, UNESCO established the Education Informatization Award to recognize individuals, institutions or non-governmental organizations that innovatively used information technology in education. At the Remodeling Education Summit in December 2021, UNESCO issued the Global Declaration on Remodeling Education for Educational Connectivity, emphasizing that we need to use the unique interactive and multimedia capabilities of Internet technology to achieve digital transformation and teaching innovation of education. The declaration provides a new direction for the development of education informatization [11].

The Ministry of Education of the People's Republic of China formally put forward the Action Plan for Education Informatization 2.0 in April 2018, which requires the upgrading of education informatization. On the one hand, this represents that China has made a breakthrough in the stage of "Education Informatization 1.0", including preliminary popularization of basic technical conditions, gradual sharing of educational resources, and comprehensive the improvement of teachers' information technology literacy; On the other hand, this also requires that "the role of information technology

needs to shift from exogenous variables to endogenous variables" [12]. Informatization education is confirmed from the perspective of strategic policy, indicating the basic direction of China's education reform. In October 2021, China's first special legislation on family parenting, the Law of the People's Republic of China on the Promotion of Family Education, was formally voted through. It stipulates the responsibility of families for children's growth in the new era, clarifies the requirements of parents' guardianship responsibility, and explains its core task and logic main line, that is, family and school cooperate to build a comprehensive education system. The importance of family education is recognized and presented in the form of law, which is an important milestone in China's education field to break the traditional pattern of school education, call for the special role of family-school co-education, and improve the quality of education, providing basic policy guidance for family-school co-education.

It can be seen that China's education reform has seen the important value of education informatization and the important position of home-school cooperation. It is of great practical significance to explore how education informatization enables the construction and optimization of home-school cooperative education pattern.

3   The Value of Educational Informatization for Home-school Co-education of Left-behind Children

The construction and development of education informatization has had a certain impact and change on the whole world's education field. Under the background of special families and special education practice of left behind children, education informatization is expected to give greater vitality and motivation to the home-school cooperative education activities of left behind children. Its value can be described from four aspects.

3.1   Education Informatization Can Solve the Space–time Dilemma of Left-Behind Families

Time and space constraints are the most fundamental constraints for left behind families to enhance parent–child exchanges. Due to the remoteness of the working place, inflexibility of working hours, and high transportation costs, most parents of migrant workers cannot go home often [13]. Parents who work in cities and children who stay in rural areas will be separated for a long time, and there are few opportunities for face-to-face communication. The parents' concern for their children is only limited to the level of daily life, and they are not concerned about their children's learning state, psychological state, etc. Under the same circumstances, communication between home and school and between teachers and parents is even more difficult.

The construction of educational informatization can directly solve the time and space limitations of left behind families. In the information age of education, the emergence and development of new media spawn a variety of convenient communication channels. Students can receive parents' urging and teachers' teaching in real time, parents and teachers can also realize the mutual sharing of educational concepts. The empowerment of educational informatization lets space and time no longer bind the hands and feet of education, and has laid an important fundamentals of Information Technology for home-school cooperation in educating left behind children.

3.2 Education Informatization Can Release the Vitality of the Ontological Value of Education

Families play an important role in determining educational achievements and life courses. The different growth environment of left behind children has a negative impact on their educational prospects [14]. This is mainly reflected in the fact that they are still trapped in conservative educational expectations and educational goals. Because of the limitation of educational resources, they cannot be given more precise and scientific educational expectations, thus limiting their potential and space for development.

Education informatization can eliminate the negative factors affecting the educational prospects of left behind children as much as possible. The information age of education not only brings about the diversification and efficiency of education and teaching, but also represents the innovation of talent training. The vision provided by informatization can present a broader educational landscape, provide more abundant educational opportunities, and deliver more profound values for rural left behind children. The lofty educational values and ideals will be realized under the background of informatization, and the fundamental "educational" principle of imparting knowledge, improving personality and enhancing connotation in educational activities will be implemented.

3.3 Education Informatization can Enrich the Home and School Life of Left-behind Children

The monotony of home and school life of left behind children is mainly reflected in the lack of resources. Because of the backward economy and narrow geographical area, a few resources will flow into the village actively. Due to the long-term influence of small farmers' economy, the countryside also has not enough capacity and motivation for self-renewal and self-creation. The dilemma of sharing a resource among multiple children happens from time to time.

Education informatization represents the enrichment of life resources and the transformation of educational resources. On the one hand, it gets rid of the limitation that left-behind children in traditional home-school life can only use printed products such as paper materials and teaching materials, and plays the role of multimedia libraries such as MOOCs, e-books and video websites, so that the types of learning resources are more abundant and diverse, and access is more convenient and quick; on the other hand, it provides resource services for left-behind children efficiently, so that they can obtain more targeted and accurate resources to gain experience and meet their personalized life and learning needs. The Internet and information technology have broken the barriers of resources, enabling rural left-behind children to easily collect, identify, screen and organize massive life and education information at school and at home.

3.4 Education Informatization can Help its New Development

As a frontier hot spot in the field of education, education informatization construction is seeking new breakthroughs and new development in all countries. Foreign Internet sharing of educational resources mostly diversified development trend, with the advantage of openness [15]. Although China is vigorously building and following up, there are still

many problems. The gap between urban and rural areas and regions in information construction is still obvious, and there are still many obstacles in the in-depth construction of educational information.

While empowering home-school to foster rural left-behind children, the construction and development of education informatization in this field also provides a new opportunity for further reform. By assisting families and schools to educate left-behind children in rural areas, educational informatization provides a basic path for narrowing the gap between urban and rural areas and between regions in information construction. In the practice of coordinating home-school education, we can further clarify the systematicness and pertinence of the Internet sharing system of basic educational resources, accelerate the breakthrough of the bottleneck of educational informatization construction, further release the profound potential of educational informatization, and improve the level of China 's educational modernization.

4   Difficulties in Reality

Although we can note that education informatization has important value and significance for home-school cooperation of left behind children, in the current reality, it is still limited by various factors if we want to further promote the deep cooperation between education information technology and home-school cooperation of left behind children. The overall analysis of the practical difficulties can be summarized from three aspects: concept, resources and pattern.

4.1   Conservative Education Concept

As a universal feature of world population mobility, the split of family structure has led to the lack and weakening of family dysfunction in the care and upbringing of left behind children in rural areas [16]. Grandparents, as temporary guardians in many cases, regard care as simply providing food and clothing, and some of them spoil and pamper their children. The long-term absence of parents in family education and the backwardness of grandparents' concept of intergenerational upbringing have led to the blank of parents' responsibility for family parenting and the deepening of the gap between children and elders, which has hindered the left behind children to form a correct world outlook and values. Some researchers found through field surveys and interviews that left behind children could not obtain correct and good parenting ideas from their family members, their overall academic performance showed a downward trend after their parents went out, and because parents who went out to work often used excessive money to compensate for their physical absence, some children formed a money-oriented world outlook [17].

4.2   Backward Information Resources

The key to the technology of education informatization to assist home-school cooperation in raising left behind children lies in the construction of information technology equipment supporting rural schools. However, in relatively backward rural areas, its

informatization development is still subject to many restrictions, which cannot provide perfect technical support for home-school cooperation. The backwardness of rural school information resources is mainly reflected in educational technology equipment and teachers' information literacy. On the one hand, the equipping rate and the utilization rate of educational technology equipment are low. Taking primary schools as an example, in 2018, there were only 0.010 online multimedia classrooms and 0.129 computers per student for rural primary school students, while the number of urban primary schools reached 0.122 and 0.628 respectively [18]. Due to the relatively backward economic development in rural areas, the local government cannot afford the financial pressure caused by the allocation of advanced education equipment, and because the rural network is not smooth enough, network costs and follow-up equipment maintenance costs are large, resulting in a low utilization rate, which cannot be integrated with the normal teaching and management order. On the other hand, teacher resources are one of the most important resources of educational resources. In terms of teachers' information literacy, rural teachers are generally lower than those in urban areas, and the index of teacher shortage of rural schools is 0.98 [19]. The problem of teacher shortage is far more serious than that in urban areas, and the teacher shortage index in urban areas is only 0.44. Rural teachers, due to their relatively closed information, have poor information technology application literacy, and are seriously lacking in the ideas of applying information technology, operating skills, the ability of utilizing the information technology to carry out classroom teaching, teaching management and teaching evaluation capabilities [20], which hinders the further improvement of education quality.

4.3   Dispersion of Cooperative Education Pattern

Many western countries in Europe and the United States, set up the family-school cooperation pattern earlier and have shown good practical results. For example, as early as 1897, the United States established the National Association of Parents and Teachers to divide the work among parents and teachers at different levels, so as to better realize their common mission of educating people. With the support of the cooperative organizations, American parents are encouraged to participate in home-school cooperation from different aspects. Through relevant empirical research, the systematic home-school cooperative education project can effectively make parents feel more concerned about the school, and also improve the initiative of parents [21]. By contrast, the weakness of China's comprehensive home-school coordination system is mainly reflected in three aspects. First, the boundary of responsibility is unclear. On the basis of the common willingness to cooperate, parents and schools have problems such as poor practical operation ability, and both sides have unclear boundaries of their own rights and responsibilities. Second, the communication mode and content is single. Effective and diverse communication methods are the premise for in-depth understanding, but the current form of cooperation between families and schools is mainly limited to the one-way opinion output mode of "parents' meeting". It is difficult for parents to communicate with teachers for a long time and independently, and teachers' guidance to parents is also lacking in pertinence, which greatly reduces the effectiveness of family-school cooperation in educating people, making the cooperation less effective. Third, there is a lack of better moving mechanism. The essence of family-school cooperation in educating people

is the establishment and operation of a community of interests. Although there are "multiple causes" between family and school, the fundamental purpose is to produce "one result", that is, to achieve the all-round and healthy development of students. In the process of the operation of the community of interests, in addition to the subjective efforts of both parties, the specialized security system, the evaluation and feedback mechanism and other objective conditions also play an important role. At present, China only gives guidance on home-school cooperation from the macro level, and no comprehensive cooperation scheme and specialized support funds have been formed in various regions. In addition, due to the lack of a sound evaluation and feedback mechanism, it is impossible to continuously accumulate the practical experience of home-school cooperation. Education has the long-term effect of educating people. The effect of home-school cooperation cannot be reflected quickly and immediately in a short time. It needs long-term tracking and timely feedback to achieve substantial educational results. The integrity and rationality of the family-school cooperation pattern directly determine the level of the family-school cooperation results. However, under the current decentralized system, family-school cooperation still has a long way to go.

5   The Path to the Goal

Under the pressure of various practical difficulties, it is particularly important to set a basic path for the bright vision of supporting home-school cooperation in education informatization. In the beautiful blueprint, we can explore the basic practice path from the following three aspects to help the empowerment of education informatization becomes a reality.

5.1   Clarify the Concept of Home-school Cooperation and Conform to the Connotation of Education

The improvement of the effectiveness of home-school cooperation cannot be separated from the consistency of the concept of home-school education and the unity of cooperation intention. The concept of "home-school cooperation" originated in the United States. The American scholar Epstein expanded the scope of the concept of home-school-cooperation to the community, proposed that school family community would have an overlapping impact on students, and summarized the practical mechanism based on the overlapping impact threshold theory. That is, six modes of family-school community cooperation and participation: "being a good parent, communicating with each other, volunteering, studying at home, making decisions and cooperating with the community" [22]. China's research on family-school cooperation focuses more on the cooperation between family parenting and school education, and has reached consensus on the two-way interaction, goal consistency and complementary advantages of family-school cooperation [23]. With the gradual release of information technology in education, the concept of home-school cooperation will be further deepened, and gradually eliminate the ambiguity of the boundaries of each subject, so as to achieve the agreement of the connotation of home-school cooperation in the concept of education and education. In this context, it is necessary to clarify the limits of power and responsibility of families

and schools, highlight the particular significance of educational informatization, connect two subjects and one technology, and explore the optimal combination mode.

Firstly, families should provide a supportive environment to show a positive attitude towards home-school cooperation. Family is an important place to attach importance to teaching by words and deeds, cultivate moral character, and buckle the first button of children's life. The educational atmosphere provided by family education will lay the foundation for the overall effectiveness of family-school coordinated education, which is the basic responsibility of each family and the main content of the family construction of rural left behind children. Therefore, parents of left behind children need to clarify their own importance, at the same time, sort out the basic concept of family education, correct the attitude towards family education, actively use relevant information technology, maintain regular and regular high-quality communication with their children, actively assume family responsibilities, and help their children grow up healthily. At the same time, as an important subject of home-school cooperation, we should strengthen our understanding of the importance of home-school cooperation, actively help respond to the school's call for cooperation, express our opinions and ideas on the construction of home-school cooperation system, participate in the cooperation with an attitude of encouragement, appreciation and support, and convey the information of being valued and concerned to children with our own attitude change.

Secondly, school education should help comprehensive education and establish an equal concept of home-school cooperation. In the face of the special family environment and background of left behind children, the school and teachers should play a more active role in the family-school cooperative education system and undertake more comprehensive and difficult educational tasks. On the one hand, school teachers are the subjects who interact most closely with children in the process of leaving behind. They master the dynamic change information in whole process of left behind children's development. Their attitudes and views on home-school cooperation will be directly conveyed to students, that is, they are the main promoters and implementers of home-school cooperation. On the other hand, as a guide in the process of education and teaching activities, teachers must closely connect with China's most advanced education goals and education concepts, implement the education ideas of "people-oriented, students' all-round development and healthy development oriented", improve the sense of cooperation, adhere to the initiative to care about the physical and mental state of left behind children, incorporate the organization of family-school cooperation activities into their professional ethics. Schools and teachers need to cooperate and communicate with parents with an equal attitude and the purpose of promoting students' development.

Thirdly, the development of educational informatization should point to education equity. The construction of education informatization is at the center of the reform tide of the times. In the rapidly changing technological rationality, we should carefully consider the fundamental logic of how and who should be trained in the new era. On the one hand, education informatization has brought educational convenience to the left behind children, but at the same time, it also inevitably encourages the trend of instrumental rationality and expands the digital gap, which makes balanced development of education a problem. If we can make full use of information technology to make backward regions have access to advanced information and knowledge, we can effectively narrow the

digital divide and promote the equitable development of education" [24]. Therefore, the construction of educational informatization should adhere to the position of humanistic value, and accurately understand and grasp the educational needs and development rules of left-behind children. It should use its technological advantages to promote educational equity and remove obstacles to the development of left-behind children. In addition, it also needs to take care of the personality development of left-behind children and enlighten the wisdom of left-behind families.

As mentioned above, the two main bodies of family and school, with the technical support of educational informatization, need to clarify their respective rights and responsibilities, give play to their respective advantages, fit in with the core connotation of education, and seek consistency in educational action from the unity of educational concepts.

5.2   Update the Form of Home-school Cooperation and Create an Information Exchange Platform

In the context of the steady and good development of education informatization, it is fully capable of enriching and expanding family-school communication channels and creating a new family-school cooperation and communication platform. First of all, the school can take advantage of the big data's inclusiveness to improve the relevant information of left behind children, customize personal growth electronic files for each left behind child, realize the mutual sharing and interconnection of home-school cooperation information, make the physical and mental development law and state of left behind children visible and systematic, and facilitate parents to participate in the growth of children in real time across time and space. Secondly, parents can actively participate in parents' education and training through modern media technology, and effectively use new communication channels derived from educational informatization, such as social software, official account, forums, etc., not only to listen to the voice of left behind children, but also to achieve timely information exchange and feedback with other left behind families, schools and teachers, and constantly improve their parenting ability and coordination skills. Finally, we will establish an all-round care network platform for left behind children. According to the needs of parents, students and teachers, we will build a comprehensive platform that can accommodate multiple sectors and multiple functions, so that students, parents and teachers can have voice and feedback channels, and truly build an education community virtually.

On the basis of parents actively creating the supporting atmosphere in family and schools paying close attention to students' dynamics, the trinity of educational resource sharing and all-round care network built with educational information technology can harmonize the three energies, make the form of home-school cooperation innovative and effective, and build a solid technical platform for China's home-school cooperative education system.

5.3 Summarize the Practical Experience of Home-school Cooperation and Establish a Complete Guarantee Mechanism

The cohesion and systematization of the pattern of home-school cooperative education is the last and most important step of enabling home-school cooperative education for left behind children. First, ICT in education should give full play to its fundamental advantage of interconnection of all things, and collect, integrate and share the practice and experience of home-school cooperation in educating left behind children in various regions. China has a vast territory and abundant resources. The special group of left behind children is scattered in various regions. Although they have their own characteristics, they can use information technology to refine the common elements, promote the universal and excellent practical experience in many places, and summarize a family-school cooperative education system with Chinese characteristics by integrating the effectiveness of home-school cooperative education for left behind children across the country. For example, Linlibao Middle School in Cheng 'an County, Hebei Province is committed to making parents become equal collaborators and resource assistants. It develops and implements the "home-school mutual visit system", pursues the authenticity and relaxation of home-school communication, and strives to make parents become strong supporters of school education and teaching. This universal concept of home-school cooperation can be deeply promoted by using big data, blockchain and other technologies. Second, a complete and harmonious family-school cooperative education pattern cannot be separated from the economic security. In order to lay a solid foundation for material security, on the one hand, a specialized funding mechanism must be established. Stable financial support is an important pillar of the establishment of the pattern of home-school cooperative education for left behind children. Whether it is the configuration of auxiliary equipment of educational information, or the mobilization of the enthusiasm of parents and schools to participate in the joint education, it can not be separated from continuous and stable financial support. On the other hand, special laws and regulations must be formulated as soon as possible. The establishment of laws and regulations is conducive to reflecting the regularity and systematicness of the family-school cooperation pattern, and making the family-school cooperation move towards a legal track. It is worth noting that the formulation of policies and regulations should pay special attention to the special existence of left behind children in rural areas, adjust measures to local conditions, and promote the development of legalization step by step. Third, a smooth and efficient family-school cooperative education pattern cannot be separated from the supporting evaluation and feedback mechanism. Assessing and evaluating the process and results of home-school cooperation activities and obtaining feedback from all parties in time are important measures to ensure the effectiveness of cooperation activities. The smooth and efficient feedback mechanism will help to realize the continuous and in-depth operation of home-school cooperative education, so that the process of home-school cooperative education for left behind children can achieve a benign closed cycle.

6 Conclusion

"Left-behind children" are words that appear with the economic and social development. They exist as a special group all over the world. They may have a different childhood, but they are still the hope of the family, the future of the country and the international community. We can believe that under the vision of the era of education informatization, parents can take the parenting responsibility on the education of left behind children, and schools can accurately care about and pay attention to the life and learning of left behind children, so as to achieve the cohesion of the joint efforts of family and school education, and finally give left behind children a more fair and happy childhood.

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