REVIEW

Targeted Poverty Alleviation Model of China's Online Education Based on "Triple Classroom": Take the "Shi Shi Xiang Yun" Online School in Chengdu, China as an Example

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***Abstract**: The use of increasingly popularized information technology to improve education poverty and then promote the balanced development of education has become the development trend of world education. On the road to poverty alleviation, China has firmly grasped information technology to encourage school reform in areas with scarce educational resources. Among them, "Triple Classroom" was the accurate result of the deep integration of education, teaching, and information technology. Driven by the "Triple Classroom" project, the Shi Shi Middle School in Chengdu, Sichuan Province, built the online open course with the "Shi Shi Xiang Yun (SSXY)" online school as a platform. Thus, they send high-quality educational resources to areas with scarce educational resources and effectively promote education quality improvement in marginal areas.*

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Introduction

THE popularization of information and communication technology has undoubtedly brought opportunities for the world's development. It can improve or create a favorable learning environment for learners, promote teaching and learning, and help learners develop creative thinking and self-confidence (Das, 2019). Tinio (2003) believes that information and communication technology has broadened access to knowledge and provided unprecedented opportunities for impoverished areas for developing countries. For example, the development of Massive Open Online Courses (MOOC) offers free and open education courses worldwide to help students who cannot receive school education continue to complete their studies (Lambert, 2020; Saputeri & Purwanti, 2021). From this point of view, the popularization of educational information technology has provided help to solve the problem of uneven educational development.

The promotion of Internet technology to education fairness is reflected in the acquisition of knowledge and the advantages of information technology without time, space, and subject limitations. Moreover, it provides more favorable conditions for realizing equal educational opportunities and the balance of educational resources among schools, counties, cities, provinces, and even larger areas (Peng & Lin, 2010). Therefore, with the in-depth integration of education and technology, countries have begun to use information technology to promote educational equity and promote high-quality and balanced education.

The United States is one of the countries with a relatively high level of information technology development globally. It attaches importance to information technology to transform education, formulates national educational technology plans, and puts forward relevant goals, requirements, and measures. For example, the USA began to implement *No Child Left Behind in 2001*, and the *Every Student Succeeds Act* began in 2015 to promote education equity effectively. This series of measures ensured the balanced development of compulsory education from the policy and system level. In addition, they applied information technology to actual teaching practice, which enabled the United States to make long-term progress in basic education information (Harris & Al-Bataineh, 2015; U.S. Department of Education, 2001; U.S. Department of Education, 2005).

To realize the role of information technology in education development, the United Kingdom also provides every child with equal access to information technology learning at the legislative level to meet individual students' information technology learning needs. In the "*Harnessing Technology: Transforming Learning and Children's Services*" development strategy, it is established that online information services should be provided to citizens, a digital learning environment for resumes, rich digital resources, advanced teaching methods, and support for children's personalized learning of information. In addition, the UK has built a series of projects, such as the "*2006-2008 Student Computer Project*". These all focus on the learning experience of children's information technology and help students master ICT skills (information and communication technology) and related life skills to achieve educational equity (Fei & Ma, 2008).

With the rapid development of information technology in China, education for poverty alleviation has also embarked on the information model. In 2017, the Chinese government emphasized in the "Decision of the Central Committee and the State Council on Winning the Tough Fight Against Poverty" that "accelerate the implementation of education poverty alleviation projects, so that children from poor families can receive fair and quality education, and block the intergenerational transmission of poverty" (Central State Council, 2017). With the achievement of overall poverty alleviation in 2020, the need for education-targeted poverty alleviation in the post-poverty alleviation period becomes more urgent. Educational information technology is a crucial means to achieve education-targeted poverty alleviation (Chen & Chen, 2017). In March 2020, the Ministry of Education issued the "*Guiding Opinions on Strengthening the Application of 'Triple Classroom*,'" which clearly stated that "promote the deep integration of information technology and education and teaching practice, promote classroom revolution, innovate education and teaching models, promote the transformation of education methods, and build the new ecology of 'Internet + Education'" (Ministry of Education of China, 2020-03-03).

Chengdu Shishi Middle School established "Shi Shi Xiang Yun" (SSXY) online school in 2013 to participate in educational poverty alleviation work. They use information means to import high-quality educational resources into underdeveloped areas and weak schools, and strive to promote the balance of high-quality education among regions, urban and rural areas, and between schools, and ultimately facilitate the process of education equity. In 2019, Chengdu Shi Shi Middle School established an SSXY online open curriculum application practice community. It explores the appropriate application of high-quality resources in remote areas and strategies for improving education quality through in-depth lesson preparation and other teaching models. This is highly consistent with the concepts of "special delivery classroom," "prestigious teacher classroom," and "famous online classroom" advocated by Triple Classroom. Therefore, it was incorporated into the 2019 Educational Information Application Practice Community of the Ministry of Education.

Construction of Targeted Poverty Alleviation Model Based on Triple Classroom

The classroom is an essential channel for educating people. "Triple Classroom," a special delivery classroom, prestigious teacher classroom, and famous online classroom, is a vital means to realize education-targeted poverty alleviation.

"Special delivery classroom" emphasizes specialization. It mainly addresses the problems of weak schools in rural areas, schools lacking teachers, and poorly developing nationally planned courses. Through the use of special online courses or synchronized courses and the Internet to push appropriate high-quality educational resources according to the teaching progress, etc., help develop the nationally planned courses and promote the equitable and balanced development of education.

"Prestigious teacher classroom" emphasizes sharing. It mainly addresses the problems of teachers' poor teaching ability and low level of professional development. Through establishing a network research community, famous teachers and famous courses can demonstrate the demonstration effect, and new forms of teaching and research activities under the network environment can be explored. Realize that outstanding teachers drive ordinary teachers to improve their level so that the resources of famous teachers can be shared on a larger scale and ultimately promote the professional development of teachers.

"Famous online classroom" emphasizes openness. It is mainly aimed at the urgent need to effectively reduce the education quality gap between regions, urban and rural areas, and schools. With high-quality schools as the main body, online courses, online courses, etc., systematically and comprehensively promote the sharing of high-quality educational resources regionally or nationwide. Eventually, meet the needs of students for personalized development and high-quality education (Fan, 2020).

In fact, "Triple Classroom" is not the first time it has been proposed. It first appeared at the "*Education Informatization Pilot Work Symposium*" of the Ministry of Education in 2012. At the conference, the Ministry of Education proposed for the first time the development of "Triple Classroom" to improve the quality of education in remote areas and promote the sharing of high-quality teaching resources (Ministry of Education of China, 2012-07-13).

In 2014, in the "*Implementation Plan for Building an Effective Mechanism to Use Information to Expand the Coverage of High-Quality Educational Resources*," the Ministry of Education pointed out that it is necessary to promote education equity and improve the quality of education through various forms such as "Triple Classroom" (Ministry of Education of China, 2014- 11-24).

In 2016, it was proposed in the "*Thirteenth Five-Year Plan for Educational Information*" to actively promote the construction of "Special delivery classroom " and consolidate and deepen the "Full Coverage of Digital Teaching Resources at Teaching Sites" (Ministry of Education of China, 2016-06-07).

In April 2018, the Ministry of Education issued the "*Education Informatization 2.0 Action Plan*", which pointed out that by 2022, the development goals of "three comprehensives, two highs and one large" will be achieved. In addition, a platform of "Internet + education" will be built to promote comprehensive coverage of online education (The Ministry of Education of China, 2018-04-13).

In March 2020, the Ministry of Education issued the "*Guiding Opinions on Strengthening the Application of 'Triple Classroom*,'" which requires the full realization of "Triple Classroom" by 2022.

After sorting out the relevant policy documents of the Ministry of Education over the years, the issuance of the "*Guiding Opinions on Strengthening the Application of 'Triple Classroom"*" is China's integration of high-quality resource development, education equity, and information technology. The "Triple Classroom" online education poverty alleviation model proposed in the document breaks through the macro-level discussion on how to realize the sharing of high-quality educational resources. Instead,

it focuses on the classroom itself, with the classroom as the prominent position. That is, through the use of information technology to expand the effective mechanism of the coverage of high-quality educational resources, the promotion of educational resource sharing, teacher development, and student development are connected in series to promote the effective closing of regional, urban and rural, and inter-school gaps, and ultimately achieve high-quality and balanced education Ministry of Education, 2020-03-03).

Construction and Application of "SSXY" Online School

There are 21 prefectures, cities, and prefectures in Sichuan Province. Affected by geographical and economic conditions, education development varies across regions, especially in remote areas. Educational resources such as teaching equipment and teachers are relatively scarce, and education is relatively backward. As China vigorously promotes the construction and development of education informatization, high-tech communication equipment and convenient communication channels have become essential to solve the unstable education situation in various regions.

The SSXY online school is a traditional online school based on classroom teaching records of middle schools that emerged under the background of the 1.0 era of China's education informatization[1]. It is an online education platform for Shi Shi Middle School to implement comprehensive education and balance of urban and rural education. It is also a pilot project of the Sichuan Provincial Department of Education for the "Construction and Sharing of High-quality Digital Education Resources" based on the Sichuan Provincial Education Informatization.

"SSXY" was officially launched on September 1, 2013. It actively responds to the national education goal of "three links and two platforms," using the advanced Internet technology to improve the technical architecture of traditional online schools from collection to dissemination and storage to access. It also provides high-quality educational resources and a number of services for the franchised schools. Furthermore, it takes into account the teachers and students of the online classes of participating schools at different levels. Therefore, it has outstanding characteristics such as universality, demonstration, interaction, sharing, economy, sustainability, and ease of use. Furthermore, SSXY adapts to the learning needs of students and promotes the radiation and guidance of high-quality educational resources to areas with weak education.

Specifically, it has the following functions:

Constructed a Network Teaching Application Model Suitable for the Development of Different Schools

SSXY is an organic combination of course output and resource supply. It is a resource and application platform based on general middle school teaching. It can provide vari-

ous services such as synchronous classroom live broadcast, asynchronous course on-demand, synchronous education and research, synchronous evaluation, synchronous training, and synchronous course resources for teachers and students of small schools time. In the SSXY community project research, the application mode of online courses (classroom) is deeply explored. Three practical and practical courses use paradigms, and several typical cases have been formed, namely, resource sharing mode, dual-teacher teaching mode, and intelligent teaching mode.

Different member schools will choose other application models according to their development needs in teacher development, student growth, and teaching quality improvement. For example, as one of the member schools, the No. 2 Middle School of Pidu District, Chengdu, is a local second-level model school in Pidu District. It has a long history, stable development, and exemplary teaching achievements. However, the quality of the college entrance examination (especially the number and rate of critical undergraduates) has always been a bottleneck restricting the further development of the school. Therefore, to improve the quality of students, the school chooses the resource-sharing application mode. Furthermore, with the help of SSXY online open courses, it continuously optimizes the classroom teaching mode and enhances the effectiveness of the classroom.

Among the member schools, most are schools in areas where teaching resources are scarce, represented by Danba County Senior High School and Shishi Baima Middle School. Because of the varying teaching level of school teachers and the poor quality of students, they chose the dual-teaching application model. In this process, teachers with excellent educational experience will share the teaching content in real-time to member schools with weak educational foundations on the network terminal without affecting the typical class. Upload lesson plans, PowerPoint, and videos to the network platform through SSXY to share with other teachers (Nie et al., 2020). Teachers in schools with weak educational foundations are mainly responsible for integrating educational resources and curriculum resources, adjusting teaching according to actual academic conditions, and forming a school-based application model based on their academic requirements.

Abundant Synchronous Teaching Resources Have Been Developed and Constructed.

In terms of resource construction, SSXY integrates teaching tools, subject resources, precision teaching, and wisdom education and develops courses according to the needs of different schools and academic conditions such as region and teaching level. Thus formed the "Six Together" sharing mode, i.e., share together, research together, learn together, practice together, examine together, and analyze together. And a sustainable teacher training program was formed, and the balanced development of education with the supply of high-quality resources was promoted (Xue et al., 2021). At this stage, SSXY online education has achieved the coverage of the entire middle school, including all grades from seventh to twelfth grade. Forty-five middle and high school national

introductory courses and local courses have been built and updated in real-time, and more than 80,000 sets of curriculum resources have been accumulated.

A total of 8 online classes are offered; 42 live courses are covered, with an average of more than 50 daily live courses; nearly 13,000 teaching videos have been generated and got more than 280,000 visits; more than 1,000 interactive teaching and research activities have been carried out, over 50,000 teachers participated; nearly 10,000 copies of teaching resources were generated, and > 250,000 times of resource dissemination and application (Sichuan Sina, 2020).

Clarified the Network Teaching Construction Standards Based on General Middle School Teaching.

SSXY teaching terminal is based on the network high-definition synchronous live broadcast classroom. In addition, each classroom is equipped with several high-definition cameras, audio pickup arrays (including three sets of teacher infrared wireless microphones, student microphones, and spare omnidirectional pickup systems), touch-sensitive interactive teaching all-in-one machines, and other equipment. There is also a standardized interactive teaching and research preparation classroom so that teachers in each course can regularly conduct collaborative, interactive teaching and research with remote teachers.

Established the Implementation Standard of Network Teaching Based on General Middle School Teaching.

The standardization of online classroom teaching based on the general middle school curriculum is an essential factor that affects traditional online school education effectiveness. Therefore, SSXY has determined the direction of standardization in four dimensions.

(i) Standardization of classroom structure. To facilitate remote teachers and students to adapt to the teaching rhythm of the SSXY classroom, each subject combines specific teaching content and strives to create a curriculum structure type with subject characteristics.

(ii) Standardization of classroom teaching. Actively explore the development of efficient classroom teaching, and introduce wisdom education methods to promote the standardization of the online classroom teaching process, enhance classroom teacher-student communication, and improve the efficiency of remote classrooms.

(iii) Standardization of resource format. SSXY provides rich and standardized remote teaching resources such as teaching videos, courseware, exercises, and test questions so that remote teachers can use them flexibly according to the actual situation of students.

(iv) Interactive teaching and research standardization. SSXY teachers and remote school teachers regularly carry out teaching discussions through the network interactive platform to help remote teachers solve how to teach well and how remote students learn.

The Evaluation Feedback Mechanism of All Participants in the Online School Has Been Formulated.

The quality of classroom teaching is the lifeline of an online school and the foundation of a school. Therefore, in teaching evaluation and supervision, it is an essential measure in the evaluation and inspection system to achieve Omnidirectional and multi-channel access to information through classroom evaluation and establish a smooth feedback mechanism to promote online school teaching quality (Dykman & Davis, 2008). Therefore, in response to the actual needs of the participating parties, SSXY Online School has formulated a series of evaluation standards and feedback measures in detail to make the channels for information exchange between each other unblocked and reach a consensus on cooperation with all parties.

Created a Complete Online Network Education Service System.

Online education service is a critical factor in the quality assurance of online distance education. It is also an essential guarantee for the academic success of distance education students. However, due to various reasons, there are still problems such as inadequate understanding of the critical role of online education services, lack of uniform standards for service quality, lagging improvement in facility service capabilities, weak humanistic emotional services, and incomplete learning support service systems (Jiang, 2021). In this regard, SSXY escorts online education in 7 aspects, including user experience and service system construction, teaching resource guarantee, learning situation tracking, teacher training, user care, consultation, and answering, and remote troubleshooting, thus a scientifically complete online education service system was built up.

From the perspective of overall development, SSXY adheres to the development concept of "adhere to in-depth integration, lead educational reform, focus on collaborative advancement, and common service growth" from the construction of synchronized resources to the teaching application model, from the structure of application standards to the establishment of a feedback mechanism. It helps alliance schools develop together in the form of the SSXY community. Of course, its contents are also continuously improved and enriched with the needs of the times and the progress of member schools.

For example, in practice, SSXY adapts to the differences in the actual needs of the development of the community member schools with the in-depth lesson preparation teaching concept and achieves resource co-construction by adding and deleting the

substitute "five preparations," forming a dual-teaching application mode. Thereby, it is critical to adapt to the learning situation of member schools, realize the localization of high-quality resource teaching application, trigger the reform of remote class teaching mode, and promote the balanced development of education through teaching reform. Furthermore, in the face of pandemic-catalyzed personalized online learning for students, SSXY has introduced wisdom classrooms to expand the online and offline teaching and learning of teachers and students with "three ends," forming personalized learning space students. Use data to efficiently and accurately help student growth, teacher development, and school governance, and use technology to empower education and promote balance. The introduction of a wisdom classroom has greatly helped SSXY Community School to realize classroom reform and promote the steady improvement of the quality of education and teaching.

Achievements

Since its establishment in 2013, SSXY has continued to link many remote schools with the curriculum concept of "open sharing, integration, and symbiosis" to form a school development community, a teacher development community, and a student growth community. Finally, teacher development, student growth, school quality improvement, teaching reform, and mechanism innovation have been achieved. After nearly ten years of development, SSXY online school has covered 13 cities and prefectures in Chengdu, 118 member schools, and 246 classes, and benefited over 300,000 teachers and students (Luo et al., 2020).

In the past ten years of development, Shi Shi Middle School has gradually explored an effective educational assistance action plan based on the "SSXY" online school. Relying on financial support, improving infrastructure and school conditions; relying on talents, strengthening teaching training, and improving school quality; relying on social participation, leveraging various forces to help students realize their dreams. Through flexible resource application forms, online schools help students directly improve their academic standards and promote the professional growth of participating teachers and the quality of remote schools.

Empower the High-Quality and Fair Development of Regional Education.

As a public welfare platform for Shi Shi Middle School to implement comprehensive informatization of education and balanced urban and rural education, and as a pilot project of the Sichuan Provincial Department of Education based on the pilot project of Sichuan Province's education informatization of primary and secondary schools, SSXY online school uses the Internet and Big data analysis empowers and strengthens classroom teaching reform. Various delivery methods, including webcast teaching, web-on-demand teaching, and IPTV, have been constructed. Through classroom live broadcasts, remote students can synchronize all teaching links such as listening, practicing, activi-

ties, testing, and guidance in class with Shi Shi middle school students. It enables remote students and Shi Shi middle school students to obtain an undifferentiated high-quality education, realizes the output of high-quality educational resources of prestigious schools, leads and drives weak schools' development, and promotes regional education balance and equity.

It has effectively narrowed the educational gap between regions, urban and rural areas, and schools. To a certain extent, it curbed the "school choice fever," thereby improving the overall educational quality of Chengdu. According to the 2020 "*Annual Report on the Monitoring of Resource Allocation for the Quality and Balanced Development of Compulsory Education in Sichuan Counties*," the results of the basic and balanced development of compulsory education in Sichuan in 2019 have been further consolidated. About 20% of the elementary and middle schools in Sichuan Province have allocated seven indicators to meet the supervision and evaluation requirements. At the same time, the inter-school difference coefficients of 7 indicators[2] for the resource allocation of elementary schools in 15 counties and the inter-school difference coefficients of 7 indicators[3] for the resource allocation of middle schools in 31 counties met the supervision and evaluation requirements (Sichuan Education Monitoring Center, 2020).

Promote the Improvement of the Quality of Member Schools.

Since 2013, using SSXY as a platform, a large number of member schools have been contacted, and a close-knit SSXY online open curriculum practice application community has been formed. Under the leadership of the community, front-end schools (resource-providing schools) have been improved in terms of connotative development, and the quality of education and teaching has been significantly improved. It pays more attention to constructing a digital campus, refines and summarizes the school-running philosophy, implements teaching experience that can be replicated and promoted, and leads the joint development of remote schools (resource application schools). In addition, a large number of small schools have used high-quality network resources to alleviate problems such as shortage of teachers, conflicts between work and school, and insufficient subject allocation. As a result, it not only improves the quality and efficiency of education and teaching but also pays more attention to the organizational reconstruction and process reengineering of the school-running philosophy, management system, and school culture, reshaping the education and teaching ecology, and gradually becoming a leading school of regional education.

Taking the No. 2 Middle School in Handan District of Chengdu as an example, the school uses SSXY online open courses to continuously optimize the classroom teaching mode and enhance the effectiveness of the classroom. In 2018, Pidu No. 2 Middle School ushered in the first college entrance examination for the SSXY online teaching class. As a result, Pidu No. 2 Middle School broke the 100-person mark for the first time, reaching 132 students. In the 2019 college entrance examination, there were 152 students in the first category of Pidu No. 2 Middle School and 500 students in the

second category of undergraduates, reaching 515. In 2020, the college entrance examination rate for undergraduates' first and second categories hit a record high. The Municipal Education Bureau has commended the school for education work for three consecutive years, and the students have developed in an all-around way.

Help Teachers and Students Continue to Grow.

The SSXY community pays particular attention to the improvement of teachers' teaching and research capabilities. A new teacher training model has been created through the combination of the online and offline practical skills learning platform. Leading schools with rich teaching resources, represented by Shi Shi Middle School, radiate their teaching, research, and teaching to small schools in the form of live broadcasts and recording. Finally, the teachers and students of the front-end schools are encouraged to stimulate endogenous motivation continuously and continuously improve the quality of teaching, research, and teaching in the process of self-regulation and self-motivation. Teachers from remote schools have optimized their educational concepts, teaching behaviors, curriculum design, and other abilities through full-time accompanying "remote follow-up" and have become vital teachers in the region. Remote school students have long-term infiltration and influence of the culture, system, value pursuit, and spiritual outlook of the prestigious school by studying online and in the same place as the front-end students. As a result, the overall quality of students has been improved, the norms of behavior and values have been reshaped, and cultural confidence and quality have been cultivated.

Taking Shishi Baima Middle School as an example, the school has innovated and perfected the SSXY online open curriculum resource co-construction and sharing model; the participating teachers have found professional development through subject research. Among them, 30 participating teachers have achieved significant professional growth performance, and seven participating teachers have won awards in various essay competitions at all levels. The academic performance of online class students has also continued to improve. Under the influence of the high-quality resources of SSXY online open courses, the college entrance examination scores have been continuously improved. By 2020, the undergraduate rate of online classes will reach 97%.

In the wave of "Internet + Education," SSXY Online School uses the platform as a carrier to join hands with schools in remote areas and areas with weak education in Chengdu to form a collaborative community of distance teaching, teaching, and research. The advantages of network big data resources use network media to realize large-scale and flat disseminating excellent educational resources. In practice, a balanced and high-quality development model of the entire school period, full time and space, full coverage, and normalization has been gradually established so that excellent educational resources can move from the elite to the masses, batch to individualization and closed to open. It provides an effective path for promoting the sharing of high-quality resources, assisting education-targeted poverty alleviation, and blocking the intergenerational transmission of poverty. As a result, it has become a very distinctive and

effective regional sample in the targeted poverty alleviation model of online education in China.

Notes

1. *The education informatization from 2000 to 2016 was called the 1.0 era. At this stage, the construction of education informatization has received full attention. For example, through the promotion of the "School-School Link" project, "Agricultural Distance Project," "Three Links and Two Platforms," and other projects, 90% of elementary and middle schools nationwide were connected to the Internet, 83% of classrooms were multimedia classrooms and more than 6,300 online learning spaces for teachers and students. Thus, an environment for teaching and learning based on the Internet is gradually being built, and digital education resources are greatly enriched.*
2. *The seven inter-school resource allocation indicators are the seven indicators for the evaluation of inter-school resource allocation in the "County Compulsory Education Quality and Balanced Development Supervision and Evaluation Measures" issued by the Ministry of Education in 2017, including the number of teachers with academic qualifications shall be 4.2 or more and 5.3 or more in elementary and middle schools respectively; the area of sports venues per student shall be more than 7.5 square meters and 10.2 square meters in elementary and middle schools respectively; the value of teaching equipment and equipment per student shall be in elementary and middle schools. They reached above 2,000 CNY and 2,500 CNY or more. The "Methods" requires that at least six indicators of each school meet the above requirements, and the rest cannot be less than 85% of the requirements.*
3. *The coefficient of inter-school difference is also called the coefficient of variation or the dispersion coefficient, which is the ratio of the standard deviation of a set of data to its mean. The larger the coefficient of difference, the greater the degree of imbalance between schools within the county; on the contrary, the smaller the coefficient of contrast, the smaller the degree of inequality between schools within the county. According to the requirements of the Supervision and Evaluation Measures for the Quality and Balanced Development of Compulsory Education in County Areas, the inter-school difference coefficients of all indicators for each school are ≤ 0.50 for elementary schools and ≤ 0.45 for middle schools.*

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