

Education

Digital Technology-Enabled “Three-Level Chain of Digital Education Communities” in Southwest Guizhou Autonomous Prefecture[¶]**Jiliang Huang^{*}**

Educational Technology Center of Southwest Guizhou Autonomous Prefecture, Southwest Guizhou Autonomous Prefecture 562400, Guizhou, China

^{*}: All correspondence should be sent to: Jiliang Huang[¶]: This study is a research outcome of the project of “Developing Educational Technology-Enabled, Cross-Eastern & Western China Digital Education Communities under the Leadership of the Ethnic Education Development Center of China’s Ministry of Education.”*Author’s Contact:* Jiliang Huang, E-mail: 284868738@qq.com*DOI:* <https://doi.org/10.15354/si.24.re1112>*Funding:* No funding source declared.*COI:* The author declares no competing interest.*AI Declaration:* The author affirms that artificial intelligence did not contribute to the process of preparing the work.

In the context of the accelerated development of information technology, digital education provides new impetus for further modernizing education, driving the improvement of educational equity and quality. Currently, how to improve the quality of education in underdeveloped ethnic minority areas is a pressing issue faced by China in its efforts to develop a balanced basic education. The digital transformation in education has the potential to bolster the overall standards of minority education by changing the traditional teaching methods and environment, increasing the accessibility of high-quality educational resources, and promoting teacher professional development in minority regions. This article focuses on expounding on Southwest Guizhou Autonomous Prefecture’s experimentation with the “three-level chain of digital education communities” program, which aims to promote the sharing of high-quality educational resources with the help of digital technology to propel the modernization of ethnic minority education in China.

Keywords: Digital Education; Minority Education; Southwest Guizhou Autonomous Prefecture; Three-Level Chain of Digital Education Communities

Science Insights, 2024 November 30; Vol. 45, No. 5, pp.1655-1659.

© 2024 Insights Publisher. All rights reserved.



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the [Creative Commons Attribution-NonCommercial 4.0 License](https://creativecommons.org/licenses/by-nc/4.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed by the Insights Publisher.

Introduction

BALANCED development of high-quality education is a high priority in China’s education modernization agenda. Ethnic minority education, an integral part of the national education system, not only has direct effects on the growth of minority children and the inheritance and develop-

ment of ethnic culture but also poses considerable impacts on the overall modernization progression of the nation’s education (Liu, 2020). In effect, the modernization of ethnic minority education has not proceeded as smoothly as expected. Due to geographical and economic constraints, ethnic minority regions in China have had a lower level of social development than their

eastern and central counterparts, leading to their significantly lower level of education and acute shortages of educational resources. Pronounced issues with minority education in China include inadequate educational infrastructure, funding, and talent supply (Qin, 2019). To further complicate the situation, minority regions in China are facing a paradox in education: they must morph their schools into modern, standardized ones in response to the national goal of developing balanced compulsory education; in the meantime, they need to react to the new trend of providing individualized instruction to children (Liu, 2023).

Luckily, the rise of educational technology can serve as an impetus to minority education improvement (He, 2011). In the era of information technology (IT), ethnic minority education has the opportunity to take a big leap forward by building digital education environments to integrate information technology (IT) into school instruction (Guo, 2020). Digital technology is of vital significance for the balanced development of minority education because of its capability to facilitate the sharing of high-quality educational resources among schools across the country. The purpose of Southwest Guizhou Autonomous Prefecture's engagement in the "three-level chain of digital education communities" program is to leverage IT to support the balanced distribution of educational resources and enhance the regional education across the board. The value of this endeavor is twofold: to provide evidence for research on ethnic minority digital education and to establish a practical, demonstrative example for the digital transformation of minority education.

The Background of the "Three-Level Chain of Digital Education Communities"

Southwest Guizhou Autonomous Prefecture, also known as Bouyei and Miao Autonomous Prefecture, is situated in the southwest of China's Guizhou Province and is predominantly inhabited by Bouyei and Miao people. It is one of the targeted regions in the national poverty alleviation project and the western China development project. Due to its special geographical circumstances and unbalanced economic development, the prefecture suffers significant disparities in educational standards between various areas, with particularly severe gaps in student performance and teacher professional competence between its urban and rural schools. Despite the schools' efforts to narrow the gaps through cooperative teaching research, collective lesson preparation, and other collaborative activities, the effects of the inter-school communication remain insignificant without the engagement of leading teachers and educational specialists (Chen, 2017).

In response to the state's IT development strategy, Southwest Guizhou Autonomous Prefecture formulated its action plan for developing digital education in the region in 2013, specifying developmental objectives and tasks, and subsequently completed the infrastructure project named "Three Links and Two Platforms" as mandated by the state policy through government-business, school-business, and inter-school collaboration (Liang, 2020). The "Three Links" refer to the school's connection to a broadband network, the class's connection to outstanding teaching resources, and the individual's connection to an online learning space. "The Two Platforms" refers to the na-

tion's administration and public educational resource platforms. In 2020, the prefecture was designated as the "intelligent education pilot zone" for ethnic minority digital education development in China. Under this project, the experimental schools, experts, and businesses in the prefecture worked together to develop state-, provincial-, and prefecture-rank exemplary schools, continuously driving the regional development of digital education (Yang, 2022).

As a result of moves like these, Southwest Guizhou Autonomous Prefecture witnesses a noticeable rise in the average years of education among its population, ongoing popularization of compulsory education, steady increases in educational investment, and substantive improvement in public education service (Ni & Zhang, 2022). Yet, the prefecture's educational development is not without problems (Huang, 2022). First off, the educational gaps, physical and pedagogical, between the prefecture and developed regions in China are increasingly expanding. Minority regions have a low utilization of digital facilities deployed, let alone technology-driven fundamental transformation of education. On the other hand, education in eastern China is experiencing expedited upgrading because of its good use of educational technology. These factors result in the emergence of a "new digital divide" (difference in the capacity to apply digital technology), even though the original "digital divide" (difference in the access to digital technology) has been substantially narrowed. Moreover, as opposed to developed regions in China, which have a continuous inflow of teachers with rich experiences and professional competence in student cognitive and non-cognitive development, the Southwest Guizhou Autonomous Prefecture has suffered the chronic shortage of qualified teaching staff, which largely hampers the growth and development of minority students in the region. Although the central educational authorities have worked to bridge the gap in teaching staff quality between eastern and western schools by encouraging the former to provide teacher training to the latter, this type of region-on-region assistance has been irregular, mainly taking place in summer vacations. Therefore, there is a need for a transition to more systematic, regularized inter-regional teacher support action. Furthermore, the issue of the uneven distribution of educational resources within the prefecture is also stark. The majority of high-quality teachers in the prefecture concentrate on the schools in Xingyi City, the capital city of the prefecture; few of them would choose to work in county-level or rural schools. The scarcity of high-quality educational resources is particularly severe in the prefecture's remote rural areas, where the schools have insufficient funding due to the local backward economy. These issues are unlikely to be resolved by the educational communities of the prefecture alone; instead, they necessitate policy intervention by the state.

The "Three-Level Chain of Digital Education Communities" Program

To explore more effective mechanisms for supporting educational development in western China, Southwest Guizhou Autonomous Prefecture and the Ethnic Education Development Center (EEDC) of China's Ministry of Education jointly initiated the project of "Promoting Digital Technology-Enabled High-Quality Development of Ethnic Minority Education" and

released an action plan for this project (Huang, 2023).

Preparations for the “Three-Level Chain of Digital Education Communities” Program

The EEDC raised the construct of the “Three-Level Chain of Digital Education Communities” in a February 2022 forum. The model entails schools at three levels: top-level schools (privileged schools), middle-level schools (ordinary schools), and bottom-level schools (disadvantaged schools). Top-level schools act as the leading schools or resource-output schools, transferring their top-notch educational resources to middle-level and bottom-level schools via digital platforms. Middle-level schools, as bridges between the two groups of schools, assimilate the assistance from the top-level schools first and transmit it to bottom-level schools, while bottom-level schools enhance their quality of education by active engagement in the program and contribute to the functioning of the model by constant feedback (Xian, 2023).

In April 2022, the EEDC hosted a preparatory meeting, setting a task force to lay out the schemes for the enactment of the “Three-Level Chain of Digital Education Communities” program. In June 2022, another two meetings were held to advance the progress of the program, announcing the initiation of cooperation between the EEDC and Southwest Guizhou Autonomous Prefecture. To develop the implementation paths for the program, the EEDC designated the prefecture as the pilot zone before introducing it to other ethnic minority regions. In September 2022, the EEDC gathered a group of specialist principals together to research the optimal implementation pathways of the program. In March 2023, a detailed progression plan was released to ensure the orderly execution of the program in the ensuing year.

Southwest Guizhou Autonomous Prefecture’s Pilot Project

Before the initiation of the “Three-Level Chain of Digital Education Communities” program in Southwest Guizhou Autonomous Prefecture, the task force under the leadership of the EEDC conducted an extensive field investigation in schools in eastern provinces and cities, such as Beijing, Shanghai, Zhejiang, Shenyang, Hangzhou, Suzhou, Nanchang, and Shenzhen, and the western regions, including Guizhou, with the aim of gathering successful digital education experiences of those schools in the eastern regions and exploring the mechanisms for developing cross-regional digital education communities.

The task force managed to attain a thorough understanding of the respective strengths and weaknesses of these schools through on-site investigations, baseline surveys, symposiums, interviews, and other means. It also investigated the willingness of developing digital education communities in various schools as well as issues like expected outcomes and funding guarantees. Special attention was paid to discerning the complications faced by the minority schools in the digital transformation of education, and workable recommendations were proposed in accordance with their actual circumstances. The task force selected 17 prestigious schools from developed, eastern regions as the resource-output institutions, which would transmit their high-quality educational resources to 10 prefecture-level schools;

the latter would, in turn, transfer them to 30 underprivileged schools (resource-recipient schools) in the prefecture. Research activities like these laid the groundwork for the prefecture’s smooth implementation of the “Three-Level Chain of Digital Education Communities” program.

An illustrative example of this three-level digital education community is the prefecture’s pilot project involving four schools: Wenyi No. 2 Primary School in Shenyang City’s Shenhe District (the resource-output school), Hongxing Primary School in Xingyi City (the prefecture-based intermediate school), and Zhelou Central Primary School and Yangba Ethnic Primary School in Ceheng County as resource-recipient schools. This link-by-link transmission pattern ensures the effects of resource sharing, giving optimal play to the digital education community.

Such a digital education community is based on a combination of “online communication” and “offline in-person interaction.” The leading school (the resource-output school) from eastern China develops precision support schemes to upgrade the educational standards of the middle-level school, which, in turn, transmits their experiences and expertise to grassroots underprivileged minority schools to make up for their weaknesses (Huang, 2023). In June 2022, Fang Zhang, deputy principal responsible for Wenyi No. 2 Primary School’s teaching management, paid a visit to Hongxing Primary School in Xingyi City to officially initiate the program. The latter’s principal visited Zhelou Central Primary School and Yangba Ethnic Primary School in Ceheng County in July 2022. After in-depth exchanges of ideas, the leadership of the four schools reached agreement on the objectives and strategies for the development of the community in the next three years.

The objectives of the pilot project are threefold: to develop a learning, research, and school development community; to develop an online-offline blended model for collaborative teaching research with specific instruments and workable procedures; and to propel governance upgrading of underprivileged minority schools and bolster their quality of education and instruction (Huang, 2024). The project’s “online communication” includes “double-teacher classroom” instruction, online cooperative teaching research, and online sharing of educational resources. Its “offline in-person interaction” includes activities like face-to-face exchanges between teaching staff in the community and on-site teaching mentoring (Huang, 2023).

Wenyi No. 2 Primary School’s management paid three visits to Hongxing Primary School in the prefecture’s capital to conduct on-site investigations and provide teacher training directions. They also helped the school develop its distinctive curriculum program and campus culture by tapping into its century-long history and local cultural resources. In the meantime, Hongxing Primary School provides demonstration lessons and in-service training to teachers from disadvantaged schools as regularly as scheduled. With Hongxing Primary School’s help, Zhelou Central Primary School began its “double-teacher classroom” (a class taught by an on-site teacher and an online anchor instructor) program in September 2022 for subjects of Chinese language, mathematics, and English in the 2nd, 3rd, and 4th grades. Observers of the “double-teacher classroom” instruction, including education researchers from all cities and counties in the prefecture and principals and teachers from other schools,

acclaimed it as a practicable, reproducible instructional pattern, emblematic of the value of the digital education community. As the pilot project advanced, the two schools, as its pivotal links, increased their investment in digital facilities, with each adding a four million CYN input to establish an online teaching platform, which enables their students to learn at any time in any place. Also, they helped Yangba Ethnic Primary School enhance its quality of teaching by introducing the “double-teacher classroom” model into its in-class instruction (Huang, 2023).

In addition, Wenyi No. 2 Primary School and Hongxing Primary School worked together to develop a teaching research paradigm dubbed “12345 collaborative teaching research model,” which is centered around the goal of “advancing high-quality development of ethnic minority education leveraging educational technology,” uses the two avenues of online and offline co-research, focuses on three types of research organization including the “micro-project alliance,” the “subject-based collaborative research group,” and “theme-based concurrent research,” employs the four research paths including “distance modeling,” “lesson honing through different approaches,” “double-teacher classroom instruction,” and “on-site diagnosis,” and involves five groups of personnel including teachers at the experimental classes, subject-specific teachers, anchor teachers, specialists, and dedicated project coordinators. Through collaborative teaching research, Hongxing Primary School succeeded in learning valuable lessons from Wenyi No. 2 Primary School regarding school management, school culture building, teaching research, and pedagogical methods. It drew on the prestigious school’s philosophy of education and generated its own education approach in a creative manner to ensure sustainable development. Subsequently, it introduced the “12345 collaborative teaching research model” into its cooperation with the lower-level schools in the digital education community and adapted it to the actual needs of those schools (Huang, 2024).

Ongoing is the community’s exploration of new cooperative models amid the advancement of the pilot project and common development of all schools in the community. “CPR-MIC intelligent precision teaching research” and the “1+1+N double-teacher classroom” are currently in experimentation.

The community deems that the purpose of teaching research organization and management is to heighten the teaching competences of all teachers and their capacity to analyze and solve problems as a team and that intelligent precision teaching research can make the activity more targeted, in-depth, and visually represented as well as making its process standardized, explicit, and traceable. Hongxing Primary School plays a lead-

ing role in developing the classroom data-based CPR-MIC intelligent precision teaching research model. CPR-MIC stands for creation, practice, reflection, modification, innovation, and continuation. At present, 2894 lesson studies, 334 scale-based reports, 445 teaching research papers, and 3957 resource items are accessible on Hongxing Primary School’s digital platform, constituting substantive data backing for the community’s research practice.

“1+1+N double-teacher classroom” refers to a classroom modality where a leading teacher from a resource-output school (e.g., Wenyi No. 2 Primary School) acts as the online anchor teacher with a teacher from an intermediate school (e.g., Hongxing Primary School) being the on-site tutor, and the middle-level school reproduces this pattern in its cooperation with the bottom-level resource-recipient schools. This modality is more effective in sharing educational resources and promoting balanced development of minority education compared to the conventional “double-teacher classroom” instruction because it can make fuller use of the resources of those advantaged schools. So far, there have been 255 sessions of “double-teacher classroom” instruction jointly sponsored by Wenyi No. 2 Primary School, Hongxing Primary School, Zhelou Central Primary School, and Yangba Ethnic Primary School, benefiting over a thousand minority students. More than 100 local teachers improved their instructional competence as a result of their engagement in this practice (Huang, 2023).

Conclusion

The digital transformation of education has become a significant driving force for the modernization of basic education in ethnic minority regions. Powered by digital technology, the “three-level chain of digital education communities,” a program combining top-level design and grassroots endeavors, has the potential to enhance the educational quality and equity for ethnic minorities by improving the sharing of educational resources across the board and promoting optimal distribution of high-quality teaching resources.

The “three-level chain of digital education communities” acts as a valuable communication platform for teachers in eastern and western China, transmitting and adapting superior classroom culture to remote minority areas, promoting common development within the educational community, and reaching precision educational assistance. The establishment of digital education communities engaging various levels of schools is conducive to the realization of a shared learning environment without spatial boundaries, making digital dividends a genuine benefit to minority children in remote and border areas. ■

References

Chen, B. (2017). Center and margin: The development of ethnic minority education in southwest Guizhou. *Tribune of Education Culture*, 9(05):117-122. DOI:

<https://doi.org/10.15958/j.cnki.jywhlt.2017.05.024>
Guo, Y. (2020). Bridging the gaps in education in ethnic minority regions by accelerating digital education

- development. *Chinese Ethnic Education*, 2020(2), 20-22. DOI: <https://doi.org/10.16855/j.cnki.zgmzjy.2020.02.010>
- He, K. (2011). Latest developments in digital education research in China. *China Educational Technology*, 2011(1), 1-19. Available at: https://kns.cnki.net/kcms2/article/abstract?v=Nyg97wmOeE5ce-u7YIPV3wXTGMvsf0Gsk-kh5At3wSWoTlnSX6foZ4XFbrQM9iaPFop-SRE_sC0O6oUIHdDF4rkapowbB1RAUvMfOfpCheGkn_mrNCVsj49lo7vrl4MCGBbpq9k-mT33ksb2l9lnQtybY-FtH1Q4-Sx7_gMINN12Ca7jacPelvWA_Hi945o&uniplatform=NZKPT&language=CHS
- Huang, J. (2022). Improving minority education in China in the “Internet plus” era: A case study of Southwest Guizhou Autonomous Prefecture. *Science Insights Education Frontiers*, 12(2), 1749-1757. DOI: <https://doi.org/10.15354/sief.22.or063>
- Huang, J. (2023). Educational technology-enabled “three improvements” in education. *China Ethnic Education*, 2023(4), 40-42. DOI: <https://doi.org/10.16855/j.cnki.zgmzjy.2023.04.016>
- Huang, J. (2024). Make good use of the national “Smart Primary and Secondary Education of China” platform to promote high-quality development of education in ethnic minority regions. *China Ethnic Education*, 2024(5), 39-41. DOI: <https://doi.org/10.16855/j.cnki.zgmzjy.2024.05.010>
- Liang, X. (2020). Leveraging educational technology to advance education modernization and educational development in ethnic minority regions. *Ethnic Education in China*, 2020(2), 28-30. DOI: <https://doi.org/10.16855/j.cnki.zgmzjy.2020.02.014>
- Liu, J. (2023). Paths for improving educational quality and equity in ethnic minority regions: Based on the perspective of digital education. *Journal of Yunnan Minzu University (Philosophy and Social Sciences Edition)*, 40(2), 44-51. DOI: <https://doi.org/10.13727/j.cnki.53-1191/c.20230302.002>
- Liu, X. (2020). Precision poverty alleviation through education for ethnic minorities in border areas: The mission, challenges, and strategies. *Education Science*, 36(4), 70-75. Available at: https://kns.cnki.net/kcms2/article/abstract?v=Nyg97wmOeE5CeXv6QNWAnmq17ireGrHS3Qucl5zcQ4S2P_uXv6DrNV0swfsDwwdk6EOxsPq4z4aWvYXze_xGO5im1zsbw9zDMDB2unZZ8H1_j7tyFA0_KOKg_WQxLT2bnVK64du7X_emZb8vjJyIfY5JDLq2U0Vyb4wxBK_RVmOuz8KedxUwhjEwco2jWTYhubtRSpgRJGeo=&uniplatform=NZKPT&language=CHS
- Ni, S. & Zhang, L. (2022). *Development through Educational and Cultural Improvement in Ethnic Minority Regions in Southwest China*. Beijing: People’s Publishing House.
- Qin, Y. (2019). *The Development of Equitable Education in Ethnic Minority Regions* (Doctoral Dissertation). Guangxi Normal University. DOI: <https://doi.org/10.27036/d.cnki.gqxsu.2019.000282>
- Xian, Y. (2023). Building a new ecosystem for digital education development in ethnic minority regions. *China Ethnic Education*, 2023(4), 33-36. DOI: <https://doi.org/10.16855/j.cnki.zgmzjy.2023.04.011>
- Yang, H. (2022, June 20). Driving the construction of intelligent-education experimental zones and pilot schools to support the high-quality development of education in ethnic minority regions. *Southwest Guizhou Daily*. pp. 001. DOI: <https://doi.org/110.28636/n.cnki.nqxn.2022.001897>

Received: September 16, 2024 | Revised: October 15, 2024 | Accepted: October 23, 2024
