ORIGINAL ARTICLE

Improving Minority Education in China in the "Internet Plus" Era: A Case Study of Southwest Guizhou Autonomous Prefecture

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***Abstract**: Southwest Guizhou Autonomous Prefecture has been at the forefront of developing digital education for China's ethnic minorities. The prefecture uses the Jinzhou Educational Cloud Platform, which is based on improved digital infrastructure, to improve teachers' digital instruction competencies, raise school precision management levels, and promote inter-school collaboration and sharing of high-quality educational resources. In this study, we examined the prefecture's paths to developing internet- and IT-enabled minority education and described their successes to provide insight into the deep integration of information technology and education in minority regions.*

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SOUTHWEST Guizhou Autonomous Prefecture is situated in the southwestern portion of China's Guizhou Province and is predominantly inhabited by Bouyei and Miao people. Due to its disadvantaged geographical and economic conditions, the prefecture's counties and districts have an extremely unbalanced education; the most pronounced issue is the significantly lower academic level of students and the poor quality of instruction of teachers in rural schools compared to those in urban schools. To alleviate poverty through education in impoverished ethnic minority areas, the educational community of the prefecture has been experimenting with new teaching, learning, and educational research models driven by the "Internet Plus" initiative and creating new avenues for minority digital education. In a bid to overcome the inter-regional, urban-rural, and inter-school education gaps, educational authorities, specialists, businesses, and other organizations have collaborated to develop high-quality online education tools for kids in rural and impoverished minority communities. This study looked into how much money Southwest Guizhou Autonomous Prefecture put into digital education for ethnic minorities and what kind of results they got. The goal was to help guide the development of high-quality primary and secondary education in minority areas.

The Status Quo of Minority Education in Southwest Guizhou Autonomous Prefecture

The Difficulty of School Enrolment and Weak Learning Awareness among Minority Students

Many ethnic minorities in Southwest Guizhou Autonomous Prefecture live in mountainous areas with harsh natural conditions and inconvenient transportation, and they continue to rely on backward production methods with low productivity. A significant proportion of families earn only a few thousand RMB per year and are barely able to support their children through primary school. Paying for their children's secondary and higher education is too much of a burden for such families, and many of them are forced to drop out (Hu, 2019).

Every ethnic minority has its own written language and Pinyin scheme, which makes it difficult for them to learn modern disciplinary knowledge, which is primarily represented in Chinese. For minority students who know little Chinese, learning Chinese entails not only learning a new pronunciation system but also accepting a new way of thinking. If the learning processes are overly complicated, teaching in Chinese may cause academic fatigue in minority students. So, the education department should move

quickly to create bilingual teaching systems for minority students so they can use their own languages to figure out what Chinese words mean.

Minority students often don't care about learning and don't realize how important school is. This is a common problem in ethnic groups that, over time, could become a bigger social problem and threaten the stable growth of minority regions and the country as a whole.

Teacher Shortages in Minority Schools

Due to their backward social development, underdeveloped economy, and low pay and compensation for teachers, minority regions have difficulty recruiting and retaining front-line teachers and normal university graduates, let alone those with excellent education backgrounds and professional levels. In minority schools, there is a high turnover of young teachers; Bianzhi (a system of publicly funded posts in China) memberships and public funds for schools are insufficient; and aging staff is an additional barrier to instruction upgrading and educational quality improvement. In some extreme cases, "all-mighty teachers" teach multiple subjects in minority schools that lack PE, music, and art teachers. Problems like these harm the quality of minority education and the overall development of students.

Despite the fact that the state has established multi-level bodies (from central to local) for minority education administration, there is no systematic minority education administration mechanism in place, resulting in an ambiguous division of responsibility. For example, some science and engineering colleges and universities in Guizhou Province have established minority student-specialized classes in recent years, but no educational authorities have attended to their operation and funding.

Minority Culture Transmission Impeded

In contrast to modern organized education, the educational methods ethnic minorities employ to convey their traditional cultures are often informal and discretionary. The majority of minority cultures are transmitted orally through national epics, folk music, production skills, and religious rites. These educational materials are natural and important to the everyday lives of minority groups, but they are rarely written down, which makes it hard to use them in textbooks (Liu, 2010).

The percentage of ethnic minority students who are skilled in their native language and culture is declining as a result of the absence of minority culture in textbooks and the popularity of Han nationality culture. The new generation of urban ethnic minorities in Southwest Guizhou Autonomous Prefecture has become indifferent to their national traditions; they are only aware of their minority identity when requested to identify their ethnicity when filling out forms. Even though there are many reasons why minority cultures are dying out, the main reason is education that focuses on the Han nationality.

The Paths of Digital Education Development in Southwest Guizhou Autonomous Prefecture

To solve the aforementioned issues, the educational community of the prefecture draws on the digital education experience of other regions and employs educational technolo-

gy to promote the modernization of minority education. Their method is also an important experiment in using digital education to help poor minority areas that are far away and have few resources.

Accelerating the Construction of Digital Facilities

The Strategic Cooperation Agreement for the Construction of Educational Big Data Cloud Platform in Southwest Guizhou Autonomous Prefecture was signed on March 2, 2016, by the National Center for Educational Technology, the Guizhou Provincial Department of Education, the People's Government of Southwest Guizhou Autonomous Prefecture, and China Telecom Guizhou Branch, ushering in the nation's public educational resource platform into the prefecture's basic education. Since then, digital infrastructure has been updated so that the prefecture's schools may make use of vast amounts of instructional data. The Jinzhou Educational Cloud Platform, which assembles top-notch online resources and apps based on cloud computing technology to offer complete services for schools, instructors, students, and parents, is the most extensively utilized big data service supported by the prefecture government. Southwest Guizhou Autonomous Prefecture has constructed a dedicated education cloud line with a bandwidth of 10G, 328 sets of live recording and broadcasting systems, 20 maker classrooms, and 26 digital laboratories in order to successfully execute the technology-powered teaching model. All elementary and secondary school students have easy access to smart teaching platforms and the internet (Huang, 2022).

Strengthening Teacher Training with the Support of Educational Technology

Southwest Guizhou Autonomous Prefecture uses educational technology to advance teacher preparation in an effort to address the uneven distribution of human resources across minority schools. Front-line anchor teachers have dedicated their time to developing "Exemplary Classrooms," or online live broadcasting classes, with the help of the Jinzhou Educational Cloud Platform in order to make top-notch courses, anchor teachers' lectures, and prestigious schools' classrooms accessible to underprivileged minority schools so that teachers in isolated locations can receive distance training on course planning and teaching methods without leaving their schools (Wei, 2017). Additionally, the prefecture's Bureau of Education launched an online mentoring program to form teaching research teams online in an effort to eliminate geographic barriers in teacher preparation. Each team uses the online platform to carry out research activities such as group lesson planning, exemplary lesson demonstration, and project-based research. Each team consists of seven senior instructors, over 20 regular teachers, and one anchor teacher. Thanks to the integration of teaching research and training, minority teachers from rural areas that aren't as well off can learn from senior and guiding teachers from other schools and improve their professional skills (Ethnic Education Development Center of China's Ministry of Education, 2022).

Encouraging Inter-School Sharing of High-Quality Educational Resources through Cyberspace

Rural education has been widely recognized as a governance weakness in the Southwest Guizhou Autonomous Prefecture, and educational disparity and inequity have been significant obstacles to its overall growth. In this context, the prefecture established the following objectives in its efforts to develop digital education: to reduce the inter-regional, urban-rural, and inter-school digital divide; to innovate new learning methods and teaching models; and to use big data platforms to collect massive quantities of high-quality educational resources. In order to foster cross-regional and inter-school collaboration, the application of the Jinzhou Educational Cloud Platform was initially tested and then widely pushed in the prefecture. Since 2019, the prefecture has implemented a series of educational technology-supported inter-school collaborative and interactive programs, such as the distance education support, anchor teacher mentoring, and resource sharing programs; a plan titled "Six Norms" has been implemented among all schools to standardize their management service, facilities construction, teaching content, teacher training, and testing and evaluation; and an intelligent assimilation system has been established to cover schools of all types, at all levels. To promote its educational association with eastern China, the prefecture utilizes IT-based platforms to establish partnerships between rural schools in Southwest Guizhou Autonomous Prefecture and schools in Ningbo City, Wuhan City, Guangdong Province, and other regions for paired partnerships and coordinated development, so that rural minority students in the prefecture can share the high-quality teaching resources in the nation's developed regions (Huang, 2022).

Modernizing School Administration

The Jinzhou Educational Cloud Platform provides information about staffing, student enrollments, and current educational resource distribution for all levels, grades, and disciplines. Educational administrators and schools in the prefecture can use this data to manage teaching, educational research, and teacher training. On the platform, school administrators can display all types of operational information, facilitating information disclosure and oversight of school operations (Liu & Liu, 2017). Using the digital platform, administrators may handle papers online, making office labor largely paperless and automated and enhancing the efficiency of school administration. Online disclosure of school curriculum development, teaching progress, tests and exams, education evaluation, as well as teacher education research and student academic quality allows schools to make changes to how they teach and how well their students do in school.

Outcomes of Digital Education in Southwest Guizhou Autonomous Prefecture

Powered by the internet and information technology, education in Southwest Guizhou Autonomous Prefecture has made great strides and maintained consistent growth in recent years. The prefecture has effectively narrowed the educational gap between ethnic minorities and Han citizens.

Upgraded Digital Facilities in the Prefecture

Southwest Guizhou Autonomous Prefecture seized the opportunity for the growth of digital education and constructed a comprehensive infrastructure by integrating the re-

sources of all parties concerned. It spent more than 5.4 million RMBs upgrading the education and teaching management software from version 6.0 to version 7.0; more than one million yuan was invested in the Third-rank Network Security Protection System (ranked protection refers to the hierarchical security protection administered to the online storage, transmission, and processing of the nation's confidential information and proprietary information of organizations, legal persons, and citizens in accordance with the National Information Security Law). In China, there are five ranks of protection. The higher the rank, the stricter the rules. The prefecture spent 2.8 million RMBs each year to move the Teaching Quality Monitoring and Diagnosis and Online Marking Systems to a cloud server so that more than 1,000 schools could be marked online at the same time (Yang, 2022).

Importantly, as a result of the successful construction of "Three Links and Two Platforms" in Guizhou Province, the digital infrastructure of the minority school in the prefecture was upgraded while the cost of the school's internet connection was drastically reduced; the school's internet connection was technically improved to ensure that a gigabit-class link was accessible on campus and that teachers had sufficient technological support for their intelligent teaching (Yu, 2022). Currently, the prefecture's educational cloud platform has a download capacity of 3T (or 3000GB), with more than 1.39 million pieces of learning materials supporting all subjects at the basic education level, nearly 16 online elective courses for general high school students, and more than 130,000 pieces of theme-based or specialized learning materials. Therefore, the online platform has become an essential learning environment where professors and students can engage in IT-enhanced teaching and learning activities. Test results reveal that the system has superior longevity and dependability, allowing for 5,000 hours of uninterrupted operation and extensive online education. More than 50,000 instructors and 700,000 students at over 1,700 schools in the prefecture benefit from a system that teaches them how to use information technology to improve teaching and learning outcomes (Huang, 2020).

Improved Academic Quality and Enrolment Rate of Minority Students

Southwest Guizhou Autonomous Prefecture's use of an educational cloud platform has altered the traditional teacher-centered instruction model and introduced new educational ideas within the framework of "Internet plus education," which has improved student learning interests and outcomes and increased teachers' awareness of teaching research. The prefecture established a task group for digital education to encourage the use of educational technology and offer technical training to all teachers and students so they can fully utilize digital resources and the internet to improve teaching and learning effectiveness. The results of a survey by Peng et al. (2019) show that after the prefecture's educational cloud platform was implemented, the experimental class at Ceheng Minority Secondary School's average score climbed by 20.23 points and its pass rate increased by 42.5%. The experimental class at Xingyi No. 3 Secondary School saw an average score rise of 9.58 points and a pass rate improvement of 21.54%. The experimental class at Zerong Secondary School saw a nearly 28-point gain in average score. The way that students learn has fundamentally changed from being "passive" to being "pro-active" at the same time.

In addition, the educational administrators of the prefecture have established an IT-assisted early-warning system through which teachers can promptly report students with a high risk of dropping out, and communities conduct comprehensive investigations of the population aged 6 to 16 to ensure that all children are retained in school and receive compulsory education. Currently, the enrollment percentage of primary school-aged children in the prefecture has risen to 99.6%, and the enrolment rate of school-aged girls has reached 99.4%; almost all junior secondary school-aged adolescents are enrolled in schools. Significant progress has been achieved by the prefecture in reducing teen illiteracy (Hu, 2019).

A Balanced Distribution of High-quality Educational Resources

Southwest Guizhou Autonomous Prefecture has developed a resource sharing model that links the urban core school with rural schools and nearby teaching sites in the same county to support educational equity based on the lessons learned from its trial projects in four cities and counties. Jinzhou Educational Cloud Platform developed online collaborative teaching patterns like the "double-teacher classroom" (taught by one on-site teacher and one online anchor teacher) independent of geographic boundaries so that students at underprivileged schools could profit from the top-notch classroom instruction of anchor teachers at prestigious institutions. Through the cloud platform, more than 300 classes in 21 regular high schools in the prefecture have used materials from esteemed institutions; online classrooms have also been used for distance learning and coaching focused on college entrance exams. As a result, between 2015 and 2017, the prefecture's overall undergraduate admissions went from 8,858 to 10,710, the rate of first-rank university admissions increased from 9.79% to 13.85%, and the number of applicants with scores above 600 rose from 255 to 459 in the same period. Additionally, a more even distribution of high-scoring applicants was seen across the prefecture (Wei, 2017). These numbers show that digital education can give kids in schools with few resources a chance to do well in school and can greatly improve educational equity in ethnic minority areas.

Educational Technology-Enabled Transmission of Minority Cultures

Minority cultures are preserved and transmitted through educational technology, which also helps them survive in the digital age. Southwest Guizhou Autonomous Prefecture employed the Jinzhou Educational Cloud Platform as the means of gathering and storing minority culture-based digital content that is intimately tied to ethnic history, customs, and festivals. From the platform, educators can acquire pertinent teaching resources regarding minority cultures and present them using multimedia. Students can master the essence of their local cultures and gain a deeper understanding of them by integrating them with the course material (Liu, 2010). Activities based on "ethnic culture" are also conducted in the platform's "Activity Square." Because of the use of online teaching materials in the classroom, students now know 116% more about their home culture and 140% more about the values of that culture (Zeng, 2019).

The prefecture's educational authorities decided to provide online training in bilingual instruction to minority instructors in response to the growing public awareness of the value of bilingual curricula. Hundreds of teachers could be trained in one session. A number of PE and music teachers at Wangmo Minority Secondary School developed innovative teaching strategies based on the theme of "Presenting Ethnic Cultures on Campus," and their studies became funded projects that resulted in dozens of articles on teaching reform. After participating in the online training, these teachers created a series of school-based bilingual textbooks. The prefecture's educational authorities uploaded top-notch multilingual teaching resources on the platform and disseminated them through multimedia teaching for those minority communities lacking access to training programs (Jiang, 2015). As a result, minority teachers' ability to teach bilingually, identify with their ethnic culture, and effectively use technology improved.

Conclusion

Southwest Guizhou Autonomous Prefecture has created a self-contained online educational system that allows teachers and students to engage in learning, training, and research at any time and in any place by utilizing the Jinzhou Education Cloud Platform. The region's educational equality and equity have been significantly improved by raising academic quality and balancing educational resources for ethnic minorities in remote and impoverished areas as a result of deep IT integration with education and coordination between online and offline instruction. Teachers' competencies in implementing internet-based digital education have significantly improved as a result of this process. In the near future, the prefecture will promote the construction of Jinzhou Education Cloud Platform's database hub and improve the digital presentation of school operations through data visualization. New ideas and methods will be developed and tested in order to improve the overall level of education quality in the prefecture and to create an internet-based education pattern with distinct characteristics. It is hoped that the prefecture's practices and experiences will give teachers in other parts of the country ideas about how to improve education using IT.

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