

Education

Digital Education for Ethnic Minorities in China**Jiangran Yu***

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The education of China's ethnic minorities has made extraordinary progress in recent years as a result of an enhanced information infrastructure, universalized intelligent education, updated teaching concepts, and intensified education reform. The *Work Plans for Building Intelligent Education Pilot Areas and Experimental Schools in Minority Regions* announced in 2020 by the Ethnic Education Development Center of China's Ministry of Education emphasized the necessity of establishing a cloud platform for minority education utilizing fifth-generation telecommunication technology, artificial intelligence, big data, and other information technologies. This article looked at the results of developing digital education in minority areas and pointed out its flaws and problems in order to help ethnic digital education grow in a way that is sustainable.

Keywords: Ethnic Minority Education; Information Technology; Educational Technology

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CHINA is a multi-ethnic nation, consisting of the Han nationality and 55 ethnic minorities. As a result of thousands of years of inheritance and adaptation, the 56 ethnicities have established a community with a shared future. Through determined effort, they have opened the wide regions of the homeland and established a long Chinese history and a wonderful Chinese culture. China's success is propelled by a potent force: the custom of China's 56 ethnics aiding one another for the sake of shared development. Nonetheless, the majority of ethnic minorities reside in the impoverished western and southwestern regions. Due to poor environmental circumstances, an underdeveloped economy, a lack of high-quality human resources, and other issues, poverty remains a significant concern in many places. The country must increase the level of education in those places to reduce poverty in those inhabited by ethnic minorities. Only by enacting successful minority education policies will China be able to eradicate the root causes of poverty,

halt intergenerational poverty transmission, and spark radical change in western minority communities (1). In recent years, China's educational authorities have formulated targeted policies to vigorously push intelligent education and leverage network-based information technology to expand the coverage of superior educational resources in ethnic minority regions in an effort to promote the high-quality development of basic education in these regions. In this study, we examined the importance of information technology (IT) to minority education, described the present successes of digital education in ethnic minority areas, and identified the obstacles to its future growth. In order to establish recommendations for the future expansion of digital education for ethnic minorities, practical new ideas were proposed.

The Importance of Educational Technology in the Education of Minorities

Technology is integrated into digital schooling. The technological characteristics of IT-enabled education are digitalization and network connectivity. Digitization simplifies educational technology equipment, whereas network connectivity allows information exchange, interpersonal collaboration, and flexible time management. Regarding education, digital education emphasizes accessibility and sharing. It decentralizes the school-centered educational system through openness, transforming education into a universal, autonomous, and lifelong activity. With its shareability, it grants all students access to the vast and limitless internet of educational materials (2). These benefits of digital education, when supported by cutting-edge educational theories, are conducive to the development of a school environment that promotes the acquisition of a broad range of knowledge and the cultivation of innovative ability. With the aid of educational technology, minority students can gain independence from the limitations of local educational resources and a guarantee of a valid education, which aids in reducing educational disparities caused by unbalanced regional economic development and enhancing the national quality as a whole.

Compensating for the Shortage of Qualified Minority Teachers

Due to geographical and economic constraints, minority schools experience a shortage of staff, poor teaching quality, and Chinese-language ineptitude among local teachers. The information-based minority education platform holds senior and anchor teachers accountable for selecting and developing quality online courses through three channels: cable television, satellite data broadcasting, and the internet. As a result, minority teachers can benefit from distance training by downloading high-quality teaching materials and courseware prepared by their peers from other regions, which can improve teaching quality and reduce the cost of education. Zhang discovered in his analysis that distance education has helped various ethnic minority communities with access to internet networks. Taking Xinjiang as an example, the autonomous region has provided more than 500 hours of online teaching videos for basic education and more than 2,000 person-times of online training for front-line teachers, which has greatly improved the professional levels of local teachers and increased the exchange of high-quality teaching resources (3).

Enriching Minority Students' Knowledge Sources

Traditional school education is primarily classroom-, teacher-, and textbook-centered, resulting in rote memorization and imitation on the part of students. Every day, students acquire prescribed knowledge at a predetermined time and location. Thankfully, the vitality of information technology has had a significant impact on the traditional school model and the variety of learning techniques. Multimedia, network, and computer technologies provide students with an expanded selection of knowledge sources. Inasmuch as kids have access to the curriculum of other schools despite their absence from them, student learning has expanded outside the school's boundaries. In a traditional classroom, one teacher instructs a group of students, but digital learning creates a novel scenario in which a single student sitting in front of a computer can study with teachers

from across the nation. Similarly, the new ecology and opportunities afforded by information technology have dismantled the isolated learning environment in ethnic minority regions, allowing minority students to access the same high-quality educational resources as their peers in developed areas, unrestricted by time or space.

Boosting the All-around Competencies of Minority Students

In order to motivate students to engage in active and exploratory learning, it is crucial to create a lively classroom environment during the instruction process. Using video, music, animation, pictures, and other digital formats, technology-enabled instruction can clearly convey the information from textbooks. Increasing the classroom's intrigue and novelty, this teaching technique will captivate minority students and fire their desire to learn about the outside world. In addition, teachers can use multimedia technologies to portray these abstract theories and intricate scientific experiment procedures in order to make them easier to comprehend. This generates a novel learning environment and cognitive approach, which is of tremendous help to minority students who may not be as skilled in Chinese as their Han nationality counterparts (4). IT-enhanced learning activities are more than just processes of knowledge acquisition for minority students; they are also processes of developing their own cognitive frames. Minority students can evaluate disciplinary knowledge in virtual scenarios and make connections between abstract theories and real-world experience using multimedia learning, which significantly increases their enthusiasm for learning and inquiry. Therefore, educational technology is not only advantageous for enhancing the quality and efficacy of minority education but also for fostering the exploratory and innovative skills of minority students, which are crucial for the 21st-century modernization of the nation.

Driving the Construction of Ethnic Culture-Based Curricula

In China, ethnic variety and cultural coexistence necessitate extensive contact, collaboration, and promotion between all ethnic groups. Educational technology provides minority teachers with a new avenue for successfully reconstructing their basic education curricula in accordance with different cultural traits, allowing minority students to obtain a profound understanding and mastery of their own cultures. Through online forums or group educational research connected by communication tools, instructors can conduct flexible cross-regional or cross-national educational research, learn from the curriculum development practices of other ethnic minority areas, and share high-quality teaching materials. Due to the remote geographical location of some minority schools, specialists and academics are unable to regularly conduct educational research there or offer help for the construction of their personalized curriculum. With the support of internet forums, however, academics can participate regularly in the teaching research of front-line minority teachers and offer their professional advice on how to integrate their distinctive ethnic culture and tradition into their curricula. Popularization of educational technology has provided the path for productive collaboration between minority teachers and curriculum experts

in the formulation of curricula that reflect their national features (5).

Major Achievements of the Last Two Decades

Over the past two decades, China's digital education has undergone a phenomenal expansion. The investment in school internet and IT infrastructure has increased rapidly, and the depth and breadth of digital education have expanded significantly. Following the state's digital strategy, educational communities of ethnic minorities have committed to the "Three Links and Two Platforms" Project in an effort to integrate information technology into schooling, promote the sharing of high-quality educational resources, and advance equitable and balanced education.

Improved Digital Facilities for Minority Schools

The Current State of the Digital Environment of Minority Schools

The provincial educational authorities are responsible for establishing requirements for the broadband connection facilities of minority schools and making plans based on the likelihood of future growth. After that, strategic cooperation agreements are to be negotiated with the three largest telecommunications providers, stipulating that the operators will provide broadband connection service at discounted rates and that schools will pay fees on a regular basis. Other resource transmission routes, such as satellite transmission and CD distribution, are utilized by the education department to ensure digital education support in minority areas where internet access is not yet present. Gansu Province is home to 16 ethnic minorities, including Hui, Tibetan, Dongxiang, Tu, Yugur, Baoan, Mongol, Salar, Kazak, and Manchu. To date, all basic education schools (including teaching sites) have access to the internet and a broadband connection, and administrators at all levels are exploring the use of IT-enabled teaching environments to improve education quality and expand educational opportunity for minority students. According to IT application in basic education statistics, by April 2021, 100% of primary and secondary schools (including teaching sites) in Gansu Province had full internet coverage and a 100 megabytes-class broadband connection; 107,900 multimedia classrooms had been built for primary and secondary schools in the province (6).

The "Three Links and Two Platforms" Project

The School Link to Broadband-based Network

According to the project, internet access and an internet-based teaching and learning environment are required in all types and levels of schools. Specifically, on the basis of broadband access, schools with sufficient digital capability should establish campus networks to provide wireless connection; schools must be equipped with digital classrooms, such as multi-media and computer classrooms; teachers should be given digital devices, such as computers and scanners; and students should be provided with internet-connected computers and electronic schoolbags for digital learning.

The Class Link to Excellent Teaching Content

The nation's public educational resource platform collects and distributes high-quality instructional materials to all local minority elementary and secondary schools. Minority educators can incorporate them into lesson planning. To develop teaching methods and paradigms, curriculum-related software tools are supplied to facilitate instructional activities such as in-class engagement, personalized tutoring, and student learning evaluation (7).

The Individual Link to the Online Learning Space

On the public educational resource platform, teachers and students create their own online learning environments. Educational cyberspace is extensively employed for resource sharing, interaction and communication, teaching administration, and teacher in-service training in order to accomplish the integration of information technology and daily teaching and learning activities. Students are encouraged to engage in self-directed learning through the use of electronic schoolbags, online homework, online self-tests, and online optional courses on the platform, and their online growth tracks are evaluated objectively by teachers.

The Nation's Public Educational Resource Platform

The public educational resource platform (also known as the educational resource cloud platform) provides cyberspace where all types of educational resources are accumulated and shared, and where communication and collaboration opportunities for classroom instruction and student independent study are created. It offers two types of services, namely public educational resource service and public teaching communication and cooperation service. Local governments should first support the building of a foundational educational resource bank, and the national platform should include storage, aggregation, and sharing services, as well as retrieval and uploading capabilities for educational resources. Consequently, instructors and students can access these resources at no cost through its directory. To provide a teaching communication and collaboration service, the public platform creates a personal online learning space with real-name certification for teachers and students, where they can perform basic file storage, instant messaging, the display of personal information, and personalized configuration. In addition, supplementary capabilities are provided for online student self-study, such as course videos, electronic schoolbags, online assignments, and information retrieval, to assist students in documenting their own development.

The Nation's Public Educational Administration Platform

The public educational administration platform provides administrative services for schools of all types and levels, as well as e-governance, fundamental education information management, and decision-making support for local education departments. Kindergartens, elementary and secondary schools, and secondary vocational schools utilize it to construct an electronic school administrative system to handle their day-to-day school operations. Multiple management functions involving students, teachers, teaching and training, funding, educational research,

equipment, finances, etc. are performed by the digital system. In addition, on this public online platform, education departments at the provincial, municipal, and county levels can perform a variety of functions, such as regular governance and regulation of schools, management of student and teacher databases, management of school assets, evaluation of education quality, foreign staff affairs, etc. The platform can provide education departments with guidance for future decision-making and education improvement by gathering essential data.

The growth of the “Three Links and Two Platforms” Project in Guizhou Province serves as an illustration of the distinctive effects of digital education attained by Chinese ethnic minorities. Guizhou is the most ethnically diverse province in China. There are 3 autonomous prefectures and 11 autonomous counties in Guizhou, taking up 55.5% of the total area of the province. More than 14 million minorities live there, accounting for 39% of the total population. Due to its poor infrastructure, low social service level, and sparse population, Guizhou has a high poverty rate, and its educational progress has been severely hindered by its economic limitations (8). In 2020, with assistance from the Ministry of Education’s Ethnic Education Development Center, the Bouyei and Miao Autonomous Prefecture launched the building of intelligent education. Priority number one for the local administration was to upgrade the digital infrastructure of the minority schools in the prefecture. First, the cost of the school’s internet connection was significantly reduced, and it was technically improved to ensure that a gigabit-class link was accessible on campus and that teachers had enough technological assistance for their intelligent teaching activities. Second, the Class Link to Excellent Teaching Material, one of the objectives of the “Three Links and Two Platforms” project, was implemented across all the schools in the prefecture, bringing high-quality teaching content and a variety of teaching applications into the classroom via the educational resource cloud platform. Thirdly, instructors and students were urged to utilize educational cloud platforms and education applications to construct their own real-name-verified online space in order to enhance teacher-student, inter-teacher, and inter-student engagement. The local educational cloud platform of the prefecture has produced one school forum, one prestigious principal workshop, one prefecture-level anchor teacher forum, 55 teacher forums, 1,124 student forums, and 1,124 parent forums; it offers a space for the display and sharing of teaching results and facilitates home-school communication and partnership (9).

Deepened Integration of Information Technology with Minority Education

Promoting the Reform of Teaching Methods in Minority Education

The traditional teaching approach has been altered by the use of big data and cloud platforms in processing huge amounts of educational data. Routine classroom instruction has been replaced with more flexible and goal-oriented learning activities. With the help of information technology, teachers can quickly assess the efficiency of every component in the classroom as well as each student’s interests and knowledge gaps, allowing them to adjust their teaching methods and strategies over time

and truly take on the roles of coordinator and motivator when students engage in self-directed learning. Regression analysis and data mining are two techniques that can be used by cloud platforms and big data technologies to help teachers evaluate the effectiveness of their teaching strategies. They can also be used to track teachers’ professional development. Teachers at Yata Town’s Ethnic Center Primary School in Ceheng County of Bouyei and Miao Autonomous Prefecture in southwest Guizhou Province were able to create a model that is based on a reliable classroom instructional behavior analysis theory that can automatically analyze teaching processes like teacher demonstration, student response to questions, and teacher-student interaction. Teachers examine their lessons in light of their growth profiles and contrast them with observations of anchor teachers’ classroom behavior in order to identify areas for creativity and improvement. Additionally, parents can automatically receive students’ growth profiles so that they can regularly obtain information about their children’s conduct. Data mining and analytics used in classroom instruction give empirical information to support scientific decision-making in education, greatly enhancing the effectiveness and standard of minority education (9).

Increasing Digital Literacy of Minority Teachers

The ability of minority teachers to use digital equipment and educate using information has progressively improved as a result of the promotion of digital education. Every teacher at the Korean Primary School in Heilongjiang Province’s Mishan City is proficient in using digital terminals for work and study. Every class uses digital content and technology, such as electronic whiteboards and mobile devices. Microlectures answer challenging issues and aid in the mobile learning of students. Regular training and research activities are carried out by schools and school-based educational research groups using Enterprise WeChat, Ding Talk Meeting, Jinshan Conference, QQ, and other digital platforms. Additionally, digital tools are used in day-to-day school administration, greatly enhancing the effectiveness of school administration. Following extensive training, more than 95% of Korean primary school teachers are proficient users of Easinote5, an educational software program created by Seewo Company, and can deliberately access a variety of digital platforms to find instructional resources. Mobile devices were also used to quickly collect and report personal information related to the prevention and control of the COVID-19 epidemic. School leaders and teachers used Enterprise WeChat, Meitu, and mini-programs to search for and download information necessary for online teaching to sustain student learning during the epidemic-induced school suspension (9).

Making Individualized Learning of Minority Students Possible

Through the cloud platform, the digital classroom is able to fully comprehend the learning circumstances of each student and offer them tailored learning content, activities, pathways, and tools. The educational resource cloud platform, which is supported by educational data mining and analytics technology, continuously gathers student learning behavior data for intelli-

gent analysis, pushes pertinent learning materials in accordance with the learner's digital model, conducts personalized learning evaluation and accurate diagnosis, and provides pertinent learning suggestions for the learner. Big data technology improves the accuracy of the learning behavior record and can clearly show the precise steps taken by each learner to use the learning resources. Teachers can optimize courseware and learning material creation by evaluating the quality of learning content chosen by the cloud platform with the aid of the recorded details. Students can examine and forecast their own learning behavior based on the digital record, helping them to create learning plans that are best suited to their needs and more successfully implement adaptive and self-directed learning. IT is integrated into education at Yangguang School in Xingyi City in Bouyei and Miao Autonomous Prefecture of Guizhou Province, and online learning spaces are used to transform classroom instruction. Students used the internet to independently choose online courses during the Pandemic's online home study sessions. These courses let them engage in online learning activities like interaction, problem-solving, testing, and learning by doing. The school also uses student and teacher spaces to redesign the learning environment and has adopted learning models like cooperative, project-based, and research-based learning to help students become more conscious of and skilled at independent learning. Additionally, the cloud platform can process and analyze student data to provide student learning reports for teachers to consult, as well as offer students highly relevant learning suggestions and extension activities so that they can continue to study effectively under one-on-one supervision (9).

Challenges Faced with Ethnic Minority Digital Education

Despite the progress China has made in ethnic minority digital education, there are still issues to be resolved, such as low quality educational content and inadequate digital competence among teachers. To achieve additional development in this area, governments, educational administrators at all levels, and all technical professionals and front-line instructors must collaborate.

Some Minority Teachers and Students Lack Digital Literacy

The fundamental objective of the "Three Links and Two Platforms" Project is to expand the accessibility of high-quality educational information and to promote the reform of teaching and grading practices. Despite the fact that the majority of minority teachers and students are registered users of "Three Links and Two Platforms," the minority teachers' utilization of educational resource platforms is low, and the opportunity for practical application of telecommunication tools in education is extremely limited. The vast majority are uninterested in the project, claiming that digital instruction has no direct and positive impact on student achievement. Some teachers may use multimedia resources in the classroom, such as electronic whiteboards, projectors, and other supplementary teaching aids, but their use is limited to content presentation. The majority of elementary and secondary schools that have constructed standard "Three Links and Two Platforms" facilities did so as a result of a state

mandate. In their reports to their superiors on the implementation of the project, school administrators only acknowledged the installation of physical digital infrastructure without analyzing its effects on school instruction and student learning. Consequently, the digital environment of many schools has had a minimal impact on the reform of the conventional teaching method (10). Even though some schools have issued stringent requirements for integrating educational technology into daily instruction and teachers have consciously promoted it in their teaching practices, students from disadvantaged backgrounds may lack interest in new learning tools and methods and have low educational expectations. This further diminishes teachers' enthusiasm for utilizing digital tools to transform education.

Limited Ethnic Minority-Specific Digital Teaching Materials

Digital teaching materials are an integral part of information-based education. Despite this, there is a serious lack of trustworthy digital instructional content that supports ethnic minority curricula. Nearly every minority primary or secondary school has its own Chinese-language teaching materials e-library that draws from a variety of sources, including material obtained from the internet, content downloaded via educational satellites, and even community and individual donations. However, these materials frequently contain a high degree of redundancy, and those that may be applied to classroom instruction are extremely limited. Due to their inadequate digital competence, the majority of minority educators are incapable of secondary processing of available digital content, leaving much of it unused (11). Apart from standard online instructional materials, minority students require bilingual digital content. According to recent research on ethnic minority education, there is a lack of corresponding digital teaching materials in schools with "Tibetan + Chinese" and "Mogolian + Chinese" as teaching languages. Textbooks of major subjects are primarily written in ethnic minority languages, but there is a lack of corresponding digital teaching materials, which is one factor impeding the development of information-based minority education (12). In addition, as a result of their prejudiced knowledge of minority cultures, a number of content creators are unable to develop digital instructional materials that accurately reflect the true value of each ethnic group. In some digital teaching materials aimed at introducing the culture of a specific ethnic minority, for instance, the author may only provide a superficial description of its physical objects, such as clothing, architecture, and traditional handicrafts, and rarely discuss the cultural connotations contained within them. Such content is detrimental to minority students' comprehension of the essence of their own culture and the inheritance of their nationality's distinctive thoughts.

The Absence of a Supervision Mechanism for Digital Education in Minority Schools

The proportion of middle-aged and elderly teachers in Chinese minority schools is relatively large, and this age group is believed to be less receptive to new ideas. Due to the unique age structure of instructors, minority schools typically do not require the use of educational technology in the classroom or digital literacy training for teachers; rather, it is up to individual teach-

ers to decide whether to integrate IT into their lessons. Thus, instructional technology becomes less applicable in minority schools. In addition, there is no effective evaluation and incentive system in place to encourage and supervise minority teachers' use of IT in their daily teaching activities; the lack of planning, as well as the blindness and arbitrariness in the construction of digital facilities, results in a far lower rate of actual implementation. In addition, the school has never established criteria for selecting and vetting valid content from the vast amount of online learning resources, and the cloud platform's intelligence in vetting online information is limited, resulting in the unstable quality of digital learning content on the platform.

Future Visions of Minority Digital Education

To Further Improve Minority Teachers' Professionalism in Digital Education

Although the majority of ethnic minority communities have digital infrastructure that meets national standards, administrators, instructors, and students still lack basic training in digital literacy, which negatively affects the effectiveness and utility of the facilities. The e-education offices of education departments at provincial and county levels should offer teachers a variety of training programs to update their teaching philosophies and deepen their understanding of the "Three Links and Two Platforms" Project in order to address the underachievement of minority teachers in the application of educational technology. The Education Bureau of Jiminay County in the Xinjiang Uygur Autonomous Region, driven by the Project, has included more than 300 primary, secondary, and kindergarten teachers in the national online educational research on digital education organized by the Ministry of Education since September 2020 with the aim of enhancing teachers' digital competence, which included a close examination of pertinent state policies, lectures on research techniques by experts in the field of digital education, demonstration lessons of Chinese, mathematics, foreign languages, history, etc., as well as comments from experts and researchers on these successful IT-based teaching cases (9). Between 2019 and 2021, Guizhou Province provided more than 240,000 person-times of IT application training to teachers through both online and offline activities. This effectively increased teachers' information literacy and technology application skills and created talent pools for minority digital teaching.

To Strengthen Multi-Agency Collaboration in Promoting Digital Facilities in Minority Regions

Regional differences in digital education among ethnic minorities have been a persistent problem in China and a key barrier to the equitable and balanced growth of education among all nationalities for a very long time. China has unquestionably taken significant steps to narrow the "digital divide." In the National Digital Development Strategies 2006-2020 announced by the State Council in 2006, for instance, the "Bridging the Digital Divide" Program was one of the six primary initiatives. One of the document's initiatives, "Establishing Good Examples," has had a positive impact on the growth of minority digital education, but its negative impact on the failure of disadvantaged

schools to secure preferred funding is more important (13). As a result of the rapid development of the computer industry, relevant infrastructure must be regularly updated, necessitating substantial capital expenditures. Due to a lack of funds, the educational sector is frequently forced to use outmoded equipment in this context. Therefore, investment in digital education in underdeveloped regions exceeds the financial capabilities of local governments and schools by a significant margin. Multiple sectors must be encouraged to participate while the nation provides policy support. South Korea, for instance, has experienced successful public-private enterprise partnerships in the construction of education-related digital facilities and has witnessed numerous win-win cases, which ensures South Korea's leadership position in digital education and affords participating companies the chance to increase their market share. Therefore, in these underdeveloped minority areas, the old top-to-bottom mechanism should be replaced by multi-agency cooperation in the construction of digital infrastructure; the development of core educational technologies and intelligent terminals should be accelerated in order to provide teachers, students, and other stakeholders with equipment that is convenient and user-friendly.

To Encourage Co-Development of Digital Education within the Ethnic Community

With the aim of creating high-quality and continuous education for people, digital education should play a role in decentralizing the current educational system, eradicating institutional barriers between regions and schools as well as those of time and space, integrating high-quality educational resources from all schools via the network, and creating ethnic digital education communities, i.e., the digital education alliance for every minority. The digital education alliance is able to completely utilize the strengths of many institutions, encourage the sharing of excellent learning materials, and produce "1 + 1 > 2" teaching outcomes. The Xinjiang Uygur Autonomous Region's Jiminay County launched its digital education alliance for the county's Uygur schools in 2019. 46 paired classes have chosen to use the "One Teacher for Two Classrooms" program to conduct daily remote synchronous instruction. The "Double Teachers Classroom" (a class taught by an on-site teacher and an online anchor instructor) is the other distance-synchronous teaching approach. It covers 53 grade-6 classes and benefits 38% of the county's sixth-graders as a whole. Jiminay County launched a resource sharing program in November 2020 for the linguistic competence course for first graders, the junior secondary students' fundamental education, and the accelerated tutoring for 12th graders (for the oncoming college entrance examination). This initiative helped 100% of the first graders, 36% of junior secondary students, and 100% of the scientific students in the 12th grade as a consequence of the efforts of 30 senior teachers. The incorporation of educational technology into the classroom has facilitated benefit and resource sharing in staffing, teaching, and administration, fostering virtuous inter-school cooperation in this underserved area. The association is currently expanding to a greater scale with more participating schools, improving the quality of education in the area (9).

Conclusion

The modernization of basic education must include information technology. Among China's ethnic minorities, basic education that is information-enabled has produced outstanding outcomes. It has enhanced the quality of education in ethnic minority communities, changed educational and teaching methods, and raised the productivity of educational resources. However, there are still issues to be resolved, including a lack of adequate digi-

tal infrastructure, a scarcity of trustworthy digital teaching materials, and low IT literacy among teachers. Education authorities, governments at all levels, and all parties involved in minority schools must work together to pursue deeper IT integration into education with the aim of enhancing instruction quality, enhancing teachers' professionalism, and introducing fresh opportunities for effective student learning in order to advance minority digital education. ■

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