

Chapter 7

Smart Education Promotes the Practice of Urban–Rural Integration



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7.1 Baiyun District with Dual Structure of Urban and Rural Areas

7.1.1 Education Status and Problems in Baiyun District

Baiyun District is the largest district in the central city of Guangzhou, with a resident population of more than 3.7 million and migrant workers of more than 2.5 million. Its educational volume ranks first in Guangzhou, with 248 primary and secondary schools, 415 kindergartens, 30,000+ faculty and 350,000+ students. The number of schools, teachers and students in the district ranks first in Guangzhou.

Influenced by historical factors, the regional urban–rural dual structure is obvious. Among them, the number of rural schools exceeds one-third of the whole district, and there are 8,205 full-time teachers in rural schools, accounting for 36.67% of the total number of teachers. The educational imbalance between urban and rural areas and between schools is prominent: First, the allocation of educational infrastructure between urban and rural areas is unbalanced, and the running conditions of rural schools lag behind those of urban schools; Second, there is a big gap between the level of teachers in urban and rural areas, and the educational resources of students in some rural schools are not rich enough; Third, the education process is unequal at the micro level, and some rural school children can't enjoy an equal education process.

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7.1.2 The Solution of Urban–Rural Dual Structure Education Governance

In order to break the dual structure of urban and rural areas, Baiyun District has vigorously promoted the educational measures of “1 platform + 1 paradigm + N fulcrum” by means of resource inclination, education poverty alleviation and education informatization, and made great progress in promoting the fairness of educational resources.

1 Platform is the Big Data Cloud Platform of Smart Baiyun Education (hereinafter referred to as “Cloud Platform”). Create a cloud platform integrating learning, resources, research and management, and provide a unified, accurate and artificial intelligence education information management and teaching service system. Integrating the resources and strength of the school and society, the incentive mechanism and evaluation system for co-construction and sharing of resources have been established. Taking the discipline as the “starting point”, we will carry out the construction activities of teachers’ online learning space. Combined with the construction of teachers’ personal information space, the subject education resources are gathered by collecting free online teaching resources, purchasing company digital teaching resources and self-developing.

1 Paradigm is the Baiyun Paradigm of Smart Classroom. Actively change the traditional classroom teaching form, promote the deep integration of artificial intelligence and education and teaching, implement the “classroom revolution”, establish a learner-centered educational environment, and provide accurate push education services. The school supports the creation of smart classrooms with local characteristics according to local conditions, and has now formed a personalized learning model and a local characteristic teaching paradigm, creating a “Baiyun Education Model” belonging to Baiyun District.

N fulcrum is the integrated application of digital textbooks, three classrooms, intelligent teaching and research, 5G+ intelligent education, artificial intelligence + education, etc. Support regional smart teaching through various ways, so that teachers can obtain resources in real time and conveniently, track and analyze classroom teaching status information, and assist teaching decision-making. Efficient classroom interaction enables students to learn independently and purposefully. The deep integration of education and information technology contributes to the balance of regional educational resources and realizes intensive sharing of high-quality resources.

7.2 Practical Case Based on Regional Cloud Platform

7.2.1 *Special Education in Urban Schools*

“Small eyes, look at the blackboard”, “Small mouth, don’t talk” and “Small waist, please sit up straight ...”. These simple routine trainings are difficult for Xiao Ming. Xiao Ming is the first autistic child in a regular class in a city school. The guidance office arranges for teachers to receive corresponding training, so that children can learn basic knowledge and skills in a way acceptable to them. Xiao Ming is encouraged to engage in social activities and enhance his self-confidence. When he first entered school, his state was: just running, just making trouble, just sitting, just tearing ... Later, the teacher found that Xiao Ming liked watching animation very much, and he was particularly fascinated by the micro-lessons played in the art class. Through nearly three years’ practice and exploration, it is found that micro-class, a new teaching mode, is of great significance to the education of autistic children, which makes Xiaoming make subtle changes in basic living ability and emotional behavior management. Now Xiao Ming has obviously reduced the number of anxiety attacks and radical behavior in art class. In view of Xiao Ming’s situation, the art teacher will also “open a small kitchen” for him, connecting multi-pictures, animations and videos into a series, giving Xiao Ming enough imagination and thinking space, and designing a series of micro-courses suitable for him. Upload the learning resources to the cloud platform, so that he can learn repeatedly anytime, anywhere, no matter at school or at home. “Although there are no professional resources like special education teachers in ordinary schools, I can’t give my son guidance in my study because of my low professional level. Now having a cloud platform is equivalent to inviting a good teacher home for free.” Xiaoming’s mother talked about Xiaoming’s study experience and was filled with emotion.

7.2.2 *Solve the Shortage of Rural Educational Resources*

Limited hardware conditions of teaching facilities, lack of teachers and unbalanced educational resources are urgent problems to be solved in rural schools. Baiyun District, by continuously optimizing the cloud platform, builds a regional coordinated innovation system to ensure that the platform’s main body can contribute what it can to the ecology, and teachers can get what they need while contributing what they can. During the epidemic, when Mr. Feng made the classroom micro-lesson resources of regional information technology discipline “stopping classes and learning” at home, he found it difficult to find relevant versions of reference materials on the Internet, but found the shared resources of teachers from other schools in the region on the cloud platform. Later, when it was necessary to collect materials to prepare lessons after returning to school, Feng’s first thought was to search on the cloud platform. Rural school equipment and conditions can’t be improved rapidly due to

many objective reasons, but the construction and application of various platforms have created an effective online learning space for rural schools, and shared a large number of high-quality educational resources, to some extent, making up for the shortage of teaching resources. The application of online learning space and online teaching and research can improve the teaching quality, promote the balance of resources between urban and rural schools, and provide more possibilities for the educational informatization construction of rural schools. Based on Baiyun District's Smart Baiyun Education Big Data Cloud Platform, at present, the number of high-quality education resources has gathered more than 10T, and a local characteristic resource bank has been built. Through the intelligent analysis of the data collected by the platform, accurate teaching and personalized learning can be realized, and data support can be provided for large-scale teaching in accordance with students' aptitude in the whole region.

7.3 Creating Teaching Cases with Local Characteristics

7.3.1 “Smart Pen and Paper” Helps Students Learn Effectively

Xinhe School, located in Zhong Luotan Town, Baiyun District, is a typical rural school. A few years ago, outdated teaching equipment and facilities had a certain impact on teaching. There are many phenomena in school English teaching, such as poor listening comprehension, weak spoken English, small vocabulary and imperfect grammar structure. The teaching time is relatively limited, which means students do not have enough time to practice English listening and speaking. The school comprehensively carries out the practice of “intelligent pen and paper” wisdom teaching, innovates classroom mode, and improves the teaching quality of teachers.

Under the normal application of “smart pen and paper”, for classes with a general English foundation, teachers will introduce brainstorming activities in the form of short answer questions, true or false questions or multiple choice questions in the review stage before class. Each student can collect data in real time by writing answers on paper and books with a smart dot-matrix pen, automatically generating analysis, and immediately feeding it back to the teacher. For a class with a good English foundation, brainstorming is designed in the link of introducing new knowledge. Teachers can check the students' learning progress and thinking process in real time in class, and quickly understand the weak knowledge points, so as to implement the teaching in a targeted way. Faced with students with poor English foundation and a lack of initiative and enthusiasm in learning, the introduction of an intelligent pen-and-paper system has enhanced students' interest in learning and provided a great boost to school English teaching.

7.3.2 Normal Application of Smart Classroom on Campus

In order to make the smart classroom better serve the teaching, Baiyun District adheres to the way of “pilot first, innovation leading and pressing ahead”, vigorously develops the smart campus construction in batches, and carries out selection, evaluation and examination year by year. By 2022, there will be 100 smart campuses in Baiyun District. Primary and secondary schools in Baiyun District actively change the traditional classroom teaching form, promote the deep integration of information technology and education and teaching, and put the “classroom revolution” into practice. Before class, teachers use WeChat platform to set up parents’ WeChat group, communicate with parents in real time, get to know each other about students’ homework and give timely online counseling; Establish class groups, show students’ excellent homework, show students’ problem-solving ideas, show students’ reading achievements and publicize students’ personalities; Set up small groups, teachers send newspapers for preview, release micro-lessons, let students collect information, and let students review old knowledge, calculations and ideas. In class, teachers make full use of multimedia and interactive learning platform, sort out information collected by students, check students’ learning situation of micro-class, and report self-study results; At the same time, create the situation that students like to see and hear, stimulate their interest in learning, guide their independent inquiry and cultivate their independent learning spirit, and cultivate their academic quality. Through digital equipment, the process of students’ learning is recorded, and students’ classroom learning situation is fed back in real time, which helps teachers understand the weak points of learning, effectively helps students to learn individually, and promotes cooperative inquiry learning in class. After class, let students carry out reading evaluation in the group platform, show their learning results, show their hands-on operation, and talk about ideas and methods; Strive to improve students’ oral expression ability, cultivate students’ hands-on operation ability and train students’ thinking ability; Through display and communication, students in the group can imitate and learn from each other, and show the good results in the group to the class group to share. At present, information technology has been applied in the daily teaching of the pilot class.

7.4 Cases of Promoting the Balance of Regional Educational Resources

7.4.1 “Three Classrooms” to Promote the Rational Flow of Regional Educational Resources

Baiyun District has built a “three classrooms” application cloud platform, with three classroom smart education application alliance bases and cultivation schools as the leaders, and organized more than 200 disciplines from 29 schools to set up “three classroom application communities” in Baiyun District. We will promote the normalization and on-demand application of “Courier Classroom”, solve the “persistent problem” of uneven, insufficient and poor curriculum in rural weak schools, and continue to expand the coverage of high-quality educational resources such as the national wisdom cloud platform for primary and secondary schools and shared classrooms in Guangzhou, so as to significantly improve the quality of classroom teaching. Up to now, 2,950 teachers and 88 schools in the whole district have joined the platform, and a total of 656 courier classes have been conducted, and 1,221 high-quality curriculum resources have been uploaded and published, with 96,000 viewers. The normal application of “three classrooms” based on the urban–rural joint teaching community provides an effective path for the professional development of school teachers. Taking No.115 Middle School as an example, Pingsha Peiying, Sanyuanli Middle School and Zhuliao No.3 Middle School have carried out the “three classrooms” joint teaching. In view of the fact that the small number of school history teachers is not conducive to collective lesson preparation, the “three classrooms” have realized long-distance collective lesson preparation and taking turns to attend classes, and promoted the professional growth of school teachers together with other schools. Under the joint discussion and study of history teachers in four schools, the efficiency of collective lesson preparation in history classes has been improved.

7.4.2 Regional Online Joint Research to Help Share Resources

Take the platform of regional smart teaching and research as the carrier to coordinate the implementation and management of regional wisdom teaching and research. Create a regional smart teaching and research model, form a new regional smart teaching and research training system, and promote the in-depth reform and innovation of regional education and teaching.

The first is to improve the working mechanism. Clarify the construction mechanism of intelligent teaching and research, promote it by stages and levels, try the regional cluster teaching and research first, gradually expand the inter-school

teaching and research and school-based teaching and research in districts, and finally form a three-level intelligent teaching and research model of “district-film-school”.

The second is to establish a collaborative model. Form an effective cooperation model with the district education research institute as the core, subject teaching and research staff as the guidance and school teachers as the implementation. Unified planning and deployment of teaching and research arrangements by the district teaching and research institute, discipline teaching and research staff to organize and guide according to the teaching progress, school teachers to implement teaching, discussion, communication and evaluation.

The third is to improve the effectiveness of teaching and research. Make full use of information technology, expand the coverage of teaching and research, refine the dimensions of lectures and evaluation, and intelligently count teaching and research data. During the epidemic period, music, English, Chinese and other disciplines have been actively tried, and 7 smart teaching and research activities have been completed. More than 3,200 teachers in the whole district participated in smart teaching and research, and the number of teaching and research observation people exceeded 20,000.

The fourth is to keep resources. Relying on the cloud platform, real-time management and preservation of intelligent teaching and research data, courseware, evaluation, playback and other resources, so that teaching and research can be reviewed and repeated, and the utilization rate of resources can be improved.

7.5 Keep Pace with Urban and Rural Areas

After years of practice, the effect of smart education in Baiyun District has gradually emerged. Baiyun District will continue to take the cloud platform as the starting point, multi-point application as the traction, and with the help of information technology capabilities of smart education platform, solve the uneven educational resources, change the current situation of “unbalanced and inadequate development” in rural education, gradually narrow the gap between urban and rural areas, and finally break the dual structure between urban and rural areas to promote the all-round development of students.