

# Chapter 14

## Exploration and Practice of Regional Intelligent Operation Application



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### 14.1 Background: Smart Homework, Responding to the New Call of Smart Education

Nanchang has created a new mode of education by focusing on smart enrollment, smart examination and smart homework, and realized a new way of education based on educational data to make people run fewer errands and more data. It is a supplement to homework classroom teaching and an important means for students to consolidate their knowledge, improve their ability, expand their thinking and broaden their horizons. However, the common practice provided by the traditional homework mode is difficult to realize the individualized improvement of students, the blind area of knowledge cannot be cleared away, and the learning problems are difficult to cure. The “birth” of homework perfectly combines multimedia information technology with a home-school learning environment, greatly improves students’ autonomy in participating in after-school learning, and helps teachers effectively improve classroom teaching efficiency and students’ comprehensive quality.

### 14.2 Concept: Smart Homework, Helping the New Ecology of Smart Education

Homework is an important starting point to promote the popularization of smart education, and rich experiences and results have been achieved in the practice of smart education.

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### ***14.2.1 Follow the Law of Regional Development and Vigorously Promote the Development of Regional Intelligent Operations***

According to the basic conditions of each district and city, the Provincial Department of Education has formed a spatial development strategic pattern with Nanchang, the provincial capital, as the guide, Ganzhou taking the lead, Yichun following closely, Shangrao spreading out and Jiujiang promoting “four plates”, making efforts to improve the application concentration, regional synergy and overall competitiveness of smart work, gradually forming a “smart work” sharing circle, and finally radiating to 11 districts and cities in the province.

### ***14.2.2 Based on the Location Advantages, to Do Better in Nanchang Smart Education Model***

Based on its geographical advantages, Nanchang City has transformed the advantages of key talents into the leading demonstration advantages of applying intelligent homework, giving full play to their influence and appeal among teachers and students in schools, paving the way for the comprehensive popularization of the application of “intelligent homework”. Up to now, the use of smart homework in the city has basically covered 838 primary and secondary schools and 18,544 teachers in the city, and the service has benefited more than 73,786 students, with 864,269 person-times of homework collection, 1,998,580 lessons on wrong questions, and 98,722 layered homework assignments.

### ***14.2.3 Implement the Application of Intelligent Homework and Continuously Improve the Teaching Effect of Regional Education***

Actively explore the application mode of “Smart Homework”, guide teachers and students to make good use of the application system of “Smart Homework”, build a learner-centered academic evaluation system, accurately push high-quality learning resources for students, provide teachers with learning situation analysis based on “Smart Homework”, and effectively support the reform of teachers’ teaching methods and students’ learning methods. In the province, it is the first to apply the hierarchical homework design system of intelligent homework, assist teachers in personalized homework design, actively explore the way of “painting students with data”, and use the hierarchical homework system to help teachers and parents discover their children’s superior potential, teach students in accordance with their aptitude, form

students' learning track files, and promote students' personalized growth. As of April this year, 176 teachers have arranged 49,331 sets of layered personalized homework through the intelligent homework platform, and students have completed 98,722 personalized homework.

### **14.3 Practice: Smart Homework, Creating A New Model of Smart Education**

In recent years, our city has seized the new historical opportunity of information development and actively explored the deep integration of intelligent homework and subject courses. The practice of intelligent operation in the whole city reflects the characteristics of "114" construction, that is, building a base, focusing on a brain and reproducing four kinds of application scenarios.

#### ***14.3.1 Build a Base to Build a Foundation***

On the basis of an intelligent operation platform, a large-scale cloud computing infrastructure is built by using information technologies such as big data, cloud computing and artificial intelligence, and three forms, such as dot matrix pen, high-speed scanner and so on, are used to provide dynamic collection support for students' homework and learning information for the upper application of intelligent operation.

#### ***14.3.2 Focus on "One Brain"***

Relying on the core advantages of independent and controllable information support technology, massive data collection and processing capabilities, open platform ecosystem, etc., the intelligent homework brain is constructed, which includes advanced technology applications such as optical scanning recognition, cloud question bank, artificial intelligence, big data analysis, etc., and realizes the coordinated deployment of students' homework elements in all time and space, process data sharing, and scene intelligence.

#### ***14.3.3 Presenting Four Types of Application Scenarios***

In the era of educational informatization 2.0, the four application scenarios that intelligent homework can achieve are intelligent homework dynamics, intelligent

homework stratification, intelligent homework evaluation and intelligent education service. In addition, it can also be used to know the latest children's learning status in real time through the intelligent homework platform, so as to realize the information exchange among teachers, parents and students, and promote students' classroom enthusiasm and teaching efficiency.

**Application Scenario 1: Accurate insight into the full-time operation situation of the job.**

We collect the teaching and learning data from the feedback of daily homework, and use the digital education decision-making platform as the basis for decision-making. The application of learning big data in the field of education can promote the effectiveness of teaching and learning, improve the quality monitoring system, realize dynamic quality management, and promote the scientific decision-making of education.

**Application Scenario 2: empowering and strengthening the refinement and stratification of homework.**

“Smart Homework” explores the way from three levels: daily study, review before and summary after the exam, dismantling teaching problems and breaking down learning difficulties one by one, and providing students with efficient “targeted homework”: dynamically capturing students' process learning data by using smart pen and high-beat instrument through students' daily paper-based teaching aids, wrong questions in test papers and homework, and uniformly summarizing the wrong questions at the end of the chapter, providing a set of questions by drawing inferences from others, including Before the exam, it can provide teachers with the analysis of the wrong questions in students' daily homework, and also summarize the weak knowledge points for students; After the exam, students will automatically count and deeply analyze the wrong questions, generate typical explanations, and provide targeted post-exam summaries.

**Application Scenario 3: Reducing burden and increasing efficiency to support the “double reduction” policy.**

In the final analysis, scientific decision-making and hierarchical homework are to improve learning efficiency and really help teachers, students and parents reduce their burdens. The teaching method of “teaching students in accordance with their aptitude and teaching in different levels” is conducive to “cultivating excellent students and making up for poor ones”, and helps teachers to know the knowledge level of class students in a short time through the application of layered homework. Questions that students can't know in homework can be personalized by watching micro-lessons. It is also possible to get rid of the “unified” sea-topic model of traditional homework through layered homework assigned by teachers, which greatly improves students' learning efficiency.

#### **Application Scenario 4: Benefiting education and people's livelihood and improving teachers' and students' happiness.**

Based on the problems of students' long learning time, low efficiency and low happiness, the intelligent homework platform displays the mastery and degree of students' knowledge points in the form of atlas, and pushes personalized learning resources according to students' knowledge atlas. It pushes personalized variant training according to wrong questions to realize hierarchical learning. Introduce accurate teaching, personalized learning, intelligent teaching and research, intelligent evaluation and intelligent management based on big data, empower teachers' accurate and personalized teaching. Based on the data, we can adjust the teaching content and reconstruct the teaching process in real time, strengthen the teaching effect of teachers and students, and enhance their happiness.

### **14.4 Practice: Smart Homework, Showing a New Style of Smart Education**

#### ***14.4.1 Application Cases in Qingyunpu District***

Qingyunpu District is a marginal city with urban-rural integration and mixed suburbs. Problems such as the late start of education reform, the weak teaching infrastructure and the scarcity of educational resources have been the fetters of education development in this region. Combined with the actual situation of education and teaching reform and development in the Qingyunpu district, we have started a number of pilot projects of circular investigation, practice, reflection, optimization and re-investigation in a "co-creation" way with Soft Cloud Technology.

##### **14.4.1.1 Take Homework as the Entry Point, and Realize Data Empowerment Layered Teaching**

Qingyunpu District focuses on building a new big data monitoring model for homework teaching covering the whole region. By enriching the district-level question bank, school-level question bank and individual question bank, the breadth and depth of intelligent homework are expanded; Through the data generated by the students, we can accurately diagnose the weaknesses of students' knowledge and ability, realize personalized and accurate push of exercises, reduce the burden and increase efficiency for students, and build a layered homework design platform with Qingyunpu Scenic Resort characteristics. In the process of practice, it is also found that there is empiricism in teachers' mastery of students' learning situation, as well as fuzziness over a long time span. Using the platform diagnosis and analysis module, through the diagnosis and analysis of the collected process data and stage data, the student

portrait analysis, class situation analysis and regional data analysis are generated, which provides a scientific basis for teachers' precise teaching.

#### **14.4.1.2 Take the Platform as the Foothold to Reduce the Burden of Education and Teaching for Teachers and Students**

Through many investigations, Qingyunpu District Education and Sports Bureau found that front-line teachers have great resistance to various platforms with complicated operations. How to make intelligent homework simple and easy to operate without increasing teachers' extra burden? First, login unification; Second, collection diversification; Third, the operation is normalized, without changing the working habits; The fourth is to correct intellectualization.

In the process of regional practice in the past two years, at present, the number of students registered on the platform is 26,585, the number of teachers registered is 1,205, and there are 22 schools using it. The acquisition equipment also covers the whole area in the form of entering classes, and the teachers and students have a good response. With the support of the city, it will become the 2021 Nanchang Smart Campus Demonstration Zone. At the same time, as a representative, it will exchange and share experiences in the 2021 Jiangxi training program, and it will also be publicized and reported by the provincial and national magazine Educator. In the future, Qingyunpu district will try to integrate sports, fine arts, music and other disciplines, covering various types of data such as homework, daily tests and academic examinations, actively explore comprehensive quality evaluation, break the "score-only" theory, and give full play to the value-added function of evaluation.

#### ***14.4.2 School Application Cases of Nanchang No. 28 Middle School Qingyun School***

Nanchang No. 28 Middle School Qingyun School, as a pilot unit of smart education in Qingyunpu district, has set up a special group to fully implement the wisdom homework project. At the same time, students are equipped with a smart homework AI study room with 16 intelligent computers and 3 printers. There are 44 intelligence-gathering machines in each class of primary and secondary schools. Teachers in grades four to nine can actively analyze the learning data of students on the platform, use the platform to generate test papers, and combine some subjects in grades seven and eight with layered homework to achieve classroom integration.

At the beginning of the project's landing, the school asked the class to use all the teaching and auxiliary homework and exercises. After a period of data accumulation, detailed subject analysis, class analysis and students' individual reports can be presented on the "Hierarchical Precision Work" system. The reports will show the common weaknesses, common wrong questions, and the distribution of important

and difficult questions in the subject/class. Each discipline group regularly discusses the causes through the common weak knowledge points of this grade, combined with the years and characteristics of the discipline, and forms a standardized discipline promotion lesson plan, which effectively improves the overall teaching effect of the discipline. Every year, a review plan for weak items will be set for each subject in Grade 7, and the class will consolidate and test the weak items according to the cycle in this plan.

### ***14.4.3 The Overall Application Case of Wanli Administration***

At present, there are 21 primary and secondary schools in Nanchang Wanli Administration, with more than 10,000 primary and secondary students and more than 500 teachers. At present, there are some problems: we can't know the teaching situation and progress level of each school in time, and how to ensure that rural schools get homogeneous teaching resources under the "double reduction" policy. To solve the above dilemma, in 2021, Wanli Bureau started to use the smart pen mode of "smart homework" in primary and secondary schools all over the world, relying on the platform of "smart homework" set up by Jiangxi Provincial Department of Education and combining the actual situation of local education and teaching reform and development.

**Help precise teaching.** The convenience of collecting teachers' smart pens expands the breadth and breadth of "smart homework". Wanli Administration matches teachers' smart pens to each teacher in the school in stages. Under the premise of not changing students' writing homework, teachers' habit of correcting homework and normal teaching, smart pens are used to dynamically collect students' daily homework learning situation, count the amount of homework questions in each school, and generate each student's exclusive set of wrong questions. We push the systematic homework analysis micro-course and similar consolidation exercises jointly developed by famous teachers in primary and secondary schools for free and accurately. Parents of students choose voluntarily, and they can view the wrong micro-course through electromechanical boxes, computers and other ways to accurately solve homework problems, and send high-quality famous teacher resources to every child to help them with wisdom accurately.

**Guarantee "suspension of classes and non-stop learning".** Students use ordinary pens to write homework and take photos with teachers or class groups. After receiving students' homework, teachers enter the online correction mode of small programs, compare students' information, and use smart pen to correct on their own teaching assistants, so as to collect students' daily homework and learning information, and let teachers know students' learning situation at home, thus ensuring the teaching effect.

**Improve the quality of teaching.** With the introduction of "Smart Homework", some changes have been made to teachers' teaching methods. Through more accurate data analysis of students' learning situation in class and after class, students'

learning situation is presented in a digitized chart, so that teachers can have a deeper understanding of students' strengths, weaknesses, learning habits and attitudes, pay more attention to them, prepare lessons more accurately, and take a step closer to real personalized learning. From the spring of 2021 to the spring of April of 2022, the average correct rate of primary school homework in Wanli Administration increased from 78.14 to 91.69%, and that of junior high school homework increased from 81.94 to 92.24%, which also reflected the progress of overall teaching effect.