



One Principle and Two Thoughts for the Construction of Urban Intelligent Education Environment

Yongsheng Zhou¹(✉), Ning Chen², Yinxue Xu¹, and Zhiqiang Yang¹

¹ School of Foreign Languages, Chongqing University of Science and Technology,
Chongqing 401331, China
zyszysscq@126.com

² School of Intelligent Technology and Engineering, Chongqing University of Science and
Technology, Chongqing 401331, China

Abstract. The article elaborates the principle of “Intelligence Integration” and its implementation path for the construction of the environment of smart education, and makes two thoughts based on this principle: First, set up urban education radio stations to ensuring the playback quality of foreign language listening examination and enrich the cultural connotation of urban smart education; Second, set up cloud data centers of colleges and universities to save investment in educational equipment, improve the quality of educational data centers, and facilitate the sharing and application of educational data.

Keyword: intelligence education environment · intelligence integration · broadcasting station · educational data center · cloud data center

1 Introduction

According to the relevant spirit of the Education Informatization 2.0 Action Plan of the Ministry of Education, we should actively carry out innovative research and demonstration of smart education and promote the reconstruction of education ecology supported by new technologies. Local governments at all levels have attached great importance to smart education and formulated relevant local documents. For example, the Five-year Work Plan for Smart Education in Chongqing (2018–2022) pointed out that various intelligent technologies should be used to build intelligent teaching application scenarios to provide a strong guarantee for the innovation of teaching models under intelligent conditions. In recent years, governments at all levels and various schools have continuously increased the investment and application of smart education environment construction. With the continuous promotion of smart city construction, it has further promoted the development of regional smart education. However, there are still some problems in the current construction of smart education environment. A prominent problem is that various regions, governments at all levels and various schools are carrying out their own environment construction, and the overall planning is not enough. Many scattered

“small environments” have been built, and the overall operation efficiency is low, which restricts the further development of China’s smart education. Based on the work and scientific research experience of nearly 30 years, this paper puts forward the “intelligent integration” principle of urban smart education environment construction, which provides reference for the macro guidance, scientific planning, effective management and scientific evaluation of smart education environment construction. At the same time, it makes specific analysis and thinking on the two aspects that need to be improved in urban smart education environment.

2 The Principle of “Intelligent Integration” in the Construction of Smart Education Environment

2.1 What is “Intelligent Integration”

“Intelligent integration” refers to taking smart education as the center, relying on smart campus and smart city, the organic unity, highly coordinated and efficient operation of the three environmental elements of hardware, software and resources, as well as the interconnection, integration and sharing of various environmental elements (such as between hardware and hardware), thus forming an integrated and systematic smart education environment. The integrated intelligent education environment and educational objectives, educational activities, educational management, and educational evaluation are mutually beneficial, mutually adaptive, and dynamically regulated, forming a virtuous circle and evolving integrated intelligent education system. The smart education system based on the “intelligent integration” environment is shown in Fig. 1.

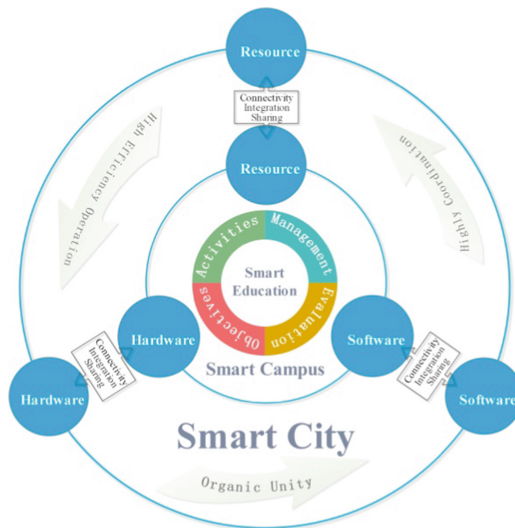


Fig. 1. Smart education system based on “intelligent integration” environment

2.2 Implementation Path of the Principle of “Intelligent Integration”

2.2.1 Take the Construction of Smart Cities as an Opportunity

At present, China’s smart city construction is in full swing. For example, Chongqing University Town has formulated the strategic idea of “five integrations” since its inception in 2003 (Ministry of Education of the People’s Republic of China, 2008). Among them, the integration of educational resources includes the integration of hardware resources, software resources and data resources, which conforms to the principle of “intelligent integration”. The planning concept of “open” and “smart” in Chongqing Higher Vocational City also fully embodies the principle of “intelligent integration”: open means that there is no fence between colleges and universities, and the infrastructure such as libraries are built and shared; Wisdom is to rely on the cloud education industry in the park to build a cloud smart city. Through virtual education, base training and integration of production and education, we can realize the integration, coordination and efficient operation of various environmental elements, and between the city and the campus.

2.2.2 Take the Network Teaching Platform as the Starting Point

First of all, the online teaching platform should organically integrate and improve the functions of teaching, learning and management, realize the unification and sharing of information, data and resources, and build a complete system of networked intelligent teaching. Secondly, the integration between platforms should be realized through their respective interfaces or data exchange, breaking the division and closure of each teaching platform, and realizing the integration and collaborative development of platform resources. Third, the information exchange between the teaching platform and the real learning situation should be maintained, so that the learning records can truly reflect the learners’ learning panorama, so as to provide personalized and adaptive learning services for learners through learning analysis, educational data mining and intelligent guidance.

2.2.3 Take Intelligent Data Integration Platform as the Core

Using data to enhance intelligence, eliminate “information islands”, and integrate data are the core issues of creating a smart education environment (Li & Dong, 2018). In the construction practice of smart city and smart campus, it is necessary to build an integrated and open intelligent teaching integrated support platform, realize the effective integration, large-scale processing and deep mining of data of various application systems, realize the online and offline, in-campus and off-campus information exchange, and break through the boundaries of classroom teaching.

3 Reflections on the Establishment of Urban Educational Radio Stations in Various Regions

3.1 Current Situation of English Listening Unified Examination

In the current national college entrance examination, the English test includes the listening part. The pilot reform of the new college entrance examination is likely to implement two tests a year or even more. In all colleges and universities, CET-4 and CET-6 are also held twice a year, and listening is also a required part. Whether it is a high school or college English test, the examination site generally configures its own broadcast equipment (wireless or wired) and provides technical support. The broadcast equipment for the test is also generally used to broadcast propaganda and education, cultural entertainment, emergency notice and other contents. These two types of examinations are national unified examinations with large scale and high requirements for safety. At the same time, for mainland students with relatively weak listening skills, listening scores are of great significance to candidates.

3.2 Problems in the Current Unified English Listening Examination

The examination site is equipped with its own broadcasting equipment and provides technical support, which has a greater security risk. Many colleges and universities are built and managed by the laboratories of the secondary colleges. The funds and technical strength are not strong enough. The equipment quality, technical support and management level are different, resulting in inconsistent broadcast effects, and even the broadcast failure due to equipment failure. In order to improve the listening effect, some schools privately increase the FM transmission power to 20W ~ 30W, causing interference from neighboring schools (DAI, 2009). There are also schools that use radio frequencies in violation of regulations, which is also easy to cause mutual interference. Every year, some examinees are affected by the quality of the broadcast. For example, more than 1,200 examinees were affected by the failure of English listening playback at a college entrance examination center in Wuhu, Anhui Province (SDTV, 2015). The broadcast failure will directly affect the psychological stability of the examinees, and may cause the examinees to be unable to perform properly in the non-listening test and other subjects, which seriously affects the objectivity and fairness of the test scores. Meanwhile, it takes a lot of talent and resources to organise make-up exams, and the mass distribution of listening discs increases the risk of leaks.

3.3 The Significance of Setting up Urban Educational Radio Stations

3.3.1 Effectively Guarantee the Broadcast Quality of Foreign Language Listening Test

Despite the rapid development of video technology and network technology in recent years, the broadcasting system is still applied by various schools with its practicability, economy and convenience (ZHANG, 2016). Urban education radio stations are set up in various places, using FM high-power broadcasting mode, which can be used to

broadcast education-related content at ordinary times, and for unified broadcasting in foreign language examinations (remote suburbs, districts and counties can receive and transmit), and of course, can also be planned as special foreign language radio stations. With advantageous funds, build modern teaching facilities with high intelligence level, large transmission power, strong stability and strong technical support, avoid the high consumption and low level of decentralized construction, realize the “intelligent integration” and the co-construction and sharing of high-quality resources, and ensure the consistency and stability of the broadcast effect.

3.3.2 Enrich the Cultural Connotation of Urban Smart Education

With the rapid popularization and growth of automobiles, the huge mobile population has gradually become the mainstream of radio listening. In addition, the vision of the elderly is reduced, while the young people also realize the negative consequences of long-term use of eyes. People only use hearing to obtain information in many times, which leaves room for the development of traditional radio. The demand for education of our citizens is increasing day by day, but the construction of education broadcasting is relatively lagging behind that of urban traffic broadcasting, economic broadcasting, music broadcasting, etc. At present, there are only a few radio stations such as Jilin Education Radio, Henan Education Radio, Guangxi Education Radio, Yunnan Education Radio, etc. However, under the situation that many provincial educational broadcasting have been turned to or cancelled, regional professional educational broadcasting media have become scarce resources, and it is necessary to stick to and enlarge (Ma, 2019). Each examination service of the city education radio station is a full coverage propaganda for the radio station, so as to continuously accumulate a huge audience with students as the main body. Under the impact of network media, educational broadcasting can be integrated with portal websites, blogs, microblogs, WeChat, news clients, etc. (Wang & Ge, 2016), and make comprehensive use of network text, pictures, audio and video and other media to overcome the weakness of single and one-way transmission of traditional broadcasting media, while enhancing interactivity. The tracking and timely evaluation of the interactive learning process is an important feature of intelligent teaching (Zhou et al., 2022). In short, educational broadcasting can be built as a regional mainstream media and shape a good image of the city, as long as it finds the right media positioning and integrates multi-dimensional communication channels such as social software, interactive websites, online knowledge radio (Liang & Wei, 2020) and offline activities. For example, the activity of “Good Voice on Campus - Jilin University Student Campus Singer Competition” launched by Jilin Education Radio has won the recognition of young audiences in the way of combining broadcast programs with offline activities.

4 Thoughts on Setting up University Cloud Data Centers in the City

4.1 Current Status of Education Data Centers in Various Regions

Due to the extensive use of information office and teaching in various schools, the demand for various information facilities has soared. Among them, the education data center is the “brain” of information education, including network core equipment, servers

and storage, various software systems, network security facilities and data resources. It has the characteristics of complex software and hardware configuration, important data, high security requirements, uninterrupted operation, and high maintenance costs. At present, there are three types of data centers: first, the data centers built by colleges and universities. Each school invests millions to tens of millions of yuan in the data center; The second is the data center of the district and county education committee, which is shared by the primary and secondary schools in each district and county; The third is the data center of the provincial and municipal education commission, with an investment of more than tens of millions of yuan. Some cities also have regional data centers such as “University Town Resource Center”, which basically realizes regional information management, resource integration and data sharing. As a provincial data center led by the Ministry of Education, it is mainly connected with the national management platform and supports the provincial education management public service platform, information system and basic database. In Chongqing, the “University City Resource Center” has built the “Chongqing University Digital Resources Co-building and Sharing Platform” (<http://www.cquc.net>) It includes teaching resources, book resources, high-quality courses, employment services, competition activities and other columns, and has realized the sharing of a large number of resources among colleges and universities.

4.2 Current Problems in Education Data Centers Around the Country

The provincial education data center is an important part of the “two-level construction and five-level application” of education management informatization of the Ministry of Education. According to the Guidelines for the Construction of Provincial Data Centers (Education Management Information Center of Ministry of Education, 2015) of the Ministry of Education, “provincial data centers should make full use of cloud computing technology and build cloud service platforms to provide computing, storage and other infrastructure cloud services for the provincial education administrative departments and schools”, and “avoid duplication of infrastructure construction”. However, the infrastructure cloud services provided by the provincial education data center are mainly for education management. In order to ensure the operation of a large number of platforms on campus, universities still need to build their own data center computer room. Due to the limitation of funds, the low-level decentralized and repetitive construction of data centers in colleges and universities have the problems of low equipment configuration, low technical level, incomplete design, poor environment, slow update, and low operation and maintenance management level. It is also difficult for the data center to adopt security technical means such as redundant dual core network architecture, distributed database, remote backup, encrypted storage and secure access of sensitive data, so that the security level of the center is at a low level, and its reliability, availability and sustainable development capacity are seriously insufficient. For district and county education data centers, with the increase of business scale and the improvement of service requirements, problems such as low resource utilization, low management efficiency, poor business continuity, and difficult data backup are also prominent (Wu, 2013). However, there is no overall planning between colleges and universities, and they go their own way to build and form information “islands”. The internal data of each school is also relatively scattered, the application system of each department is not well integrated, the software

and hardware management is decentralized, the database is not unified, the data between platforms is difficult to share, and it is difficult to realize the integrated management of teaching, learning and management (Deng & Duan, 2015).

4.3 Realistic Opportunities for Setting up University Cloud Data Centers

First of all, with the gradual maturity of cloud computing technology and the continuous improvement of network quality, it is possible to set up cloud data centers in colleges and universities. Second, the construction of local data centers has reached a certain scale and accumulated rich experience in construction and application. Third, from the perspective of national planning, in the layout of the big data center of the national “channels computing resources from the east to the west”, various hubs and clusters form some key areas. According to the application needs of education big data, governments at all levels can plan ahead. Taking Chongqing municipality as an example, for the educational structure of “university town in the west and higher vocational city in the south” in the main city of Chongqing, the construction of data centers in the university town and higher vocational city can be planned as a whole and integrated. In the construction of the second “university town” in Chongqing - Banan Higher Vocational City, the largest cloud education industrial park in China has been planned to build a high-quality education cloud platform and global cloud classroom, and establish the best cloud education data center (Tan, 2021). Obviously, the existing university town resource center can be upgraded to the cloud data center of Chongqing universities, or it can be upgraded after merging with the data center of the higher vocational city. Relying on the cloud computing and online education industry of the higher vocational city, it can provide big data management, services and research for universities in the city, and promote the optimization, integration and sharing of education resources.

4.4 The Significance of Setting up University Cloud Data Centers

4.4.1 Save Investment in Educational Equipment

Through cloud computing strategy, build a virtual, flexible, open and intelligent education cloud data center, realize the server and business to gather up, improve resource utilization efficiency, and generally reduce construction and maintenance costs. Specifically, the mode of “data centralization, system centralization, infrastructure centralization, security management centralization, and distributed application” is adopted (Tang et al., 2014) to build the infrastructure cloud platform (IaaS), integrate the education and teaching business system, and provide shared hardware, software, network and data resources for colleges and universities. As a provincial and municipal education cloud data center, it should integrate various information services such as scientific storage of education data, monitoring and management of education development, information release, various education application support, host hosting, service hosting and application hosting.

4.4.2 Improve the Quality of Education Data Center

By concentrating the advantageous funds and technological forces, we can build an advanced regional data sharing center, fully guarantee the quality of software and hardware equipment from the aspects of environment, planning, purchase, development, maintenance, etc., enhance the reliability, and make it have high-speed computing capacity, large-capacity storage capacity and high-speed and stable network data transmission capacity. At the same time, we will build a comprehensive service platform for smart education based on the education big data center, collect, mine, analyze and present massive education data, promote intelligent education management, intelligent teaching activities and scientific education decision-making (Xu et al., 2016), and help urban education informatization and intelligence.

4.4.3 Facilitate Educational Data Sharing Application

Centralized storage and management of application systems and data in colleges and universities, realizing “intelligent integration”, eliminating “isolated islands” of information, and data integration, business aggregation and service integration are more conducive to data sharing and efficient application. Through the deep mining of data, rapid modeling, analysis and display, promote the mutual learning between schools, and also facilitate the government’s macro supervision, evaluation and regulation of universities, so as to jointly improve the level of university governance. The existing resource sharing service platforms in various regions will be further optimized, and the digital resources such as documents, courses and test papers of various universities will be fully integrated, so as to better implement the “implementation of digital strategy and construction of intelligent higher education platform”, and promote high-quality talent training and scientific research in various regions.

5 Conclusion

In 2022, the Ministry of Education is working hard to promote the “Focus on Digital China” campaign. With the development of artificial intelligence technology, automation technology and information technology, we should take the development concept of innovation, coordination, green, open and sharing as the guide, fully rely on the macro guidance of the government, the extensive participation of enterprises and the in-depth practice of colleges and universities, improve the level of education digitization and information, and promote the healthy development of smart education. Following the principle of “intelligent integration”, we will build urban education broadcasting stations and university cloud data centers well, and build new infrastructure of computing power represented by data centers and intelligent computing centers, which will surely bring our urban smart education environment and smart city construction to a new level. The “intelligent integration” principle proposed in this paper is not only applicable to smart education, but also to smart transportation, smart energy, smart health care, smart tourism and many other industries. Therefore, this paper has certain reference value for the government’s smart city construction, education macro decision-making, and public service ability improvement.

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