



China

ICT USE IN EDUCATION

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Policy goals and Implementations

The Chinese government believes that modernisation of education by applying information technology is essential in order to produce students who can be competitive in the information era. The process of introducing and integrating information and communication technology (ICT) application into the education system is referred to as educational “informationisation” – something the Chinese government is giving a great deal of attention to.

The actions being undertaken by the government and schools include the following:

- ➔ Constructing infrastructure needed for an information environment;
- ➔ Developing educational resources;
- ➔ Encouraging computer education;
- ➔ Supporting teacher professional development;
- ➔ Integrating ICT into traditional classrooms;
- ➔ Delivering good educational resources into rural areas using ICT-assisted distance education methods;
- ➔ Changing administration systems through ICT applications.

Long-term Goals for Chinese Educational Informationisation¹

The aim is to meet the following goals by 2010:

- ➔ ICT-based infrastructure which covers the whole country will be set up;
- ➔ ICT education will be popularised in the most places;
- ➔ The competence of ICT application for all Chinese citizens will be improved;
- ➔ There will be enough ICT specialists to meet social development needs;
- ➔ A lifelong education system will be in place;
- ➔ Software producing centres and ICT corporations will be operational;
- ➔ The general level of infrastructure development and ICT application in education will rank at the top level among developing countries;
- ➔ For universities, and for 85 per cent of the technical/vocational schools and primary and secondary schools in the developed area of China, the level of infrastructure development and ICT application will match that of developed countries.

Main Tasks and Relative Policies²

To realise these goals, the Chinese government has developed policies and plans as follows:

- ➔ Increase the bandwidth of the main lines of China Education and Research Network (CERNET),

extend coverage towards the West and include small cities;

- ➔ Enhance the province and city networks of CERNET in order to supply good quality service to all kinds of education institutes with 2.5 Gbps bandwidth;
- ➔ Construct a wide band satellite-based network (CEBSat) and combine that with Internet (CERNET) in order to supply multiple information transmission services for the entire country, particularly remote and rural areas;
- ➔ Enhance university campus network construction, particularly in the western part of China, and develop a digital information platform to support an e-library, an information management system and a distance education system;
- ➔ Enhance campus network construction in primary and secondary schools, particularly in village areas, launch the course ICT Education in most of schools and integrate ICT into the curriculum of middle technical/vocational schools;
- ➔ Improve education administration informationisation by constructing platforms for officials, resources and public information;
- ➔ Increase the number and quality of ICT specialists to spread ICT education in primary and secondary schools, to train teachers in information literacy and to provide inservice training about information literacy for adult and vocational students;
- ➔ Facilitate sharing of teaching resources in order to improve the quality of education by developing a distributed education resource platform;
- ➔ Launch research on second generation networks and conduct trials in selected central cities;
- ➔ Develop policies regarding education enterprises that will encourage more financial investment and support development of ICT corporations;
- ➔ Develop quality standards for education informationisation and use them to develop evaluation systems.

In 2000, the Teacher Education Department of the Ministry of Education published a very important document, "Training Guidance for Teacher Training about Information School," which requested that all the teachers in primary and secondary schools learn how to use information technology by engaging in professional development activities.

In summary, the central government is attempting to enhance the application of ICT in different aspects of education in China through its national plan, by launching national-level projects and by encouraging local governments and local schools to be involved in and to invest in education informationisation.

Current level of ICT access and use

*Main Achievements to Date*²

- The development of infrastructure for educational informationisation is proceeding. The CERNET and CEBsat system provides basic support for scientific research and modern distance education. CERNET covers 30 cities and has become the second largest network.
- Application of ICT in education is developing swiftly. About 70 per cent of all colleges have established campus networks. Good progress is being made in secondary vocational education and in primary and secondary schools. Support for education from social enterprises and the development of educational resources are assisting this process.
- Education resource development and the modern distance education experiment have made some progress. Recently, many education administration departments and schools have developed an educational resource warehouse for materials such as web-based courses and other courseware, grouped according to the subject specialties and instructional characteristics of the institutions.

The Main Forms by Which ICT Is Applied into Education

- The satellite network system with two digital channels provides the main method of delivering courses to rural areas.
- More schools have access to the CERNET system as bandwidth improves. CERNET is used to obtain learning resources and for distance education.
- Computers are being connected to form network classrooms that can be connected to CERNET or the Internet.
- Multimedia classrooms are being developed to enable the exchange of instructional information (audio, video, Word, etc.) between teachers and students for use in conventional classrooms.

- Teachers and students use personal computers at home or schools.
- Instructional platforms are becoming available to provide support to schools for networked learning based on local and wide area networks (LANs and WANs).
- Resource warehouses are being established to share learning resources among teachers and students in all subjects.

*Classifying Access and Use in Education*⁴

Because of gaps in the economy, there are different levels of ICT access in education. These can be classified as follows:

- **Top level:** Some schools in central cities have very good ICT infrastructure. Teachers and students have access to the CERNET and all staff and students have a high level of ICT literacy. They understand how to change the teaching and learning model, how to develop curriculum content using ICT and how to improve the effectiveness and efficiency of administration through ICT applications.
- **Middle level:** Most schools at this level are trying to integrate ICT into courses and administration with a middle-level ICT environment. Only some of the staff are skilled in the use of ICT, but even though they are far from the top level, they are making a start at using ICT in the classroom.
- **Lower level:** Most schools in rural areas have no money to invest in ICT. Even with sponsorships from donors or governments, they cannot use ICT in effective ways. Few staff have received any training. They need more money, training and resources.

Major initiatives

National Government Projects

- **School Connection Project:**⁵ The purpose is to enable all primary and secondary schools to have access to the Internet and to encourage the application of ICT. The goal of the project set by the national government is for over 90 per cent of elementary schools to be connected to the Internet by 2010.
- **Modern Distance Education Project:**⁶ The purposes of this project are to increase the bandwidth of the China Education and Research Network, to convert two satellite TV channels from analogue to digital, to develop web-based teaching resources and

to support some universities to deliver distance courses by ICT on an experimental basis. The national government is providing the funding and the necessary authorisations.

- ➔ **Computer Network Construction Project for Western University Campus:**⁷ In 2002, the national government invested CNY 900 million (US\$ 108 million) to support 152 western universities to establish campus networks and have access to the China Education and Research Network (CERNET). The project improved the infrastructure for the rural areas of China, which may be useful for other levels of education in the future.
- ➔ **Popularisation of ICT Education in Primary and Secondary Schools:**⁸ In 2000, the Ministry of Education launched a plan called Popularising ICT Education in Primary and Secondary Schools, and requested all primary and secondary schools to offer a course on ICT education during the following five to 10 years. The intent is to have all K-12 students learn to use a computer.
- ➔ **Administration Informationisation Project:**⁹ This project aims at establishing a web-based support environment for educational administration to enhance the quality of public service education administration, to improve the efficiency of educational administration and to facilitate monitoring by the society.
- ➔ **Distance Education Project for Communist Party Members Training in the Countryside:**¹⁰ The government plans to build a distance education network, which will reach the Communist Party member learning centres in the countryside. This project will use distance education to facilitate the provision of education for country Communist Party members, schools and the general community to improve the cultural condition in the countryside.
- ➔ **Modern Distance Education of Primary and Secondary Schools in the Countryside:**¹¹ This project started in 2003 with CNY 10 billion (US\$ 100 million) invested by the central government. The money was used to buy infrastructure equipment. The aim was to enable primary and secondary schools in the countryside to make use of distance education in order to share good educational resources with the schools in developed areas.

Joint Projects Between Enterprises and The Education System

- ➔ **The Rural Area Distance Education Demonstration Project:**¹² The Li Jiacheng Fund and the Ministry of Education will provide 5,000 sets of

receiving equipment to primary and secondary schools in 12 provinces in rural areas, and set up 10,000 learning centres which can receive China satellite and broadband learning programmes. The aim of the project is to improve education quality by supplying good teaching and learning resources.

- ➔ **China–U.S. e-Language Project:**¹³ This is by far the biggest educational co-operation project. Through the co-operation of experts in China and the United States, it uses advanced technologies such as multimedia and simulation, together with advanced educational ideas, to develop web-based learning courseware for English and Chinese instruction. The learning modes are portable media such as CD-Rom/DVD, web-based learning and combinations of the two. It is mainly aimed at high school students from 12 to 18 years who study English in China and Chinese in America.
- ➔ **Wireless Network Instructional Demonstration Project Sponsored by Lenovo, Intel and the Affiliate School of Remin University:**¹⁴ The aim of this project is to use the Lenovo E360 notebook together with the campus wireless LAN to apply different kinds of instructional resources for daily learning, to enhance interactions among teachers and students and among students themselves, and to improve the learning efficiency of students.
- ➔ **China-Europe Basic Education Project in Ganshu:**¹⁵ This project is the biggest of all the European Union–sponsored Ganshu projects. The fund is EUR 15 million. Begun at the end of 2001, it has provided tuition assistance to students, equipped sets of desks and tables and provided computers. It has helped 439 primary school teachers to take degree programmes, provided training for 1,200 junior school teachers and set up 86 teacher learning centres. The project has now spread to 41 rural villages in Ganshu province.

Examples of training

- ➔ **Demonstrated Software College:**¹⁶ In 2002, the Ministry of Education and the Committee of Country Development authorised 35 universities to set up demonstration software colleges. The aim is to train information technology personnel to meet market demand.
- ➔ **Training for Educational Technology Specialists:** About 150 universities provide training at the bachelor's degree level in educational technology. Approximately 20 other universities have the right to award master's degrees in educational technology and, among those, three universities (Beijing Normal

University, East China Normal University and South China Normal University), have the right to award a doctoral degree in educational technology, thus providing a multilevel system of professional training in educational technology.

- **Intel Future Education Project:**¹⁷ In 2000, the Normal Department of the Ministry of Education and Intel Company set up the Intel Future Education project on an experimental basis in 10 provinces and central cities. The project delivers teacher professional development on how to integrate ICT and new teaching methodology in teaching and learning.
- **Teacher Training for The New Century:** The aims of this project are to improve the quality of teachers in primary and secondary schools, strengthen professional development opportunities for key teachers, improve the structure of teacher teams and increase the numbers of teachers in rural areas.
- **The Teacher Education Network Union:** In 2003 several universities, such as Beijing Normal University, Central Radio and TV University, and the China education TV station set up the Teacher Education Network Union. The union will work on supplying teacher professional development by distance education using ICT.

Constraints on the use of ICT

- **The lack of a clear and shared understanding of informationisation:** The different levels of government and administrators, as well as students, teachers and parents, often lack a full understanding of educational informationisation. Thus local governments often fail in their efforts to direct and promote educational informationisation because of impracticable plans and measures.
- **The deficiency of the investment in educational informationisation and the imbalance of the development in different areas:** The eastern part of the country invests more money and manpower in infrastructure than the west does. The provision of ICT equipment in elementary schools in the middle west and the poor villages is falling behind and the computers and networks they do have are not satisfactory. According to 2001 statistics, in Shanghai the ratio of students owning computers is 16.7:1, but in Yunnan it is 186:1. It is not unusual for there to be no computers at all in the schools of the western villages.

- **The difficulty in integration of ICT into education:** The integration of ICT into traditional classrooms is a practical difficulty in Chinese schools because of the lack of education resources and sound application methodology. Research should be carried out to develop suitable models for China that embody best practices of ICT in daily instruction and administration.
- **The demand for the people who are skilled in ICT:** In order to integrate ICT into education, there needs to be many more people with specialised knowledge of educational technology – particularly on the part of the teachers and the administrators. Moreover, the insufficiency of the teachers and the resources in the west increases the gap between the western and the eastern parts of the country.
- **The constraints of the education informationisation facilities in elementary schools:** It is common for elementary schools to pay much more attention to the hardware than to its application and to teaching and software development. They also don't have sufficient budgets for daily maintenance, which limits the efficiency of ICT application. It is also worth noting that the schools seldom have an overall plan when using ICT in teaching and administration.
- **The immaturity of the educational ICT industry:** There are many factors creating obstacles to the development of the educational ICT industry. These include the lack of ICT products in terms of both quantity and quality, which are needed to support the development of informationisation; the shortage of talented people; the lack of co-ordinating policies, competitive mechanisms, and evaluation of results; and the immature stage of the development of information criteria and success indicators.

Analysis

Generally, China has made great progress in the application of ICT in education as a result of the sustaining effort of the national government. Most people in education realise that meeting the challenges of ICT is an important condition for moving forward. However, there is much to be done if the education system is to produce an information society with competitive citizens.

Educational informationisation can be classified into three steps for any country. The first is information infrastructure construction. The second is applying ICT into all aspects of education. The third and last is to change all aspects of the education system, particularly the education environment, educational content, pedagogy and administration methods. At this point, China has almost finished part of step one in

the central cities, but not in the villages. There are still two kinds of effort necessary for China: one is to support village schools to complete step one; the other is to push other schools to pass the second and third steps as soon as possible.

The following initiatives are suggested as ways of promoting the application of ICT in education:

- ➔ **Invest money on village information infrastructure and staff training.** Village information infrastructure level in China is very low. There are two problems: there are not enough facilities and few people can provide technical support.
- ➔ **Develop resources that are relevant to the application of ICT in education.** First, a national resource platform is needed to support the sharing of learning materials among regions and schools. Second, it is important to identify and spread ICT application models suitable to Chinese education. Last but not least, greater effort is needed to identify appropriate management and resource criteria to use as a basis for future development.
- ➔ **Supply staff training on ICT and new education philosophy.** In order to increase the application of ICT in education, it is necessary to help staff develop the requisite skills. Additionally, the ideas of relevant persons should be renewed to improve the efficiency and quality of ICT applications. The training of administration and decision-making staff is the most important task. So far there is no plan for this.
- ➔ **Promote development of modern e-government.** It is necessary to push forward the informationisation of educational government affairs and to build the perfect e-government system in order to improve the educational public services and administration. This will require the development of a wholesome e-

government system and management mechanism, as well as e-government criteria.

Many domestic and overseas organisations and enterprises, such as UNESCO, Apple, IBM, Lenovo, TCL, overseas institutions and non-governmental organisations provide products, technology support, teacher training programmes and funding to enhance the development of ICT educational application in China. These joint projects have contributed a great deal to the application of ICT in education in China in terms of funds, new education philosophy and methodology, and administration system methods. Chinese education has benefited much from these collaborations and joint projects.

NOTES

- 1 "Education Development Agenda for 21st Century," Government document, 1999.
- 2 "The Development Agenda of Educational Informationisation for Tenth Five-year Plan," Government document, 1999.
- 3 See note 2 above.
- 4 Chen Li, "Research Report on Education Informationisation in China," *Network Era*, 4 (2002).
- 5 "Set up 'School Connection Project' in Primary and Secondary Schools," Government document, 2000.
- 6 "Instruction on Developing Modern Distance Education in China," Government document, 1999.
- 7 "The Project of Constructing University Campus Network for West Universities," Government document, 2001.
- 8 "Popularising ICT Education in Primary and Secondary Schools," Government document, 2000.
- 9 "The Instruction on Accelerating Speed of Educational Administration Informationisation," Government document, 2001.
- 10 "The Distance Education Project for Communist Party Member Training in the Countryside," Government document, 2003.
- 11 "The Project of Modern Distance Education of Primary and Secondary Schools in the Countryside," Government document, 2003.
- 12 See the home page of China State Ministry of Education website: www.moe.edu.cn.
- 13 See note 12 above.
- 14 See note 12 above.
- 15 See note 12 above.
- 16 "Instruction on Authorising Some Universities to Set Up Demonstrated Software Colleges," Government document, 2001.
- 17 Chen Li, "Statistic Report about Network Education College in China," 2003. [success_storiesUNDP.html](#).