

The Current Status of Information Technology in Education

The Case of Japan

Ministry of International Trade and Industry, Japan

1. The Significance of Information Technology in Education

Information Technology, or IT, has become popular in our homes, public places, and businesses. Using networks, we are now able to exchange information in real time with people anywhere in the world. IT will surely continue to make further inroads in society. And that makes it necessary for everyone to acquire the ability to use IT.

IT should also be understood as something that has the potential to radically change educational methods. With computers, however, it has become possible to provide guidance to students appropriate for their individual levels of comprehension and progress. Computer graphics and other technology have also made it possible to visually study things that used to be described in books or viewed as photographs.

In these circumstances, all the countries of the world recognize that IT affects their future and the future of their citizens, and are therefore placing a high priority on IT in education.

In the Summit last June, the Japanese prime minister Mr. Obuchi emphasized the importance of IT in education in this global era. After his comments, the leaders agreed that the ability to use information and communication technology is essential for all children.

2. The Japanese Government's Policy on IT in Education

(1) Basic Concept

Recently the Japanese government determined its basic objectives to proceed with IT in education. First, improving children's ability to communicate, and enabling children to think, select and reconstruct

information by themselves through networks. For example, one school introduces computers as a method of information index and data making, and then children develop high-level usage by themselves and master information literacy. Second, creating a new teaching style so that children can recognize images of abstract concepts such as molecular structure in science lessons and solid structure in mathematics lessons. Third, enabling the exchange of information among local people or with distant schools, and close contact between home and school with IT, through the changing geographical relationship between home and school. For example, connecting with schools in isolated islands and urban areas helps children to exchange opinions and develop friendships and share lessons by using telecommunication satellites.

(2) Action Plan

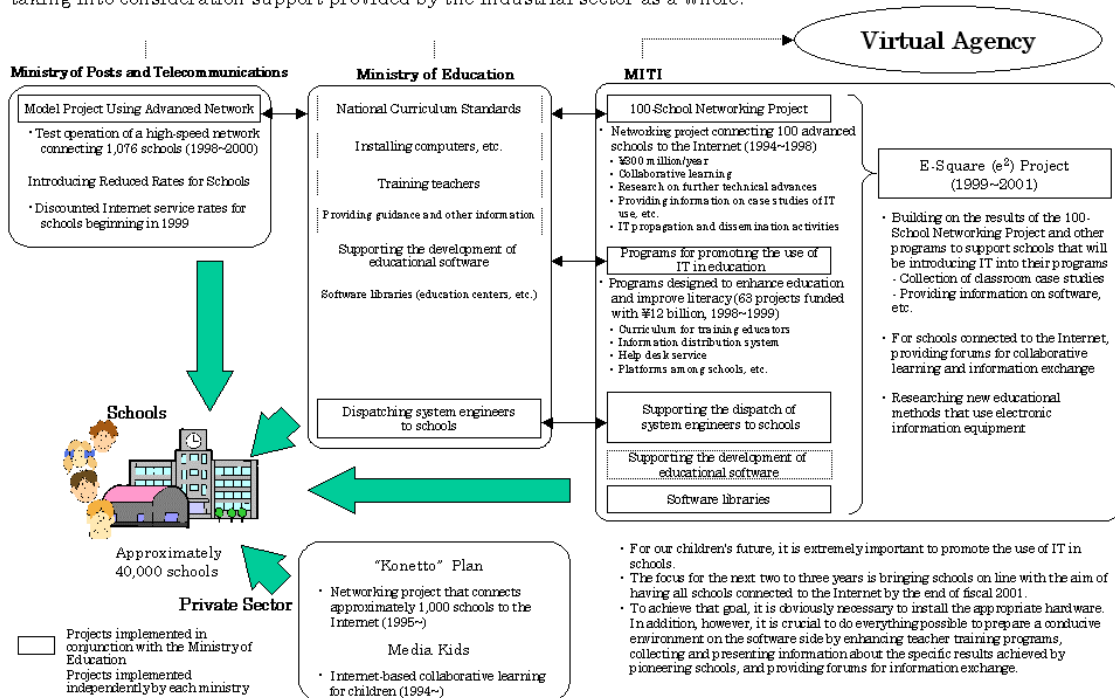
In January 1997, an educational reform program was announced as a government action plan, thus reflecting the further promotion of IT in education as an official government policy. Other countries also recognize that IT provides a wellspring of national competitiveness. Efforts are being made to introduce IT in school education programs on a national scale, with the aim of training qualified people who will support the nation in the future. The Ministry of Education's "national curriculum standards" will be introduced in fiscal 2002 for elementary and middle schools, and in fiscal 2003 for high schools. Through these standards, an information course will be established as part of the curriculum, and provisions will also be made for the use of IT in other courses. Beginning in fiscal 2000, a three-year plan will be implemented to give teachers the necessary training, and, as a transitional measure, pilot programs will be introduced in some classes.

3. The Current Status of IT in Education

Progress has been made in preparing the environment for IT in schools, including hardware and software. However, work must still be done to train educators who can use IT and to develop relevant curricula for educational purposes. But recently there have been many pioneering projects in this area, and these programs are expected to lead to full-scale dissemination of IT.

Figure 1. Japan's Efforts Related to Disseminating IT in Education

MITI has supported school education primarily from the perspective of IT utilization. The importance of schools as a training ground to prepare students for their role in society is widely recognized. MITI will continue its efforts while taking into consideration support provided by the industrial sector as a whole.

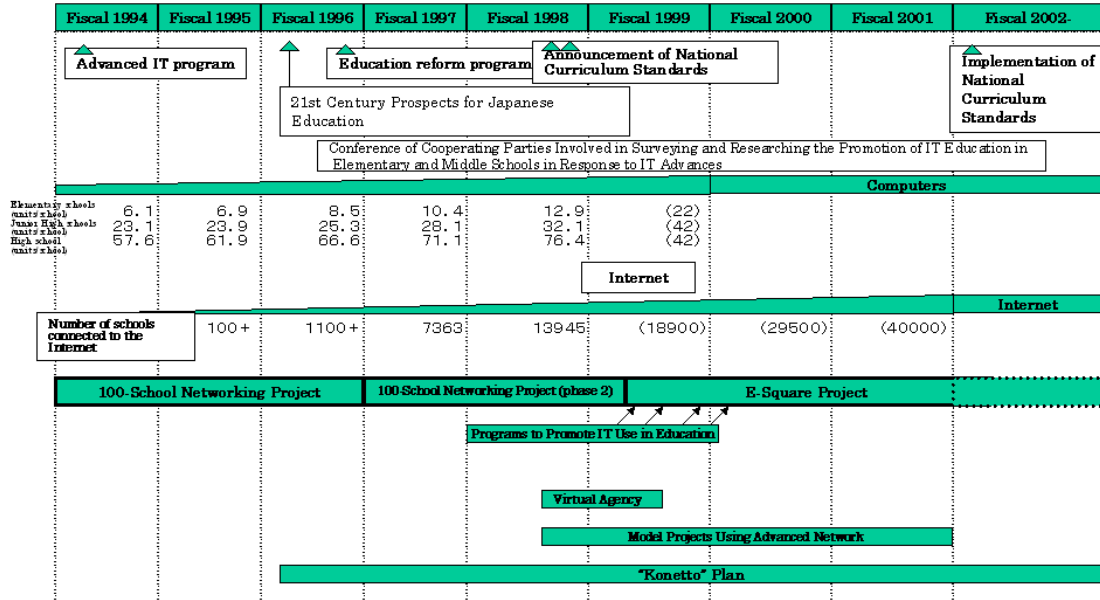


(1) IT in Schools

The Ministry of Education has been installing computers in schools since 1994 on the basis of its new facilities plan. The current status and future plans for IT introduction in schools is shown in Figure 2. There are not enough computers in Japanese schools, and further installation is a matter of pressing urgency. The Internet was first introduced in Japan's educational system in 1994 through the 100-school networking project. (This was also the year when the first commercial provider was introduced in Japan.) The Ministry of International Trade and Industry, MITI, implemented the 100-school networking project from 1994 to 1998 in coordination with the Ministry of Education, and then started the E-square project in 1999. The initial target of the 100-school networking project is connecting 100 technically advanced schools to the Internet and implementing research on using the Internet effectively. From this year, MITI will build on the results of the 100-school networking project and other programs to support schools that will be introducing IT into their programs through the E-square project.

Figure2. Overview of the Introduction of IT in Education

- The Internet was first introduced in Japan's educational system in 1994 through the 100-School Networking Project. Development has been rapid since then, with even further dissemination expected in the future.



(2) The Issues for IT in Schools

In proceeding with IT in schools, there are some problems. In many cases, funding is insufficient for maintaining and operating the computers. Also, because each school is responsible for operating its own computers, a heavy burden is placed on the teachers in charge of IT.

By connecting their school computer to outside networks, students can engage in exchanges with other schools and use online resources for their research and study. As shown in Figure 3, however, very few schools are currently connected to outside networks. Even among schools that are connected to the Internet, there are a great variety of capabilities; some schools have several computers hooked up through LAN systems, while others have online access through only one computer. The effectiveness of LAN systems within schools has been recognized, but only a small percentage of schools have LAN systems installed.

In addition to that, the cost of networking is a major problem, especially for schools in isolated areas. For example, some schools on islands have given up their lessons because of the high maintenance cost of connecting with outside networks.

Figure 3. Percentage of Schools connected to the Internet and having own Homepage

| | Percentage of schools connected to the Internet | Percentage of schools having own homepage |
|-----------------------------|---|---|
| Elementary schools | 27.4% | 29.4% |
| Junior high schools | 42.8% | 28.9% |
| High schools | 63.7% | 55.3% |
| Schools for the handicapped | 36.3% | 53.6% |
| Total | 35.6% | 34.7% |

(3) IT Education for Teachers

IT education for teachers is an even more important issue. As IT is further disseminated in the schools, teachers must be trained in how to use it. As shown in Figure 4, 57.4% of teachers say they can use computers, but only 26.7% say that they can teach others how to use them. Training programs are provided for IT education for schoolteachers, but during the last fiscal year, only 27.1% of all teachers in Japan participated in computer training programs. Moreover, 49.9% have never participated in such programs. To achieve full-scale dissemination of IT education, teachers themselves must seek more opportunities to use computers.

Figure 4. Current Status of Informatization in Schoolteachers

| | Teachers who can teach with computers | Teachers who can operate computers | Teachers who have taken computer training programs | Teachers who took training programs last year |
|-----------------------------|---------------------------------------|------------------------------------|--|---|
| Elementary schools | 28.7% | 52.7% | 62.1% | 39.0% |
| Junior high Schools | 26.1% | 59.3% | 47.3% | 22.9% |
| High schools | 26.0% | 67.6% | 34.3% | 11.6% |
| Schools for the handicapped | 16.5% | 44.3% | 33.5% | 15.1% |
| Total | 26.7% | 57.4% | 50.1% | 27.1% |

To tackle these problems, 3000 area leaders will be deployed in each prefectural area by the year 2001 through the IT educator training program. In each prefectural area, school-leaders will also be deployed in each school in conjunction with area leaders, all teachers are expected to learn how to operate computers by 2001. In schools, training programs are provided for teachers to master practical computer operational skills. And before introduction of “national curriculum standards” and “information courses” in high schools, the necessary training will be done.

(Actually to promote IT in education, understanding on the part of director-level educators is very important, so special training courses have been set up to enable director educators to understand the importance of IT in education.)

4. Pioneering Efforts to Employ IT in Education

(1) E-Square (e²) Project

The E-square is based on an earlier project called the 100-School Networking Project, which was implemented in 1994 when Internet use had not yet been fully introduced and disseminated even among major corporations. The Internet and other types of information technology were introduced in approximately 100 pilot schools to test the effectiveness and possibilities of the Internet, through joint research projects in a multi-school.

Currently plans are being implemented with the target of installing Internet connections in all 40,000 public schools by the end of fiscal 2001. As the number of connected schools increases, there is a need for a comprehensive program aimed at all personnel involved in education. The E-square Project was designed to fulfill this need. The “E-square” is a square in cyberspace that is designed for education. The capital “E” in this project name stands for two adjectives – ‘educational’ and ‘electronic.’ We adopted the word ‘square’ because the project is like a plaza in the heart of a town that enables participants to increase their knowledge through communication.

The project was designed to achieve the following three goals:

* Disseminating the know-how and results obtained from the 100-School

Networking Project, and providing support so that schools that come online, as well as schools that seek to broaden their network environments, can use the system smoothly and effectively.

- * Providing a forum where participants can interact and contribute freely through the network, thereby encouraging everyone from beginners to experts to learn together while stimulating and challenging each other.
- * Testing out advanced educational techniques that utilize IT.

The E-square Project comprises the following two sub-projects.

(a) School Network Support Project

This project provides a forum where schools that are planning to use the Internet as an educational tool can communicate with each other. It also provides a place where they can make practical use of the Internet for educational purposes, and supplies the technical information needed for successful Internet installation and utilization.

(b) Advanced IT Application Project

For schools that are already engaged in educational activities that utilize advanced network technology and methods, this project sponsors research programs on advanced technology and practical applications from new perspectives. Schools are asked to participate in the research, and the results are immediately posted on the E-square homepage with the aim of sparking a broad-based exchange of opinion.

(2) Some Private-Sector Educational Project

(a) Konneto Plan

The Konneto Plan is a network project implemented by the Konneto Plan Promotion Council, with the cooperation of the Ministry of Education and prefectural boards of education. More than a thousand schools are participating, including twenty schools in each prefecture. Participants conduct large-scale trial programs focusing on providing information and engaging in exchange between schools.

(b) Media Kids

The Media Kids is a Internet-based collaborative learning project for children. This project involves using the Internet to learn some topics and sharing the information on a web-site.

In addition to the Konneto plan and Media Kids, other activities, including a variety of regional network programs, have been implemented.

5. Assistance on IT in Education from Outside Communities

Support to schools from local communities and private companies is important for the success of IT in education.

(1) Deployment of IT Coordinators

To smoothly implement IT in Education, coordinators are nominated in each local educational committee. Coordinators' main activities are compiling plans for the use of IT in education, maintaining networks, establishing help-desks and implementing training.

(2) Enlisting System Engineers to Support Schools

To enhance teachers' knowledge of IT, efforts are made to recruit system engineers who are dispatched to schools to provide back-up assistance. In conjunction with these efforts, funds are dispatched to allow schools to request the dispatch of these experts when needed. As of the end of March 1999, 5,083 engineers were registered with this program. We expect greater participation of these specialists.

6. Future Directions for IT Use in Education

Practical experience with IT in education has clarified the issues, and preparations are steadily proceeding. In fact there are many elements, and it will be necessary to conduct careful studies in individual categories such as IT education (including computer operation), electronic information use education (including information searches), and specialized technical education (including instruction in CAD and other specialized fields). In addition, it is necessary to study such questions as how exactly computers can be used if they are installed in a school's computer room, how computers can be used if installed in classrooms, and what we can do if every student has his or her own computer terminal.

In the next few years, IT is expected to spread quickly throughout the education system. MITI intends to provide all the support it can to help create an educational environment that makes full use of IT.