Educational & Electronic

Bringing the Future to Our Classrooms-CEC

CEC Outline and Description of Activities

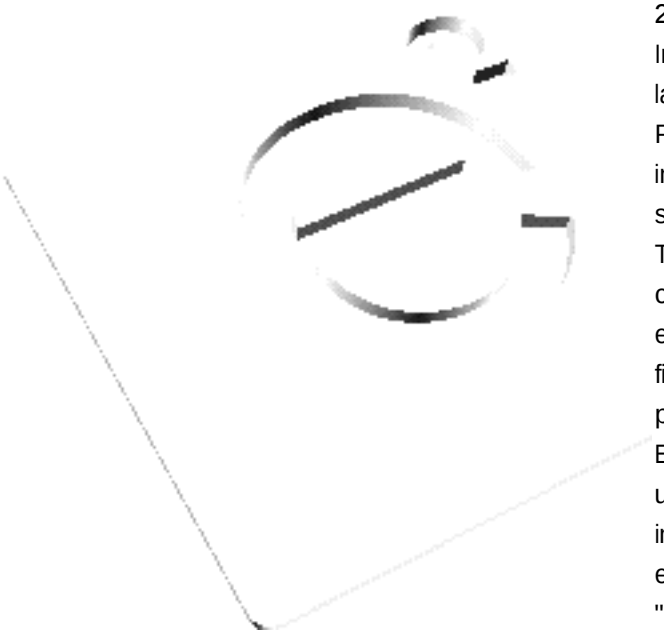
Center for Educational Computing (CEC)

The CEC was set up in order to promote the use of computers in school education in Japan, particularly in elementary and middle schools, and is under the joint control of the Ministry of Education, Science, Sports and Culture (MOE) and the Ministry of International Trade and Industry (MITI).
CEC conducts various surveys and research and development projects every year.
CEC's management includes members from academic circles, educational organizations, the computer and software industries, and representatives from corporations and individuals that support CEC's work.

Outline of the E square (e^2) Project

Introduction

This report summarizes the outcome, based on actual research, of the 100-School Project and New 100-School Project (1994-1998).



1. Project Objectives

The E Square (e^2) Project was designed to realize the following three objectives:

(1) Enable knowledge obtained through the 100-School Networking Project to be shared with as many outside parties as possible, and ensure that schools planning to access the Internet or improve their current network environment are able to easily and effectively use that resulting knowledge.
(2) Provide all project participants, from newcomers to advanced net users, with an opportunity to study together and expand their knowledge in an environment promoting free and open sharing of ideas.
(3) Verify the effectiveness of advanced educational methods that incorporate information technology & other such technologies.

2. Project Background

In 1994, when net usage was uncommon even in large companies, the 100-School Networking Project introduced the Internet and other information technologies to approximately 100 schools with orientation to those technologies. This project enabled participating schools to conduct joint research, thereby demonstrating the effectiveness and potential of the Internet in the field of education. Several other Internet-based projects have been conducted. The Ministry of Education, Science, Sports and Culture (MOE) is undertaking research-and-development projects involving net use at schools. Such private-sector educational projects as the "Konet Plan" and "MediaKids" also employ the net, and there is yet

another project currently underway that aims to provide Internet access to approximately 40,000 public schools nationwide by the end of 2001. Due to this project, the number of schools with Internet access is expected to steadily increase.

3. Project Name

"E square (e^2) Project"

Meaning behind the project name: 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" to depict a plaza in the heart of a town that enables participants to increase their knowledge through communication. Our project is open to all comers involved in education. The project is intended to provide data to net users at elementary, junior high, and senior high schools around the country.

We adopted the abbreviation "e^2" because of the two "e"'s -- "educational" and "electronic" -- and another meaning of the word "square" to multiply a number by itself.

4. Project Outline

The E square (e^2) Project consists of the following two projects:

(1) School Networking Support Project:
Provide opportunities for schools planning to access Internet and those already using the Internet to communicate and interact with each other and to join corporate projects that use Internet. The project is to also provide an technological information service for introduction and usage of Internet at schools.

(2) Advanced Information-Technology Application Project:
Invite applications and case examinations of schools planning project work that use advanced technologies and methods on the network. The results shall be published on the E square homepage and openly discussed.

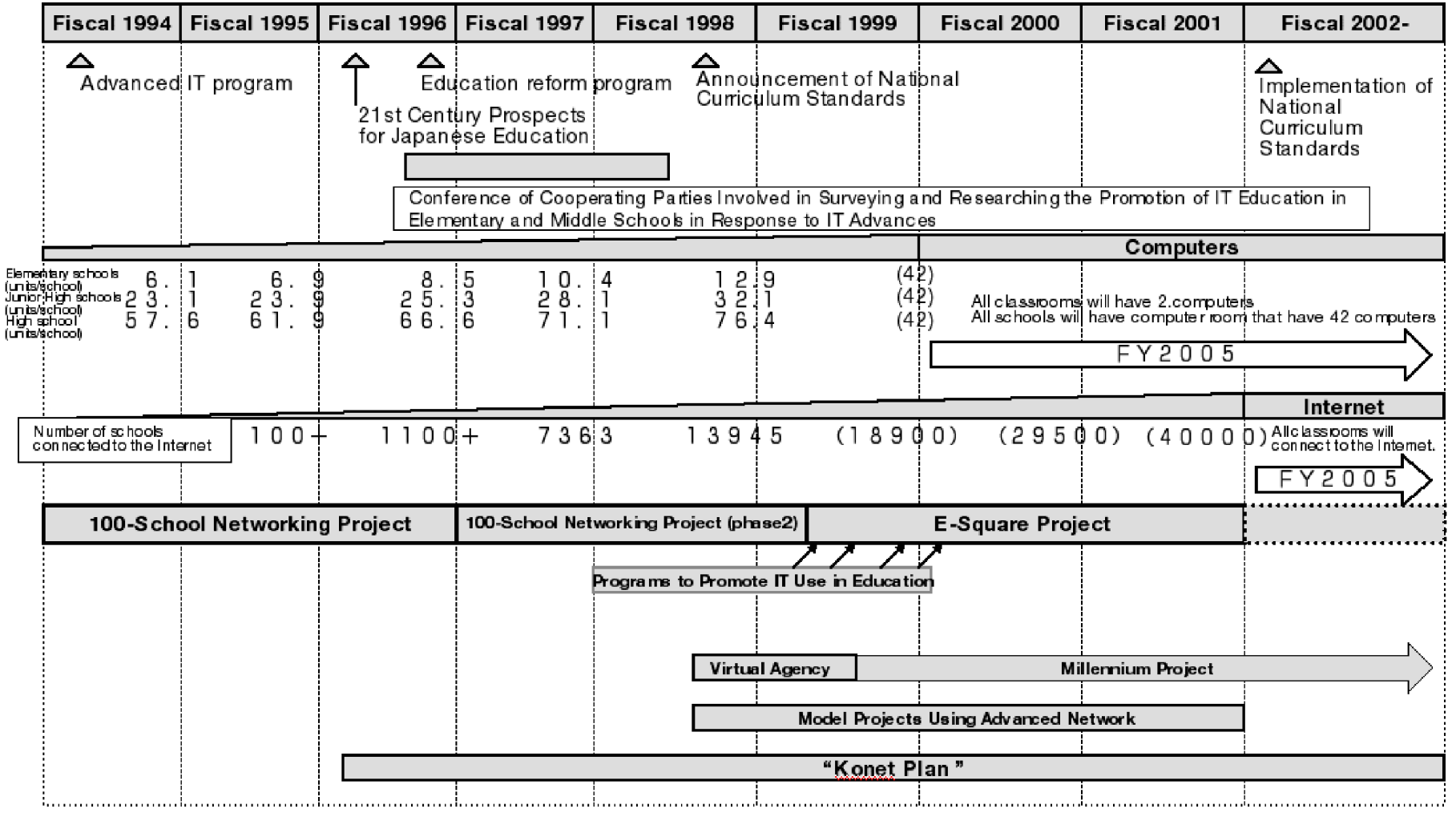
5. Operation of the Project

The E square (e^2) Project Promotion and Cooperation Committee shall be established to discuss the introduction of information-based education to schools and plan cooperative learning projects.

Sub-committees or research councils, consisting of academics and specialists, shall be set up in order to make policies and plans and to evaluate the results. The Information-technology Promotion Agency and the Center for Educational Computing shall be the secretariat of the E square project in cooperation with the National Education Center. They will work to ensure effective implementation of the projects. As needs arise, we will incorporate into our projects achievements of other projects designed for the promotion of information-based education at schools. Our plan is to also advance our projects in cooperation with universities, educational institutions and network projects already assisting schools. We will also launch public-relations activities to expand our project activities and make achievements known by the public.

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.



Challenges

100-schools networking Project
(1994～1996)
Evaluation of Effectiveness and Possibility

MITI provide IT
Products,Network.
Coordination

From evaluation to application

100-schools networking Project
(1997～1998)
Global, Community,
Advanced Technology

Coordination

Information Revolution

Teachers

Request for IT

BUT

Expensive

Background

School Environment

Computer	2000.3
Internet	2002.3
Curriculum	2002-2005

Over 1000 schools are Connected to the Internet

Emerging issues are to train teachers and to make many educational software

For 100 schools

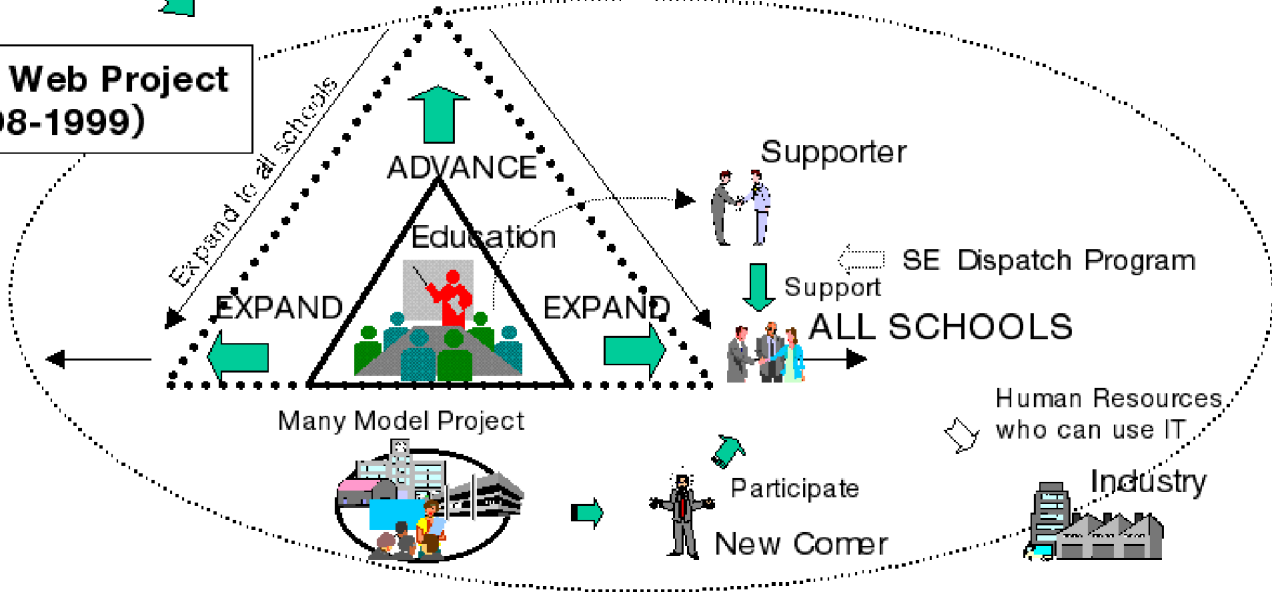
For all schools

E-Square (1999-)

Learning Web Project (1998-1999)

School Network Support Project
Advanced IT Application Program

Millennium Project (2000-2005)



Bringing the Future to Our Classrooms-CEC

Contents

Why Use Computers and Internet?

Usage of information technologies are being recommended in course of studies beginning the 2000 fiscal year which is the beginning of the transition period, and the plan to fully equip schools with Internet is steadily proceeding. So why is it necessary to introduce computers and Internet in schools?

Preparing for an Information Society

- While households, cities and companies become more information oriented, it will become essential to attain basic knowledge and skills in information technologies.
- The entire society is overflowing with information. Within such a society, the knowledge to collect, analyze and make use of information and the knowledge to communicate and express oneself is becoming a basic characteristic for all to have.

Using Computers & Internet as a Tool for School Management

- Effective in expanding the class range
  - Makes possible to collect and transmit a wide range of information
  - Makes possible to view examples of subjects that can not be achieved in reality
- Effective in enhancing the desire to learn
  - Enables students to study in ways that meet personal degrees of understanding and interests
  - Enables students to collect information for personal interests other than from textbooks
- Effective in opening schools
  - Makes possible to interact with regional residents by transmitting information from schools
  - Makes possible to communicate with households by corresponding through E-mail and introducing course work through the home-page
  - Enables communication with specialists outside of school by asking questions through E-mail, etc.

Of course, traditional methods of class work using textbooks, notebooks and experiments are still important. Usage of computers and Internet can be thought as a tool that will make these classes even more effective.

What Can Be Learned by Using Computers and Internet?

Once schools are fully equipped with computers and Internet, it is time to put these tools into use. So what should we teach? And what will students learn?

Basic Information Skills

- Learn how to use computers and Internet
- Learn the organization of computers and Internet

Existing Curriculums

- Computer simulation enables students to deepen their understanding of class contents
- Usage of network information makes possible to expand breadth of classes
- Attained knowledge can be put into practical use or can be further strengthened through network communication

Information Application Skills

- Learn how to collect, select and utilize information from an abundant amount of information
- Learn cross-cultural communication through international and regional interaction
- Learn how to express and transmit collected information

Specialized Knowledge

- Learn basic skills related to information, such as programming

Societal Structure

- Learn the importance of information technology in society

Students are adaptable and if given opportunities, they will begin to learn with computers. Students will adjust quickly without teachers inflicting pressure on them to begin using computers.

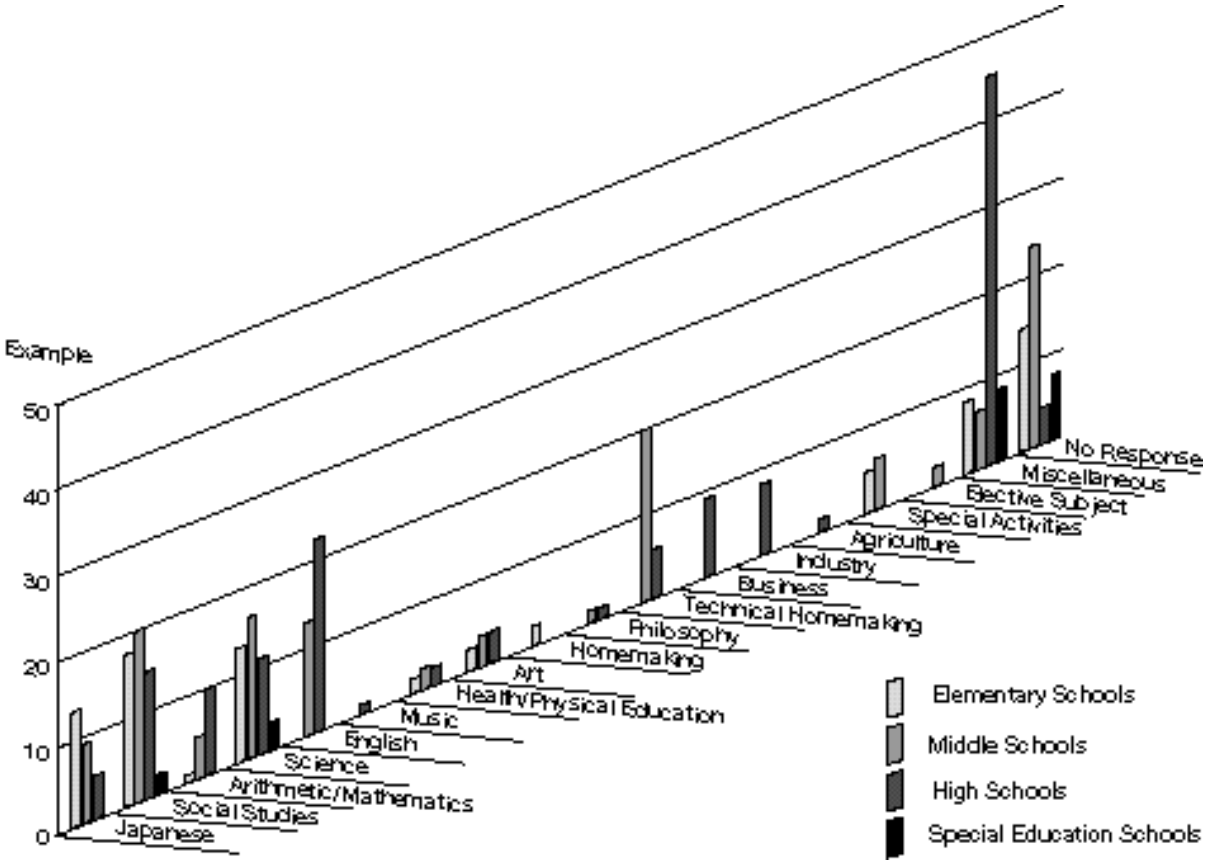
What Should We Teach Using Computers and Internet?

Computers and Internet are more frequently used for subjects such as English, Science, Social Studies and Technical Homemaking. It is also apparent that these tools are being used in Japanese classes.

- Students can learn more than the content of the literature, such as its history and geographical background. Thus they are able to obtain a broader view through a single piece of literature.
- As information for various subjects on software and Internet increases, it is thought that computer and Internet usage will advance into other subjects such as Music and Physical Education.

Many people answered in the Miscellaneous category. This is most likely because many subjects are cross overs that can not be categorized within a single subject. Through international relations, a language course would be combined with a history course.
As the example given, it is thought that subjects will be combined through usage of computers.

By collecting and analyzing information on subjects such as this, it will become possible to attain a higher level of education through class work.



What Does an Education Using Computers and Internet Aim At?

By now, you must have an idea of why computers and Internet will be used and what we will teach using these tools. So what are we aiming at for the future?
The virtual agency, which is a trans-governmental task force, reported 3 main points in December 1999.

Children Will Change

- Raise children who can think for themselves, listen to the ideas of others but can also form their own ideas, and actively express these ideas.

Classes Will Change

- Teachers are to actively utilize computers and Internet in classes, and this will help children gain further interest and actively take part in classes. This is due to change the basis of the entire Japanese education system.

Schools Will Change

- Advancing information technology into schools will not only make improvements within education systems. It will change the entire existence of Japanese schools by activating the improvement of school administration and relations between schools, households and regions.

The following ideas were shared by the 100 schools that are currently taking part in this project:

- Establish a personal identity that is not lost within the abundant amount of information
- Develop the strength to exist within society
- Educate students to respect etiquette, morals and human rights and to distinguish and use information as needed
- Learn the way to learn, instead of learning the knowledge
- Information technology is merely a tool; importance is in actually attaining the knowledge and method of learning

True importance lies in the future when all schools begin to use Internet. The goal is not to become equipped with computers and Internet. It is reaching the time to genuinely start thinking about how to improve the education system within such an environment.

What Has Been Attained Through Computers and Internet?

Actual results have shown that computers and Internet usage in schools have greatly changed both teachers and students.
Let us take a look at the ideas that were shared by the 100 schools currently taking part in this project.

Changed the Children

Progress was seen in children's interests, concerns, and knowledge to transmit ideas and to utilize information.

Revolutionized the Consciousness of Teachers

- As more changes were made, teachers' viewpoints of education and classes evolved, and new outlooks were gained as advisors.
- Their concept about education and the style of classes changed.
- Crossing the barrier of school, they were able think about future education.
- Teachers began to learn themselves.

Activated the Schools

Staff members became cooperative, and the sharing of ideas was promoted.

Leadership Skills Were Improved

New information became easily obtained and was used for researching.

Opened Up the Schools

Schools were linked to regions, thereby developing relations with people of other occupations.

Who Will Use Computers and Internet?

Computers and networks play an important role for all people related to schools. What kind of view point is needed for each standpoint?

Principles and Vice-Principals

- Actively use computers and Internet in corresponding with school officials and other schools
- Take the lead to instruct and promote the school to become information-oriented
  - An experiment was conducted where a notebook computer was provided to a school principle in the U.K. Now with the reputation of having "a principle that understands information society and a vice president that is familiar with information tools," the school is succeeding due to their incorporation of information technology.

Teachers

- Use computers and Internet as a tool that helps in classes and special activities
- Try to use computers in school administration
- Try to use internet in corresponding with people outside of school

Children

- Use for studies within classes
- Try to have them use during recess time
  (Will be necessary to consider other issues such as mail management, etc.)

Parents

- Use computers and Internet to communicate with schools, such as informing them about children's absence
- Better understand the school situation by viewing school newspapers posted on the home-page
- An idea would be to develop a system where parents become volunteers of society and answer questions from students through Internet

What Will the Teacher's Role Become?

Let us take a look at what teachers taking part in the 100-School Networking Project felt that their roles should become.

- Should play the part of a filter for students to contact society directly
- Be the coordinator of classes and the producer of group studies with other schools
- Become an instructor that supports both students and teachers
- Become an advisor that has a broad perspective but can also give precise advise
- Become a supporter that can insure the time and place for students to use computers and Internet freely
- Play the role of a guide who can select, from the abundance of information, that which will be useful on the education site

It is thought that the role of teachers will change from the traditional view of them being a figure who has great knowledge to share to students through classes.

What Kinds of Troubles Do Teachers Responsible for Information Technologies Experience?

Not only is it important for teachers to be active in using computers and Internet, but it is also essential that the surrounding environment is supportive of its introduction.In the following, we have organized the ideas shared by those taking part in the 100-School Project.

It Is Important That the Director Understands Information Technology

- It is mistaken that preparation for classes and activities to set-up network environments is merely out of personal interest.
- It is difficult to balance information advancement and class/school administration.

A Guideline Is Essential

- It is necessary to develop a guideline for the protection of privacy, rather than leaving the matter to teachers that conduct the classes.
- If a guideline is not developed, it will become the teacher's responsibility to make decisions every time a problem occurs. This imposes a burden on teachers.

Support Is Needed in Obtaining a Budget

- The process of obtaining a budget is made easier if supported by specialists.

It Is Essential to Hire an Advisor

- Teachers are not technicians, and computers are specialized products compared to TVs and videos.
- Thus support from a specialist is an essential factor. Even If an advisor can not be hired for each school, the burden of teachers is lessened if an advisor is insured for each school district.

A Place to Meet and a Person to Coordinate Such Meetings is Necessary

- In order to conduct group studies and international relations, schools will need support from educational organizations (such as CEC), educational centers , universities and volunteers.

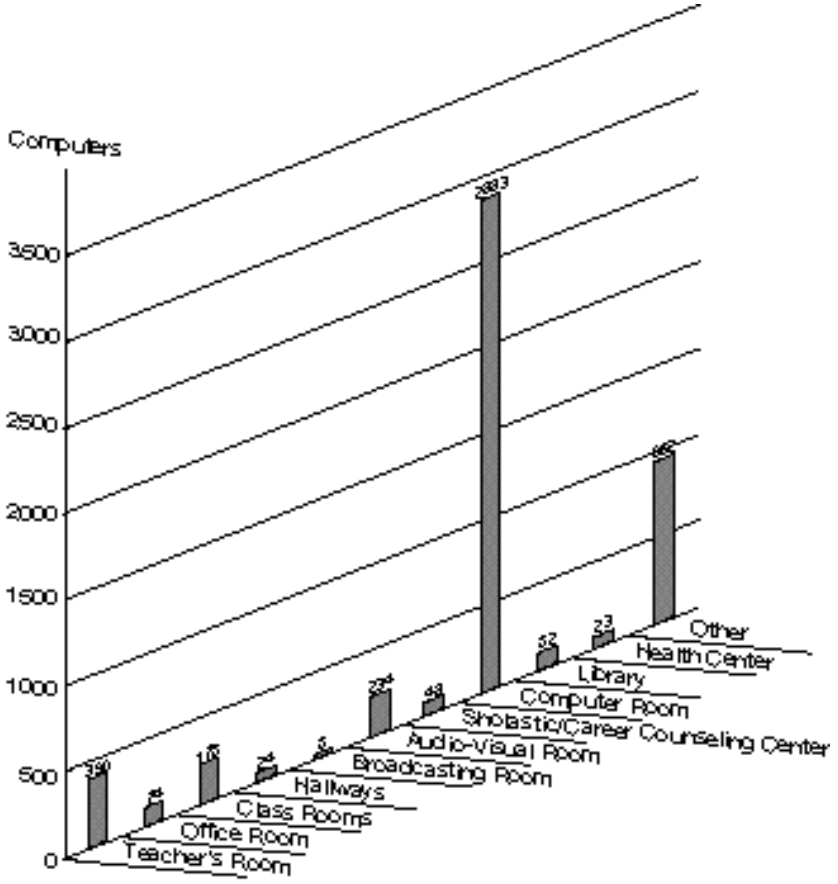
CEC has offered popularization activities, production of various guidebooks and meeting places.
CEC would appreciate any kind of ideas or opinions on how to be of better support.
Net@cec.or.jp

Where Will Computers and Internet Be Used?

Locations for setting up computers do not have to be limited to computer rooms. Let us take a look at some examples of set-up locations at various schools.

Usage of computers in the computer room is most common. However, we plan to equip all class rooms other than the computer room with computers and make Internet available in these rooms by the year 2005.

Beginning the 2000 academic year, we will begin to organize the LAN system, which connects all computers within a school.



Where Will Computers and Internet Be Used?

If the number of computers increase, the set-up locations for these computers will also increase. So what can be done at each of these locations?

Computer Room (1 Unit Per Person)
- Education that can be conducted in a group on basic operations

Computer Room (1 Unit Per Group)
- Group projects, such as regional studies and group production work

Various Classrooms
- E-mail usage, research for classes

Teacher's Room
- Correspondence with each household and school administration

Health Center
- Management of individual health and drugs/medicine

Library
- Management of the book collection and collection of information using the network
- Collection of information by children

Free Space (Such as Hallways)
- View E-mail and homepages during recess and after school hours

Each Household
- Homework and research projects, notification of absence, transmission of school newspaper

Outdoors (Such as Cities & Mountains)
- Input illustrated books, data and maps to use as an information terminal during field trips
- On-the-spot reporting from school excursion sites

When Will Computers and Internet Be Used?

Computers not only have to be used during classes, but they can be used in various other situations.

During Classes
- Necessary to distinguish usage between computer, group study and other classes according to the situation (Please see page 13)

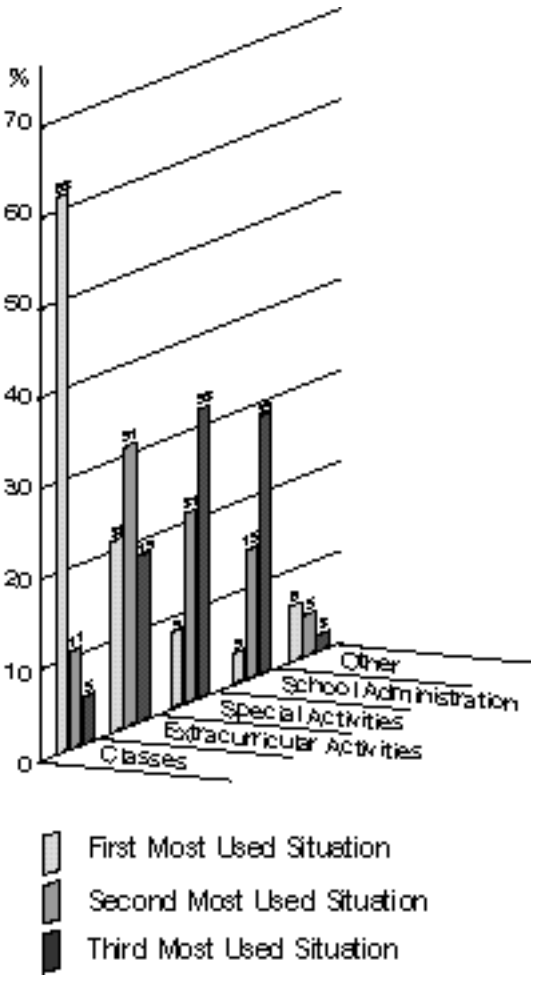
Class Preparations
- Not only use for computer class preparation, but can also use to create teaching materials
  - It will be possible to get information on the relationship between historical people and the school region

Open Hours
- Use computers and Internet freely, such as for viewing homepages and checking E-mail

Special and Extracurricular Activities
- Use for research and club activities
  - Can be used by people other computer club members (ie: soccer team members who want to learn formation and game strategies)
- Use for sports festivals and cultural festivals

Field Trips and School Excursions
- By using personal digital assistant (PDA) and digital cameras, broaden the breadth of usage

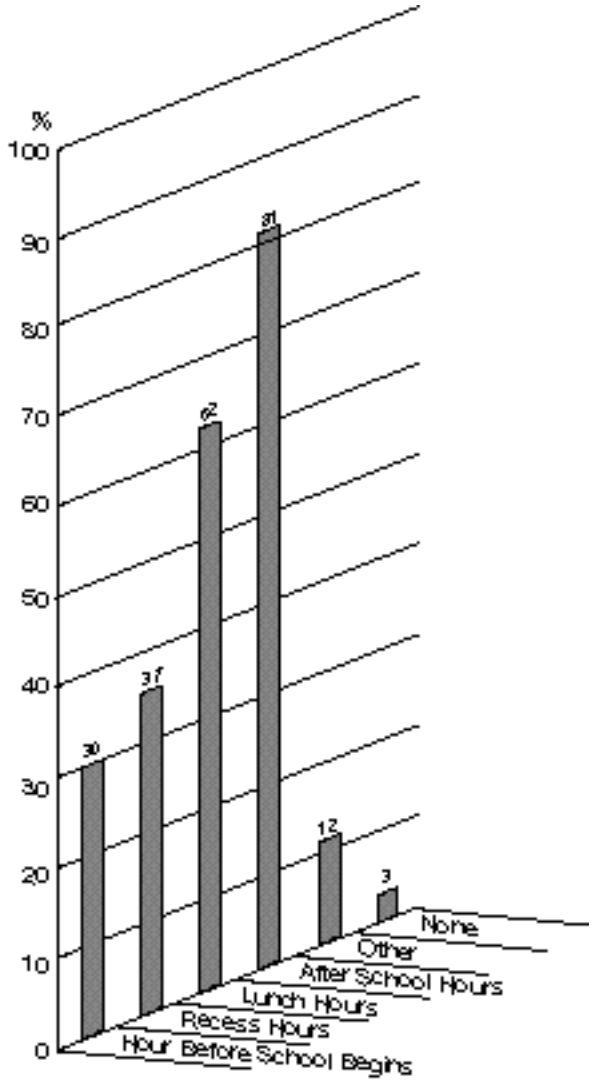
When Are Computers and Internet Used?



When Will Computers and Internet Be Used?

Other than during classes, we found that computers were most frequently used during recess and after school hours.

We recommend considering ways that students can use computers and Internet during lunch and after school hours.



How Should the Structure of Each Region Be Organized?

The 100-School Project has been supportive of regional programs in various forms. Considering the burden of teachers, it is thought that the regional center type will be the most effective method from now on.

Type A Educational Center (Server Set-Up Within the Center)

- With the educational center as it's core, manage the educational network
  - Advantage
    It will be possible to concentrate on improvement of server resources and problem solving. At the same time, more activities can take place in training and sharing experiences.
  - Task for Improvement
    If the server somehow becomes handicapped, it will interrupt all schools connected to the network.
    If the system is not structured in a way that meets the demand of schools, it will cause a top-down situation.

Type B Educational Center (Server Set-Up Within each School)

- The educational center supports each school's network management
  - Advantage
    Homepages and mail addresses can be easily managed because the server is located within the school.
    Less burden is placed on the school manager because they are given support from the server.
  - Task for Improvement
    It is difficult to insure a employee to be placed at the educational center.

School Intercommunication Type

- With the school (teaching professionals) as it's core, manage the educational network
  - Advantage
    It is possible to spread the knowledge of advanced schools to neighboring schools, thereby leading to future development of a regional network.
  - Task for Improvement
    There is a possibility that burden will be placed on a specific teacher.
    Also if the teacher standing at the core has a change in position, it will be difficult to maintain developed relations.

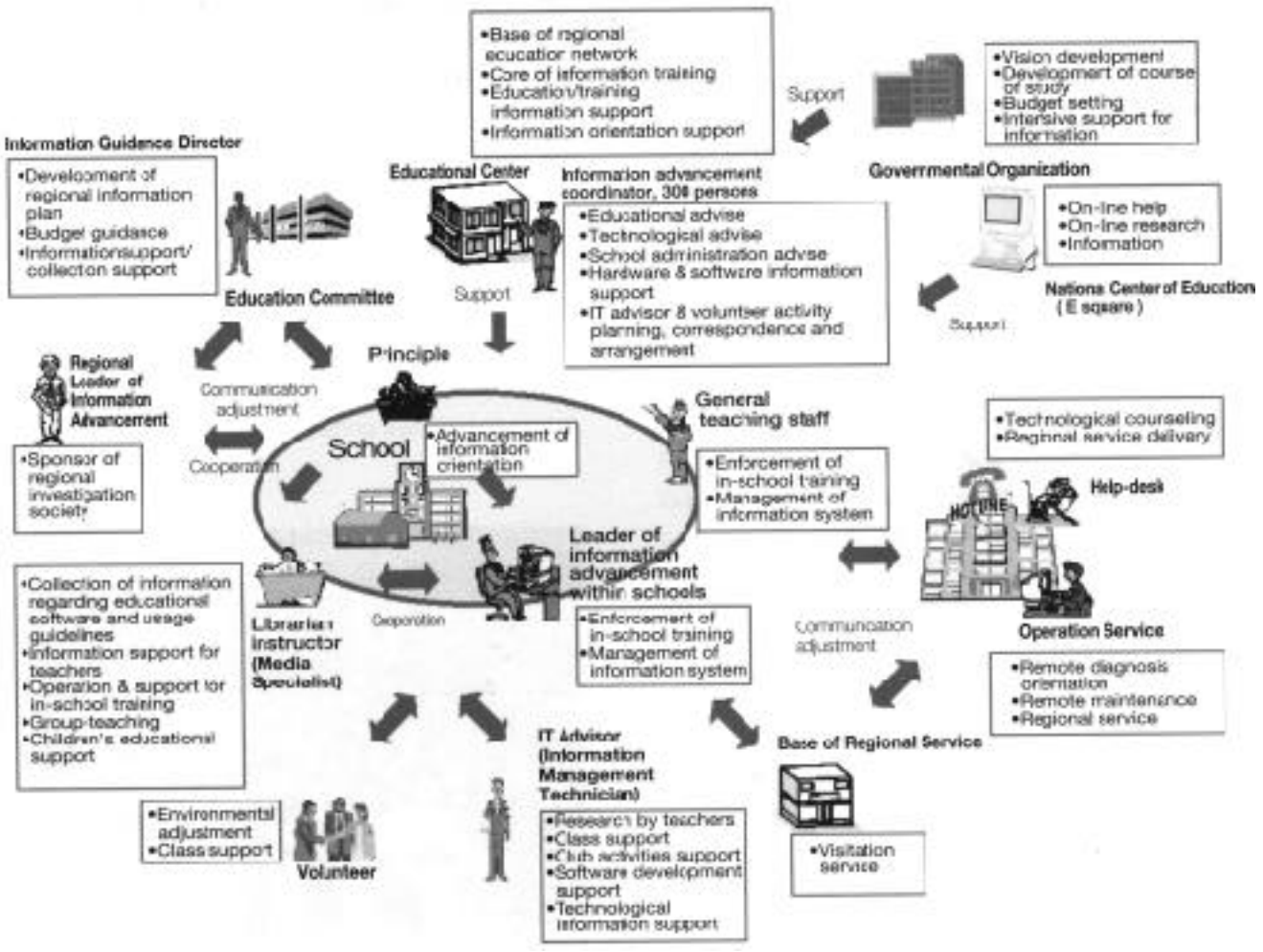
Group Relations Type

- With the educational research group (including volunteers) as it's core, manage the educational network
  - Advantage
    Active relations between schools can be anticipated due to vigorous volunteer activities
  - Task for Improvement
    Regional volunteers will be the center, but not all neighboring schools will participate.Thus it is necessary to gain cooperation from organizations such as educational committees.

How Should Regional Development Be Spread?

In order to advance the regional center type, it is necessary to station an information advancement coordinator to support schools within the region. The idea to station a coordinator has been proposed at a meeting enforced by the Ministry of Education (Meeting of Cooperative Investigation and Research), where the advancement of information education within elementary, middle and high schools is discussed.

We suggest having 1 coordinator per 50 schools. The maximum that a teacher from each school can give regional support is 10 schools.



How to Take Part In Group Education.

Due to Internet usage, a method of studying that crosses the barrier of schools is making an entrance.

Relations Between Various Schools

- Exchange of information between regions
  By exchanging information about each region's culture and weather, children can learn about cultural and regional differences

Nationwide Research

- Nationwide market research
  Learn about price ranges by comparing the price of the same product in different parts of the nation
- Acid rain & NO x research
  Through researching density of PH and NO x included in acid rain, think about environmental issues
- A single tree
  By observing a single tree over a period of time, study the flow of nature
- Nationwide germination map
  After planting a seed at the same time in different regions of Japan, compare conditions of growth and learn about plants and weather
- Group observation of weather
  Study about the weather in different parts of the nation
- Live camera
  Compare how clouds drift by setting an observation camera in different regions

Questions & Research

- About surroundings
  Ask parents of the school simple question about the school's surroundings
- Nationwide inquiry mail
  Solve questions by sending inquiry mail to volunteers and specialists
- Newspaper database
  Find necessary information from the newspaper database and learn the way to use information

In order to advance these plans, it is important to have a system where the coordinator can operate in an effect manner.
The E square in constantly supporting group study projects with numerous themes. We recommend that everyone takes part in these projects.

How Should International Relations Take Place?

Through international relations, the reexamination of one's own country and the broadening of one's interest in English can take place
The following are changes that teachers taking place in the 100-School Project began to see in children:

- Began to acknowledge their own country; instead of English being a subject to memorize, became a language to know and communicate with others
- Began to be more active in learning English and felt more familiarized with people of other countries
- Showed an attitude of listening to different ideas of others
- Acknowledged that there are various methods of communication
- Interest towards other countries increased and realized information-oriented society

A translation system to encourage students to communicate with other countries was developed. This was effective in comparing the English and Japanese languages.

- There are still some tasks for improvement
  - Difficult to translate when the cultural background is not known
  - Difficult to translate in a way that is understood by children
  - Difficult to hire a translator

There are tasks for projects other than translation.

- A system where continuous communication takes place after students are first introduced is necessary.
- Setting a goal for students to continue communication is important.
- A meeting place is needed for to meet other schools involved in international relations.
- Advance preparation was necessary for set-up with exchange schools. This was a difficult procedure.
- A coordinator is needed to support exchange projects.
- It is difficult to adjust the schedule during long vacations and periods before the new semester.
- The time difference between countries makes it difficult to communicate during normal school hours.
- There is a limit to written communication. Attachment of videos could be effective.
- It is a good idea to plan visits, so that students can actually meet each other and communicate.

CEC has produced a International Relations Guidebook. Please take a look at it on the E square homepage.
(http://www.cec.or.jp/e-cec/CEC_Esquare.html)

Center for Educational Computing

Address:
Terayama Pacific Building,1-23-11, Toranomon,
Minato-ku,Tokyo,105-0001 Japan
Tel :+81-3-3593-1801 through 1805
Fax:+81-3-3593-1806

http://www.cec.or.jp/
E-mail: cec@cec.or.jp

Editorial Design : Hirano & Associates, Inc.
Printed in Japan 2000.5-300HD