Japanese IT Strategies in Public Schools: A Case Study of Policies and Practices of Hiroshima Prefecture[1]

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Abstract

The Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) has tried to supplement Information Technology (IT) education in school curriculum. New national curriculum standards[2] which will be implemented from fiscal year 2002 and 2003, introduced "Information and Computer" in the compulsory subject "Technique and homemaking" for lower secondary schools, and a new subject "Information" for upper secondary schools. Moreover, the national curriculum standards have urged schools to use computer and telecommunication networks in all subjects. In response to the new national curriculum standards, each prefecture has improved the educational environment and teacher training related to IT, with support from MEXT and Ministry of Public Management, Home Affairs, Posts and Telecommunications in Japan.

This paper describes the IT strategies in school education in Japan through case studies in Hiroshima Prefecture. Then it will suggest towards innovations in IT education in Hiroshima. The paper is based on both secondary materials and primary sources, such as interviews and school visits.

1. Introduction

According to the final report[3] of the Working Committee[4] for the Promotion of Information Education in Elementary and Secondary Education (MEXT ed., 1998c), the discussion about information education in Japan started by the special committee for education held from 1984 to 1987. The committee emphasised the need for education corresponding with computerisation and influenced the revision of education curriculum.

A plan was set up which allocated computers for education sponsored by local distribution tax and implemented for six year since 1994. The plan aimed to install 22 computers in each elementary school, 42 computers in each secondary school and 8 computers in each special education school (MEXT ed., 1998c).

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The Round-table Conference regarding the Promotion of Educational Policy corresponding with the Development of Multimedia (MEXT ed., 1995) discussed the establishment of basic idea using multimedia and the physical equipment such as computer projectors, computers and printers.

In the basic policy for Advanced Information and Telecommunications Network Society (AITNS) headed by prime minister in 1995, the Ministry of Post and Telecommunications have given responsibility to promote IT devices such as computers and soft-wares in elementary, secondary, special, technical college and university (The Ministry of Post and Telecommunication, 1995). In the Council Report of the 15th Session of the Central Council for Education, MEXT (1996) had also recommended the qualitative improvement of school education and the establishment of "New School" corresponding with AITNS policy.

In 1997 the Ministry of Education, Science, Sports and Culture (now MEXT) announced plans to connect schools to the Internet (MEXT ed., 1998c), and in 1998 the Curriculum Council under the Ministry had also recommended the improvement of education in every level of education, in line with the growth of information-oriented society (MEXT ed., 1998d).

Eventually, a programme called "Virtual Agency" started under the Japanese Prime Minister Obuchi in 1998, and then in 1999 its concrete project called the "Millennium Project" was launched.

In connection with this, this paper examines the IT strategies and projects in school education in Japan with specific reference to the implementation of "Virtual Agency" and "Millennium Project" in Hiroshima Prefecture.

2. Japanese Strategies on IT and the Educational Projects

2.1 Virtual Agency

The Virtual Agency, which started from December 1998, has aimed at tackling problems[5] with several Ministries (Japanese Government ed., 1999a). Virtual Agency is a horizontal government system, which has been operated by the staff of member Ministries by using telecommunication tools. There are four projects under this programme.

One of the projects[6] is an educational project called "Computerisation of Education" organised by five staff[7] under the chief of Lifelong Learning Bureau of MEXT. (**See Figure 1**)

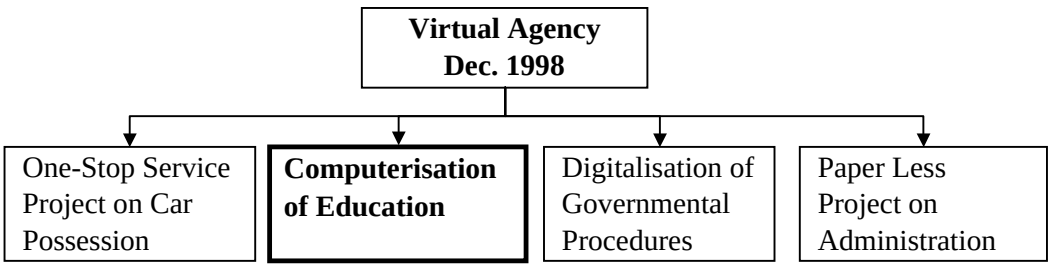

Figure 1. Virtual Agency's Stracture

Source:Japanese Government ed. (1999a). *The Mid-Term Report of Virtual Agency* (in Japanese). http://www.kantei.go.jp/jp/it/vragency/990728report.html (2002.06.27).

They submitted the final project report to the Japanese Prime Minister Obuchi in December 1999 (MEXT ed, 1999b). According to the MEXT (1999c), that report aimed at promoting high-quality human resources with information literacy in order to strengthen industrial competitiveness, enhance the convenience of national life, and establish a firm position in the world. To achieve these aims, the project has paid attention to elementary and secondary schools in order to raise information literacy of the whole nation. Moreover, this project has been implemented comprehensively up to 2005 and it is expected that equipment of computer environment at schools and tackling by software and hardware aspects will improve students' achievement, teaching methodology and school management itself.

Main aims of the “Computerisation of Education” project are categorised into three: students, teaching methodology and school management. Students should get used to use computers and the Internet as the closest tool in their life at elementary school level actively as a tool for independent study and active communication with others until the completion of lower secondary school so that they can gain advanced skills of handling those IT instruments for purposes such as international exchange at upper secondary school level. Moreover, students should learn under the guidance about information moral according to their developmental stage (MEXT ed, 1999c). The computerisation of teaching methodology aims to promote students' understanding and their active participation expressing their own opinions, will make class understandable for all, will decrease the difficulties for handicapped students in studying and lead them to social independent and should be usually used in all subjects. The third aim of computerisation of school management will promote closer relation between school and the community, will promote the participation by society concerned with school management, will do counselling of students including those who do not come to school, will revitalise school management system, and will promote the rationalisation of in-service training by using network system (MEXT ed, 1999c).

Moreover this “Computerisation of Education” project has paid attention to tackling hardware as well as software aspects, in order to achieve the aims mentioned above. Hardware aspects include provision of LAN and computers in public schools[8], provision of one computer per teacher and the support system in public school, installation of computers in private schools, provision of computers and high-speed access to the Internet in Japanese schools abroad, high speed connection to the Internet from all public schools (More than 1.5 Mbps[9]), reduction of charges for the Internet connection, and promotion of research with high-speed connection. Software aspects include in-service training for 3,000 leaders at prefectural level by fiscal year 2001, in-service training for all teachers to gain computer basic skills by the end of fiscal year 2001, re-arrangement of organisations in schools such as locating at least one teacher in charge of IT and making teachers' administrative work efficient and simple, provision of IT oriented system in each board of education such as allocating staff in charge, and promotion on supply of information on supporting teachers and schools and on exchange project[10]. Other software aspects include adoption of information literate people in employment examination, allocation of co-ordinators[11] taking charge of promoting IT in each board of education, inviting part time lecturers and assistance by experts in class and in-service training, inviting foreign youth who have IT skills at secondary school level, and arrangement of help desk in each educational region by contract with private companies

2.2 Millennium Project

Millennium Project started in December 1999 for the sake of information innovation for new industries, which are very important and urgent for Japan's economic society (Japanese Government 1999b). These new industries mean three kinds of fields: ageing, computerisation and correspondent to environ-

ment (**See Figure 2**). Within computerisation, there are three projects: Computerisation of Education, Realisation of Electronic Government, and Information and Telecommunication Technology 21 Plan.

Millennium Project - Computerisation of Education is six-year plan[12] starting from fiscal year 2000 and the concrete policy of Virtual Agency "Computerisation of Education" project report mentioned above. The objectives of this plan are as followings (the MEXT, 2000).

(1) Installing of computers in public schools till fiscal year 2005 - One computer for four or five students, two computers and one projector in each usual class room, six computers in other class rooms in each school, and one computer per student in computer room in elementary school
(2) Access to the Internet from all public schools[13] by fiscal year 2001
(3) Equipment of LAN in 8,000 schools[14] and then internet access from all the class rooms by the end of fiscal year 2004
(4) Installation of computers and access to the Internet in private schools by fiscal year 2004
(5) Implementation of in-service training for all public school teachers[15] at the end of fiscal year 2001
(6) Development and spread of contents for educational subjects, which are divided into three categories: for subjects, for teachers and for display, in order to understand easily by fiscal year 2005[16]
(7) Creating of the function of National Information Centre for Educational Resources (NICER)[17] till fiscal year 2005[18]

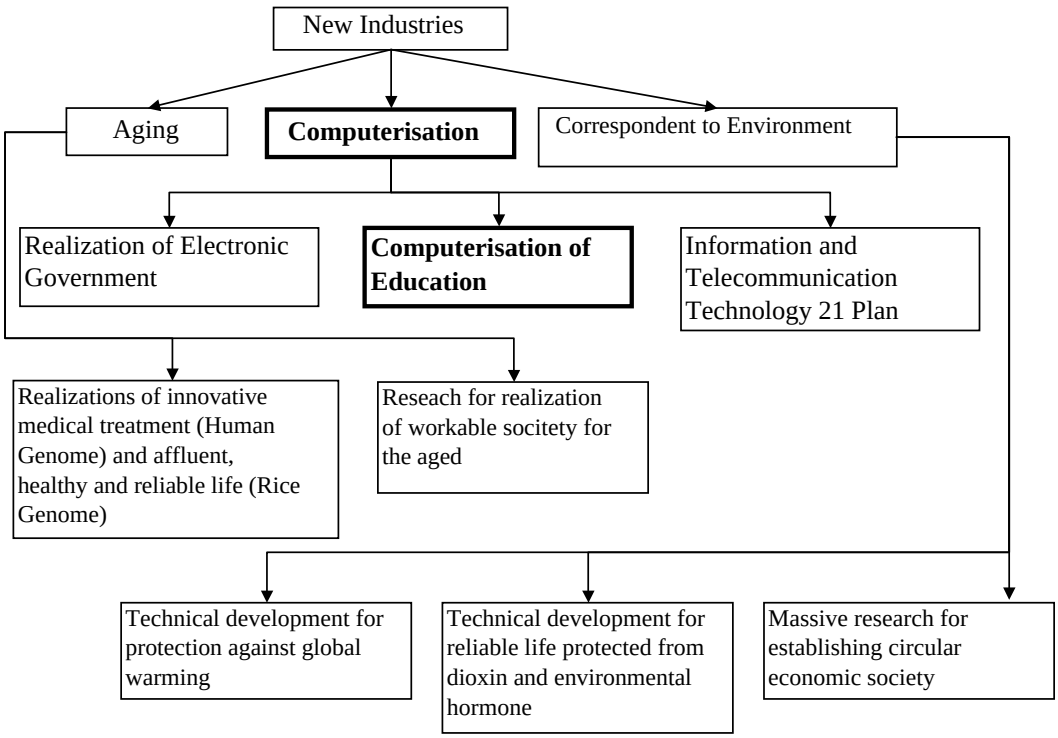

Figure 2. Structure of Millennium Project

Source: Japanese Government ed. (1999b), *Millennium Project* (in Japanese). http://www.kantei.go.jp/jp/mille/991222millpro.pdf (2002.06.27).

2.3 "e - Japan Strategy"

In January 2001, IT strategy headquarters drew up e-Japan strategy, which aimed at making Japan a nation in the forefront of IT within five years. In March 2001, they worked out "e-Japan Priority Policy Programme" as the concrete action plan of the strategy. The e-Japan 2002 programme has been implemented from fiscal year 2002. (Japanese Government ed., 2001a). In "e-Japan Priority Policy Programme", there are five priority policy areas: (1) formation of the most advanced information and telecommunications networks in the world, (2) promotion of education/learning and human resources development, (3) facilitation of electronic commerce, (4) computerisation of the administration and utilisation of IT in other public areas, and (5) ensuring the security and reliability of advanced information and telecommunications networks (Japanese Government ed., 2001b).

Although the contents of educational policy in the e-Japan Programme are almost the same as Virtual Agency and Millennium Project, its policies not only for elementary and secondary education but also for higher education and lifelong education.

2.4 Focal Point of Japanese IT Strategies on Education

The detail objectives already mentioned can be categorised into seven types (**See Figure 3a and 3b**). This typology has been based on the categorisation of main aims of Virtual Agency-Computerisation of Education (See 2.1 in this paper) and the basic recognition for the usage of information tools[19] set forth in the final report[20] of the Working Committee for the Promotion of Information Education in Elementary and Secondary Education (MEXT ed., 1998c). Figure 3b shows that most of these objectives have been categorised into Type F. It means that improvement of teachers and school management are necessary for educational innovation.

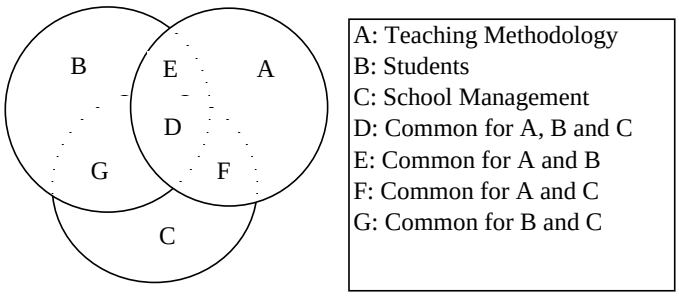

Figure 3a. Categorisation of Each Detail Objective

Source: By Authors

3. Hiroshima Prefectural Policies and Practices regarding IT Education

3.1 Outline

Hiroshima has aimed at "New Educational Prefecture, Hiroshima", which promotes educational innovation by using IT. To achieve this aim, Hiroshima has started "Information Triangle", which connects three cities[21] in Hiroshima by optical fibre cable since fiscal year 2000, and developed "Hiroshima Maple Net". These services have enriched the bases of telecommunication system and given equal opportunity to use for all residents in Hiroshima prefecture (Hiroshima Prefectural Board of Education ed. 2000b). The prefectural governmental organisations and public schools have been using the maple net service since fiscal year 2001 (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

According to Hiroshima Prefectural Board of Education (2000b and 2000c), Hiroshima has implemented several activities regarding IT education in response to the Virtual Agency and Millennium

Type	List of Objectives	Ratio in all objectives
Type A	> Using computer in all subjects	7.70%
	> Equipping suitable peripheral device for handicapped students	
Type B	> Improving study way and expression ability of students	3.84%
	> Internet moral	
Type C	> Relationship between schools and the communities	7.70%
	> Efficient and simple administrative management	
Type D	> Focusing on basic, higher and lifelong education	19.23%
	> Equipping LAN	
	> High speed connection to the Internet	
	> Cutting the charge for connection	
Type E	> Development of educational contents	15.38%
	> Installing computer for students	
Type F	> Full information for teacher and exchange project	42.31%
	> Allocating help desk and coordinator and installing IT system in each educational board	
	> Re-arrangement of school organisation	
	> In-service training	
	> Recruitment of teacher having IT skills	
	> Inviting experts from outside school	
	> Equipping computers for teachers	
Type G	> Inviting foreign youth	3.84%

Figure 3b. List of Objectives of Virtual Agency, Millennium Project and e-Japan Project, Its Categories and the Ratio in All Objectives

Source: Japanese Government ed. (1999a). *The mid-term report of Virtual Agency* (in Japanese). http://www.kantei.go.jp/jp/it/vragency/990728report.html (2002.06.27).
Japanese Government ed. (1999b), *Millennium Project* (in Japanese). http://www.kantei.go.jp/jp/mille/991222millpro.pdf (2002.06.27).

Table 1. Current Situation of Computerisation of Education

	Equipping ratio of computers in school (%)	Number of Students per computer	Access ratio to the Internet from schools (%)	Ratio of teacher who can use computer (%)	Ratio of teacher who can teach using computer (%)	Ratio of School that have Homepage (%)
National	99.3%	13.3	57.4%	66.1%	31.8%	38.6%
Hiroshima	98.3%	12.9	41.9%	57.1%	23.8%	36.6%
Difference	-1%	+0.4%	-4.5%	-9.0%	-8.0%	-2.0%

Source: Hiroshima Prefectural Board of Education ed. (2000b), *Conception for the Promotion of Computerisation of Education in Hiroshima Prefecture* (in Japanese). Hiroshima, Hiroshima Prefectural Board of Education.

Project-Computerisation of Education mentioned already. It has given priority to Multi Media Education-Study Plan since March 1997 and to Computerisation of Education in the vision of the innovation of compulsory education, called “21 Hiroshima Education Plan- New Bridge to the Future”, since November 1999[22]. An educational network called *Heiwa* Net[23] has been established in fiscal year 2001 using Hiroshima Maple Net in order to connect public schools and prefectural educational centres.

Hiroshima Prefectural Board of Education wishes that realising computerisation of education would 1) increase academic ability of students, 2) develop human resource, 3) promote open schools to general public, and 4) enhance effective school management (Hiroshima Prefectural Board of Education ed. 2000b). According to Hiroshima Prefectural Board of Education (2000b), Hiroshima has implemented and planned seventeen projects in order to achieve its objectives (Table 2). For details of the contents of each project, see appendix 1.

Table 2. 17 Projects regarding IT of Hiroshima Prefecture

Type	Projects Planed in Hiroshima Prefecture	Starting Year	Status
A	1. Implementation of Class Using IT for Handicapped Students	2001	On-going
	2. Improvement of Various Classes Using IT	2001	On-going
	3. Promotion on Distance Education Using NetMeeting System	2001	In planning
B	4. Enhancement of Students' Information Literacy	2002	Not yet
C	5. Promotion on Developing a Homepage for Each School	2000	On-going
	6. Official Announcement of Educaiotnal Information to Public People	2001	On-going
	7. Mutual Use of Administrative System	2001	In planning
	8. Establishment of Network for School Management	2002	Not yet
D	9. Establishment of Educational Network	1999	On-going
	10. Setting up LAN Connection	2000	On-going
E	11. Equipment of Cpmputers to Every Class Room	2001	On-going
	12. Enrichment of Educational Contents	2001	On-going
F	13. Enhancement of Teachers' Information Literacy	1999	On-going
	14. Allocation of Leaders in Charge and IT Oriented Organisation in Each School	2000	Difficult
	15. Equipment of Computers for Teachers	2001	In planning
G	N/A	N/A	N/A
Others	16. Implementation of Distance Education at Prefectural Universities	2001	On-going
	17. Support for Computerisation of Education in Private Schools	2002	Not yet

Note: Those projects are categorized according to the typology of objectives of national strategies (See Figure 3a and 3b in this paper). Type A: Teaching Methodology, Type B: Students, Type C: School Management, Type D: Common for A, B and C, Type E: Common for A and B, Type F: Common for A and C, Type G: Common for B and C

Source:Hiroshima Prefectural Board of Education ed. (2000b), *Conception for the Promotion of Computerization of Education in Hiroshima Prefecture* (in Japanese). Hiroshima, Hiroshima Prefectural Board of Education.

Hiroshima Prefectural Government ed. (2001b), *IT Action Plan 2005 in Hiroshima* (in Japanese). Hiroshima, Hiroshima Prefectural Government.

Authors categorised those projects in T**able 2** based on the typology of national objectives (See Figures 3a and 3b). According to Table 2, Hiroshima has also focused on teacher and school management system and implemented 14 out of the 17 projects. However four projects are facing difficulties in implementation and are still under consideration, two of which focus on innovations in software aspect. It means that implementing educational innovation in software aspect is more difficult.

3.2 Current situation

Current situations at prefectural level are mentioned below, according to the categories divided in Figure 3a, 3b and Table 2.

3.2.1 Type A - Teaching Methodology

Projects 1, 2 and 3 are categorised into type A. Regarding project 1, each school can order suitable peripheral device and Hiroshima Prefectural Education Centre (HPEC) also has the sample of various devices for handicapped students. (See picture 1). However, it depends on each school to purchase additional device for those students (Interview with a staff, HPEC, 2002). Therefore, if they do not think it is necessary to educate those students, they purchase nothing in particular.

Picture 1. Peripheral Device for Handicapped Students

As for project 2, it is hard for prefectural board of education to grasp the extent of the use of computer as a teaching tool in all subjects and to what extent it has helped students' understanding. There is no standard to evaluate these aspects (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

In case of project 3, although this project was supposed to start from fiscal year 2001, it is still under consideration. The delay seems to be due to the absence of concrete objectives of the project.

3.2.2 Type B - Students

Only project 4 comes under type B. The situation of this project is not clear because it is supposed to be implemented from fiscal year 2002. Moreover this project, in its implementation, should have clear standards to evaluate students' IT literacy.

Regarding Internet moral, even though there is no specific project in Hiroshima, filtering system is installed at HPEC under project 9. Therefore HPEC controls and protects against unsuitable information for students.

3.2.3 Type C - School Management

Project 5,6,7 and 8 are applicable to type C.

As of fiscal year 2001, 76 percent of all public schools in Hiroshima have their own homepage site. It has increased by about 40 percent compared with fiscal year 2000 (36.6%). (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

As for project 6, Hiroshima Prefectural Board of Education has three tools for official announcement to public people: publication, broadcast and homepage.

Publication: CLIP (Creative Learning Information Paper) is published three times a year since 1996. It publishes information on innovation of compulsory education, new national curriculum standards, entrance examination schedule for upper secondary schools, cultural and lifelong learning activities and so on. It can be read on the Internet as well[24].

Broadcast: TV programme regarding education in Hiroshima is broadcast for 15 minutes (17:15-17:30) on the second and third Sunday of every month. This programme has introduced active students in schools tackling educational innovation. People can also know the monthly schedule and review the past contents on the Internet[25].

Homepage: In the homepage “Hot Line Education Hiroshima” organised by prefectural board of education, public people can access and discuss on the website[26]. This homepage aims at enhancing public people's interest regarding education (the website of Hiroshima Prefectural Board of Education, 2002).

In terms of project 7 and 8, although groupware that can share information[27] among teachers has been planned, it has not contributed to effective school management and everything is still under consideration (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

3.2.4 Type D - Common for type A, B and C

In this type, project 9 and 10 are applicable.

Hiroshima Prefecture has established *Heiwa* net since fiscal year 2001 as an educational network. Using this network, all public schools have been able to access the Internet. Moreover, it is planning to start high-speed connection from fiscal year 2002 and make it possible from all public schools in fiscal year 2005 (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

Regarding LAN connection, as of August 2001, 79 out of 104 public schools have set up LAN connections. The rest of schools will do it within fiscal year 2002. This LAN connection is not to all classrooms but to all floors (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

As for cutting costs, since it has been possible to access to the Internet using *Heiwa* net, each school can pay only for the connection charge to the nearest Maple (*Heiwa*) net. Before the establishment of Maple net, each school had to have contract with Internet providing company (Interview with a staff, Hiroshima Prefectural Board of Education, 2001) (**See Figure 4**).

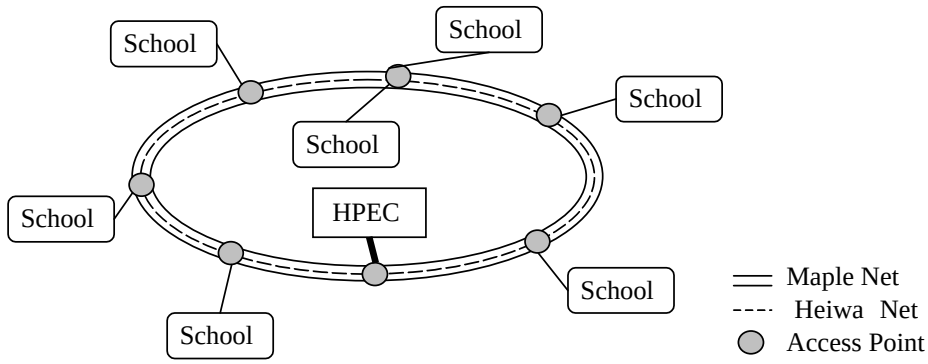

Figure 4. Concept of Heiwa Net
Source: By Authors

Moreover HPEC is the only access point to the Internet and maintains the safety status of the system by protecting against outside using firewall system. Moreover filtering system will protect students from unsuitable information on education. The gap between home and school, however, has been recognised as a big problem (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

3.2.5 Type E - Common for type A and B

Project 11 and 12 come under this type.

According to Table 1, 12.9 students share one computer in Hiroshima, as of August 2001. This aver-

age is slightly higher rather than national average of 13.3 students per computer (See Table 1). However it has tried to install more computers for students in order to reach the ratio of one computer for 5.4 students by fiscal year 2005 (Hiroshima Prefectural Board of Education ed., 2000b). As of August 2001, all public schools have 42 computers each. However there has been no computer in usual classroom yet. Hiroshima Prefectural Board of Education is thinking whether providing computer in each class is necessary or not, because they think it is enough to equip mobile personal computer (lap top) in each floor (usually grade by grade), although Hiroshima Prefecture has implemented project 11 since fiscal year 2001 (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

In terms of educational contents, portal site at HPEC and the database of the contents for student, teachers, and for each subject have been established in fiscal year 2001. As for the number of the contents, about 20,000 contents will be made from fiscal year 2002 (Hiroshima Prefectural Board of Education ed., 2000b). The educational contents will be shared using *Heiwa* Net into inside and outside network separately. Access to the contents from inside can be possible by inputting personal password. (Interview with a staff, Hiroshima Prefectural Board of Education, 2001)

3.2.6 Type F and G - Common for type A and C, type B and C

Project 13, 14 and 15 are applicable to type F. As of fiscal year 2001, Hiroshima does not have any plans that can be categorised into type G.

Staff Allocation

Regarding allocation of staff in charge of information education, it has two problems not only at school but also at board of education. At school level, personnel exchanges and school scale have disturbed the staff allocation, although it has been designed to allocate 2 or 3 teachers in each school. At the level of board of education, Prefectural Board of Education has one staff each in the division of elementary and secondary school since April 2001. Their main tasks are to co-ordinate seminars and go to each school and guide there. At city or town level, it is planned to allocate few staff in each board of education. In establishing help desk as well, personnel exchange disturbs it. For instance, there was no staff in the help desk in prefectural education centre in fiscal year 2001, although a staff was allocated there in fiscal year 2000 (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

To solve the problem of staff allocation, paying attention to information education skills in employment examination and in-service training must be emphasised even though Hiroshima Prefecture has not paid attention to IT skills in employment examinations yet.

In-service Training Programmes

Hiroshima Prefecture has implemented several in-service training programmes in order to enhance teachers' information education skills. There are eight in-service training programmes (Table3): general training, promotion advisor of computerisation, leaders' training for computerisation of education, special training for advanced computerisation, beginner teachers' programme, second-year training programme, experienced teachers' programme, and intensive course for teacher license.

Training programmes for all teachers - general training programme and promotion advisors' programme

General training programme is one of the in-service training programmes for all teachers, held at HPEC. Table 4 shows the types of general training programmes and the schedule.

Table 3. In-Service Training Programmes in Hiroshima Prefecture

Programme	Target Group	Duration	Venue	Contents
General Training	All Teachers	1-5 days	Refer to Table 4	Training by Prefectural Education Centre (Refer to Table 4)
Promotion Advisor of Computerisation	Teachers who can not handle computers	2 years (FY2000 and 2001)	Each School	Mobile training by advisor employed from temporary employment agencies
Leaders' Training for Computerisation of Education	IT leaders for elementary and lower secondary	6 days / year (1-2 years)	HPEC*	Lectures and practices regarding information education
Special Training for Advanced Computerisation	Teachers who are eager to learn IT education for public schools	5 days / year (3 years)	Special School	Contents regarding network management. Lecturers from temporary employment agencies.
Beginner Teachers' Programme	All new teachers	Half day / 8 days	Certain place specified by Hiroshima Prefectural Board of Education	Training supervised by Hiroshima Prefectural Boad of Education
Second-Year Training Programme	Teachers in the 2nd year of service	Half day / 2 days	Certain place specified by Hiroshima Prefectural Board of Education	Training supervised by Hiroshima Prefectural Boad of Education
Experienced Teachers' Programme	Teachers in the 6th year and the 11th year of service	A option (2 days) in 3 days	Certain place specified by Hiroshima Prefectural Board of Education	Training supervised by Hiroshima Prefectural Boad of Education
Intensive Course for Teacher's license	Teachers who have certain license	15 days (FY 2000-2002)	Special School	Delivering teacher's license for new subject "Information"

*HPEC=Hiroshima Prefectural Education Centre
"Source: JICA ed. (2001a), *A Guide to Educational Training Courses 2001*. Hiroshima, HPEC.
JICA ed. (2001b), *The Outline of Activities 2001*. Hiroshima, HPEC.

General training programme is divided into four programmes: basic training programme, practical training programme, objective training programme, and comprehensive training programme. In these programmes, there are eight courses on IT education out of the 130 courses, and four out of eight are only for teachers who worked for eleven years. The total number of teachers who can participate in these courses in a year is 650 for teachers in the 11th year of service, compared to 588 for all teachers. This means it tends to focus on middle age teachers' training. According to the interview with a staff of HPEC in 2002, the motivation of middle age teachers are lower than the one of young age teachers, who have strong confidence and high motivation on educating students because the hurdle of employment examination[28] is getting higher year by year. Therefore, the reason why HPEC emphasises middle age teachers is to encourage them to have high motivation as young age teachers.

Picture 2. The Computer Room in HPEC
Teachers can see the lecturer's screen in the monitor pointed by the arrow in this picture.

Picture 3. The Room for the Courses: "Non-linear Video Compilation (Premiere)" and "Construction of In-school LAN"
Teachers can know the structure of LAN using those two computers and another one (lap top computer)

Promotion advisor of computerisation

According to the interview with a staff, Hiroshima Prefectural Board of Education in 2001, the advisors are employed by temporary employment agencies. They go to each school and guide teachers who cannot handle computers well. However it is difficult to recognise teachers who can or cannot handle computers, because the ability of handling computers is measured by self-report by each teacher. Therefore there is difference between the official reported data and the reality (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

Leaders' training for computerisation of education and special training for advanced computerisation

Leaders' training programme is for elementary and lower secondary school teachers while the special training programme is for public school teachers who are eager to learn IT. As for the contents, the former programme consists of lectures and practices regarding IT education while the latter consists of network management. Moreover the lecturer has been employed from temporary employment companies (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

Intensive course for teacher's license

With the establishment of new subject "Information" at upper secondary school level, teacher license for the subject has been also required. Hiroshima Prefecture has implemented summer intensive seminars for 15 days from fiscal year 2000 to 2002. The total number of teacher participants who will have completed this course is expected to be more than 300 by 2002 (there were 100 participants for 2000 and 136 for 2001). The seminar consists of lectures, reports and final examination. The lecturers should be teachers who took the same seminar in previous year. As for the limitation of participation, only teachers who have teaching license for mathematics, science and home economics can participate in this seminar. Teachers who have other licenses are allowed to take only the final examination, after self-study or attendance at classes concerned at University. This is only one way for them to get the license (Interview with a staff, Hiroshima Prefectural Board of Education, 2001).

Table 4. Types of General Training Programmes, the Course Names and the Schedules for Fiscal Year 2001

Types of Programmes	Course Names	Target Group	Full Quota	Date	Venue	Percentage in each programme
Basic Training	Music: Musical Moment by PC	All teachers	24	August 6, 7	HPEC*	5.88%
Practical Training	Presentation Using Computers (PowerPoint) (A), (B)		88	(A) August 23 and 24, (B) September 10 and 11		8.11%
	Database (Access) Starting from ABC		88	September 13, 14		
Thematic Training	Class Teaching Using the Internet (A), (B), (C), (D), (E)	Teachers in the 11th year of service	88	(A) July 11and 12, (B) July 23 and 24, (C) July 30 and 31, (D) August 2 and 3, (E) August 6 and 7		20.00%
	Creation of Web Page (DREAMWAVER) (A), (B)		60	(A) August 28 and 29, (B) September 5 and 6		
	Non-linear Video Compilation (Premiere) (A), (B), (C)		10	(A) October 18 and19, (B) October 22 and 23, (C) October 25 and 26		
	Construction of In-school LAN (A), (B), (C)		20	(A) September 18-20, (B) October 3-5, (C) October 10-12		
Comprehinsive Training	School Making for the Information-oriented Education	All teachers	300	July 26		9.09%

*HPEC= Hiroshima Prefectural Education Centre
Source: JICA ed. (2001a), *A Guide to Educational Training Courses 2001*. Hiroshima, HPEC. JICA ed. (2001b), *The Outline of Activities 2001*. Hiroshima, HPEC.

Inviting experts and lecturers from outside

As of August 2001, Hiroshima has not planned any project related to this idea. According to e-Japan strategy, 1,000 temporary lecturers will be employed. Hiroshima also will be expected to follow this project after the e-Japan national strategy of 2002.

Computers for teachers

Hiroshima prefecture has given priority to provide computers for students rather than for teachers (Interview with a staff, Hiroshima Prefectural Board of Education, 2001). Therefore project 15 is not working well even though it has already been implemented from fiscal year 2001.

4. Conclusions and Recommendations

Appendix 2 shows the current situation and the problems in Hiroshima compared to national strategies and objectives based on research including interview and school visit. Based on Appendix 2, authors have pointed out three common problems: 1) unclear objectives, 2) unclear standards for evaluation, and 3) lack of staff due to personnel changes. In fact, current situation of some projects, such as “Equipment of Computers for Teachers” project, that have objectives such as equipment of computers

for teachers are also not clear. Moreover, it is difficult to measure or evaluate or recognise the number of teachers who can handle computers and improve students' IT literacy and student academic achievement in projects such as “Enhancement of Students' Information Literacy”, because evaluation methods and standards have not been established yet. Furthermore, allocation of teachers are one of the weakest points regarding lack of staff in charge of IT in projects such as “Allocation of Leaders in Charge and IT-oriented Organisation in Each School”.

Based on problems described in this paper and showed in Appendix 2, four recommendations can be made to improve the status of Hiroshima IT education. First, there is a need to express the objectives numerically, such as 80 % of all public teachers will have a PC till 2003. Second, appropriate standards need to be set up in evaluating and measuring the results. Such standards need to measure students' achievements and evaluate whether teachers can handle PCs or not. Third, persons or volunteers from temporary employment agencies need to be employed to fulfil the lack of personnel in the schools. Fourth, delivery system of teachers' license needs to be improved so that all teachers can participate in the courses.

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Endnotes

[1] This paper was presented at the 7th Annual UNESCO-APEID International Conference on Education in Bangkok, December 2001.

[2] National curriculum standards for elementary and lower secondary school notified on December 1998 and then will implement from fiscal year 2002. The standards for upper secondary school announced on March 1999 and will start from fiscal year 2003.

[3] MEXT ed. (1998c), *Final Report of the Working Committee for the Promotion of Information Education in Elementary and Secondary Education: For the Improvement of Educational Environment Corresponding with the Development of Information-oriented Society* (in Japanese). Tokyo, MEXT.

[4] The Working Committee was formed in October 1996 in order to discuss information education systematically.

[5] Problems, which are difficult to solve for usual governmental system divided vertically. IT education project is a good example because it needs cooperation between MEXT and other Ministries in promoting access to the Internet.

[6] Other projects are regarding “one-stop service project on car prossession”, “Digitalization of governmental procedures” and “paper less project on administration”.

[7] They are all section cheif level and respectively from MEXT, Ministry of Economy, Trade and Industry (METI), Postal Service Agency, Ministry of Home Affairs, Cabinet Secretary

[8] 1. Equipment of educational environment using computers in all usual class rooms (in primary, junior high, high and special education schools)
2. Equipment of peripheral device according to physical and mental condition at special education schools
3. Supplies computers in other rooms in the sake of various aims

[9] Mbps=Mega bite per second

[10] Distributing materials through the Internet (Konnet Plan etc.)

[11] Retired teachers and staff from companies are supposed to be employed.

[12] A festival using the Internet will be held on 2002, in order to evaluate complephensively from the point of international standard and inform on the project results to nations.

[13] The number of all public schools are about 39,700 schools.

[14] Those schools are about 20 per cent of all public schools and only large scale schools.

[15] The number of all public school teachers are about 900,000.

[16] Using 15-30 minites animation added to text book as teaching tools

[17] The basic site was established and opened in public August 31, 2001. http://www.nicer.go.jp This centre is a core portal site for all information on education and for promotion of computrisation of education in school education, higher education and lifelong education.

[18] Research of portal sites and some developments for circulation and management of contents have been started since fiscal year 2001.

[19] The basic recognition for the usage of information tools is divided into three types: using for students' learning, using for teaching methodology and using for school planning and management.

[20] MEXT ed. (1998c), *Final Report of the Working Committee for the Promotion of Information Education in Elementary and Secondary Education: For the Improvement of Educational Environment Corresponding with the Development of Information-oriented Society* (in Japanese). Tokyo, MEXT.

[21] Hiroshima, Kure and Higashi-Hiroshima Cities

[22] The background of Virtual Agency and Millennium Project mentioned in 1. Introduction in this paper influenced to these plans.

[23] *Heiwa* means “Hiroshima Educational Internet Wide Area” and is wide area network (WAN) system.

[24] http://www.pref.hiroshima.jp/kyouiku/hotline/kouhou.htm

[25] http://www.pref.hiroshima.jp/kyouiku/hotline/kouhou.htm

[26] http://www.pref.hiroshima.jp/kyouiku/hotline/hiroba.html

[27] Such as schedule management

[28] The number of teachers employed lately is quite small and has been reduced year by year due to decrease of the number of students.

Appendix 1. 17 projects regarding IT education in Hiroshima Prefecture

Project Name	Aim	Contents	Project Period: The period for basic equipment FY 1999	FY 2000	FY 2001	FY 2002	The period for expansion FY 2003-2005	Achievement	Current Outcomes
Implementation of Class Using IT for Handicaoooed Students	With using computer, enhancing communication ability and promoting self independent and social participation	Preparing special device according to students' handicapped level Try to use educational software in order to decrease the difficulties Implementing distance education for students, who study at home and in hospital Developing database for special education and using			Preparing computers		Enriching educational software		Still under consideration
Improvement of Various Classess Using IT	(1) Try to improve students' achievement in all subject using IT (2) With using computer, make class understandable.	Implement understandable class using computer Choose pilot schools Accumulate teaching materials and educational methodologies Expand to whole area in Hiroshima			Choose pilot schools and encourage study Increas pilot schools and feasible subjects		Expand to whole area in Hiroshima	Improvement of students' achievement	It is hard to grasp daily use of computer in each class
Promotion on Distance Education Using NetMeeting System	(1) Implementing various educational system by distance education and credit exchange (2) Considering exchange project between junior and high school, and between high school and University	Installing NetMeeting system in schools Establishing feasible network system for distance education			Pilot project	Testing NetMeeting system and making guideline for distance education	Expanding the system in whole are in Hiroshima Prefecture		Under consideration
Enhancement of Students' Information Literacy	Gain the computer skills needed in the information society	Implementing class using PC in all subjects and giving the opportunity for students to use computers in break time and Sharing educational contents for students in Heiwa net Let students join in developing homepage Teaching network manner				Implementing bit by bit			Developing the basement of the database for students by the end of FY 2001

Appendix 1. 17 projects regarding IT education in Hiroshima Prefecture

Project Name	Aim	Contents	Project Period					Achievement	Current Outcomes
			The period for basic equipment				The period for expansion		
			FY 1999	FY 2000	FY 2001	FY 2002	FY 2003-2005		
Promotion on Developing a Homepage for Each School)	Open school- all public school have own homepage, deliver the information to the community and feedback to school management	Put all homepages in the homepage server at a network point on Heiwa net. Promotion on developing home page Enrichment of the contents To close relationship between school and home, use homepage as a tool of connecting between them Development of system on asking ideas and comments from parents and the community and feedback to school management		Promotion on developing homepage			Enriching the contents	100 % of public schools have own homepage by the end of FY 2005	78 out of 104 public schools have own homepage already.
Official Announcement of Educational Information to Public People	(1) Establishing easy access system for public people. (2) Promoting educational innovation by participation of public people	Promotion on participating in educational innovation by public people public by information actively Broadcasting and sharing information by TV and Homepage Preparing a homepage for i-mode access			Starting broadcasting and enriching homepage	Enriching digital delivery system of broadcansting and homepage	Implementing digital delivery		Publication named CLIP, Homepage and broadcasting
					Supplying full information on Prefectural Universities and preparing information supply to i-mode access				
Mutual Use of Administrative System	Developing system to use simple administrative system, developed by certain schools, at other schools	Registing administrative system developed by certain schools in Heiwa net and promoting on using the system in other schools			Implementation bit by bit				Still under consideration

Appendix 1. 17 projects regarding IT education in Hiroshima Prefecture

Project Name	Aim	Contents	Project Period: The period for basic equipment — FY 1999 / FY 2000 / FY 2001 / FY 2002 / The period for expansion — FY 2003-2005	Achievement	Current Outcomes
Establishment of Network for School Management	Try efficient daily administrative work using network system	Management of administrative work such as education schedule Management of tuition fee with computer Developing delivering system of several sertificates	Implementation bit by bit		Still under consideration
Establishment of Educational Network	Equipping educational invironment, that all students and teachers can access to the Internet and educational contents with high speed, cheap cost and safty connection.	Equipping access point to Heiwa net using Hiroshima Maple Net	Setting up the access point of Maple net; Starting Heiwa net; Management of Heiwa net; Enrichment of access point; 100 % access to Heiwa net from all schools; Connecting to the Internet from all public schools; Access by using Maple net from all public schools; Promote high speed access from all public schools	(1) 100% high speed access (1.5Mbps) from all public schools by fiscal year 2005 (2) 100 % access from other schools	(1) 100 % access to the Internet from all public schools (2) Heiwa net started (3) Establishing access point of Heiwa net and the Internet at HPEC (4) Controlling access from outside by Firewall (5) Protecting unsuitable information for education by Filtering (6) Establisment of inside network for teachers in order to share several information
		Connecting to Heiwa net from all schools in Hiroshima Prefecture	Promoting the access to Heiwa net and the connection to the Internet from other schools; Promote the access from other schools		
		Accessing to the nearest point of Maple net			
		Protecting against unsuitable information for education	Making rules about management; Updating contents		
		Establishment and management of intranet			
Setting up LAN Connection inside School	Establishing LAN inside school and equipping other devices such as projector	• Establishment of LAN in public schools	Making guideline about school LAN; Equipment of school LAN in public schools; Expanding school LAN in every class room; Equipment of device such as providor	100 % equipment of school LAN in all class rooms	(1) As of August 2001, 79 out of 104 public schools have school LAN (2) Prefectural board of education is planning to ask volunteer group in equipping LAN to each class room
		• Establishment of LAN in other schools	Making guideline about school LAN; Promotion on equipping school LAN in other schools		

Appendix 1. 17 projects regarding IT education in Hiroshima Prefecture

Project Name	Aim	Contents	Project Period: The period for basic equipment / FY 1999	FY 2000	FY 2001	FY 2002	The period for expansion / FY 2003-2005	Achievement	Current Outcomes
Equipment of Computers to Every Class Room	Equipping computer accessible to the network in each class room	Equipment of computer in schools			Preparing necessary number of computers in schools (standard: 42 computers in PC room, 2 computers in each class room, 8 computers in special school			5.4 student / a computer (at this moment, 12.9 students / a computer)	(1) Preparation of 42 computers in each public school (2) No computer in class room (3) Under consideration about equipment of computer in each class room
					Preparing bit by bit				
Enrichment of Educational Contents	Establishing the system on developing, enriching and sharing educational contents on Heiwa net. Use it among schools and teachers	Try to enrich the contents about teaching materials, teaching methodologies			Creating database for subjects, for students and for teachers	Enriching the contents		Creating 20,000 contents in database	Finish creating datebase within FY 2001
		Creating search engine system on Heiwa net			Preparing potal site				
Enhancement of Teachers' Information Literacy	Try to enhance all teachers can teach class using computers	Implementing in-service training at HPEC, distance training and delivering study materials for self study by Heiwa net		In-service training for handling computers and training by advisors		All teachers can handle computers		(1) 100 % of teachers can handling computer by the end of FY 2001 (2) Reaching 50 % of teachers can teach usign computers by the end of FY 2001 and moreover (3) 100 % of teachers can do by the end of FY 2005	(1) Implementing in-service training at HPEC (2) Mobile lecture by educational advisors (3) No staff in help desk at HPEC
		Making support system strong and implementing mobile lecture		In-service training for teaching skills using computers, establishment of support system on information					
		Developing database about "Knowledge and Knowhow"							
Allocation of Leaders in Charge and IT Oriented Organisation in Each School	Allocate leader in charge of IT and developing information system inside school	Allocating leaders in all public school and promoting the training inside school		Training leaders		Allocation of leaders in each public school	Promotion on allocating leaders in each public school and establishing of inside information system	(1) 100 % staff allocation in each public school by the end of FY 2005 (2) 100 % development of inside information system by the end of FY 2005	(1) Implementing several in-service training programmes (2) Personnel change disturbs the allocation of staff in charge of IT in each school
		Training the leader and enhance the skills							
		Promoting information system inside school							

Appendix 1. 17 projects regarding IT education in Hiroshima Prefecture

Project Name	Aim	Contents	Project Period: The period for basic equipment FY 1999	FY 2000	FY 2001	FY 2002	The period for expansion FY 2003-2005	Achievement	Current Outcomes
Equipment of Computers for Teachers	With using computers, try teachers to manage administrative work using network system and implement effective class.	Equipping computers for daily use and promoting to develop teaching materials Sharing common information among teacher by email etc. Equipment of computers in all schools			Equipment of computers in public schools (a computer for a teacher)		Equipment of computers in other schools (a computer for a teacher)		Still under consideration
Implementation of Distance Education at Prefectural Universities	Impremention of Various lecture at higher education level	Preparing information device in three Prefectural Universities Creating the exchange system on lecture Promoting exchange credit among the 3 Universities			Equipping the class for IT	Additional equipment of information device Information for the community		(1) Preparing 3 class room for exchange project (2) Equipping necessary device for connecting each University	Out of research
Support for Computerisation of Educationain Private Schools	(1) Support on equipment of computers and school LAN in private schools	Equipping computers and school LAN				Condideration time	Promoting the connection to Heiwa net and open educational contents		Out of research
	(2) Allow private schools as well to use Heiwa net and educational contents	Allow them to use Heiwa net and educational contents							

Source:Hiroshima Prefectural Board of Education ed. (2000), *Conception for the Promotion of Computerization of Education in Hiroshima Prefecture* (in Japanese). Hiroshima, Hiroshima Prefectural Board of Education.
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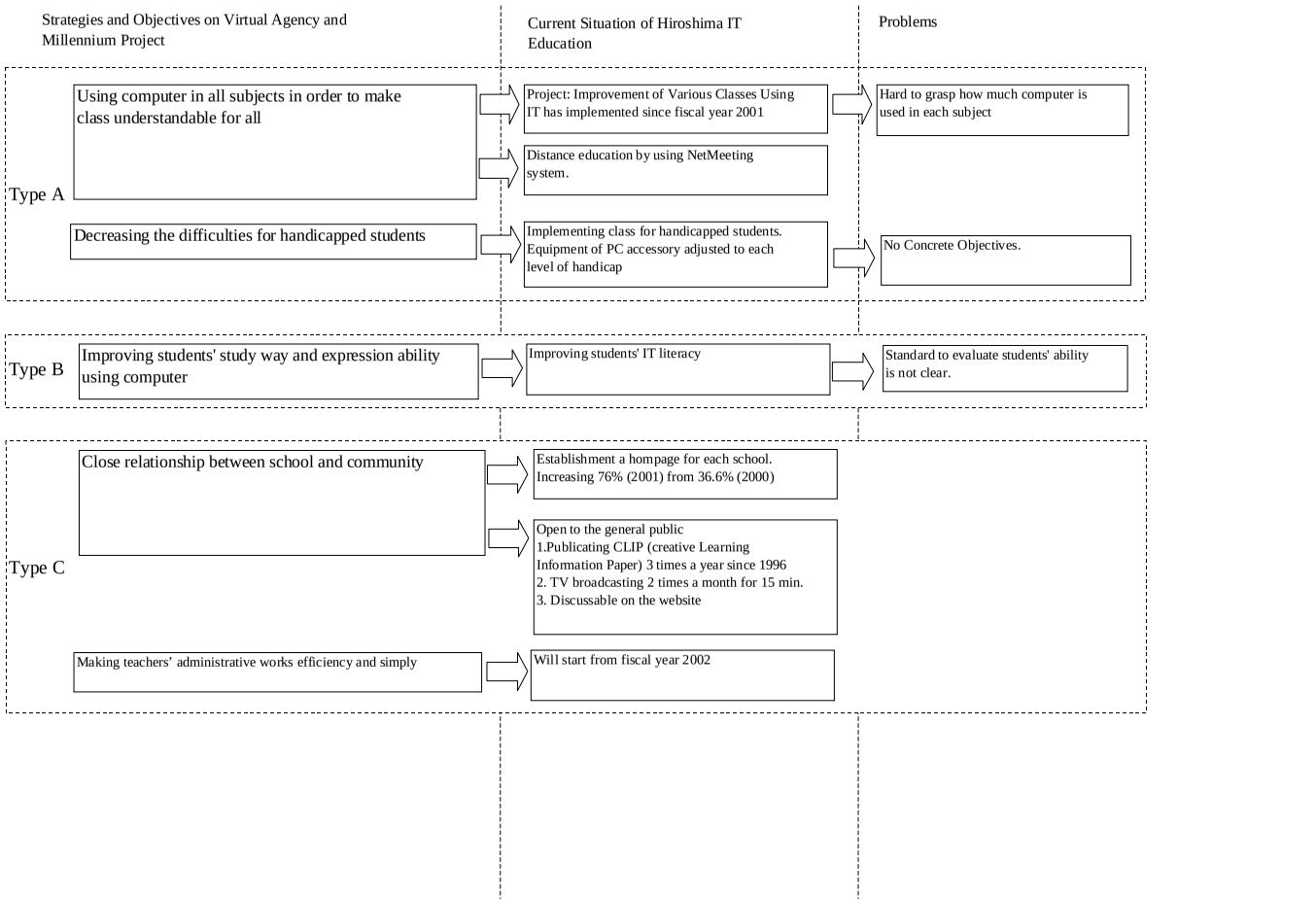
Appendix 2. Current Situation and Problems on IT Education in Hiroshima, Comparing with National Strategies



Note: Type A: Teaching Methodology, Type B: Students, Type C: School Management, Type D: Common for A, B and C, Type E: Common for A and B, Type F: Common for A and C, Type G: Common for B and C

Source: By Authors

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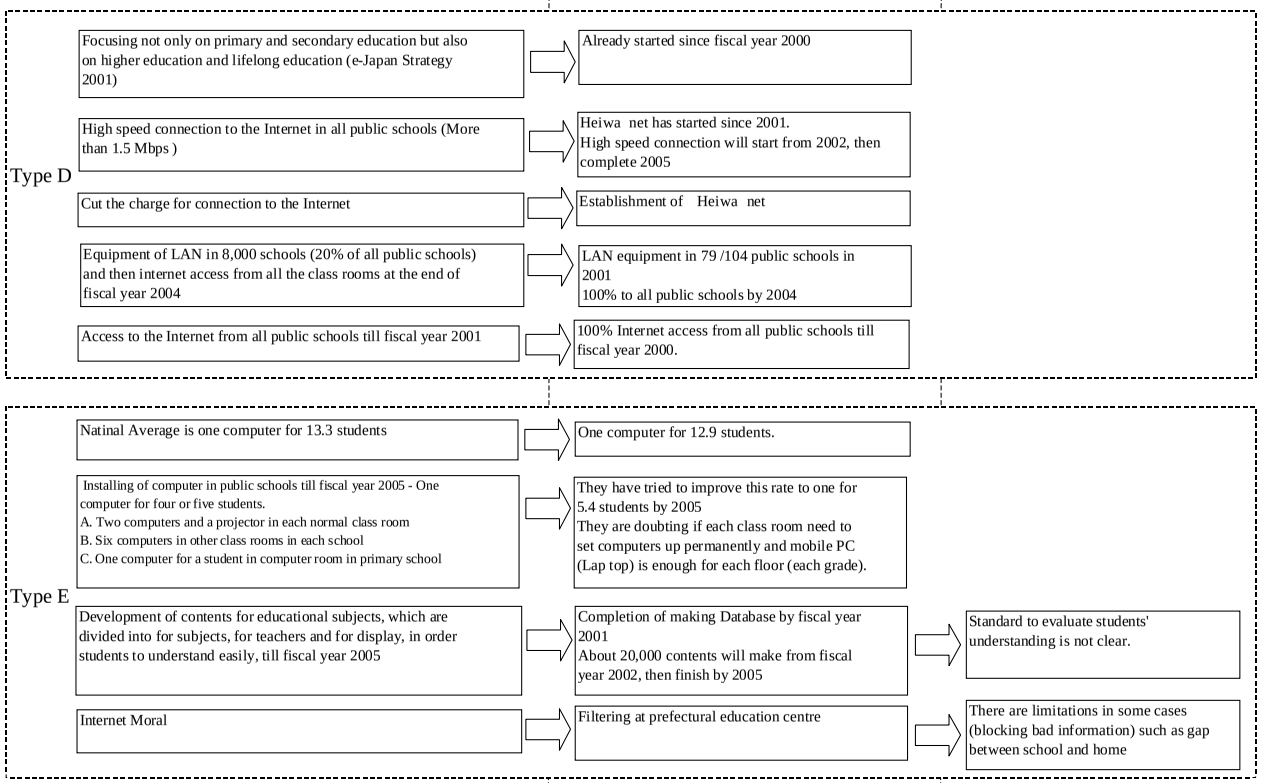
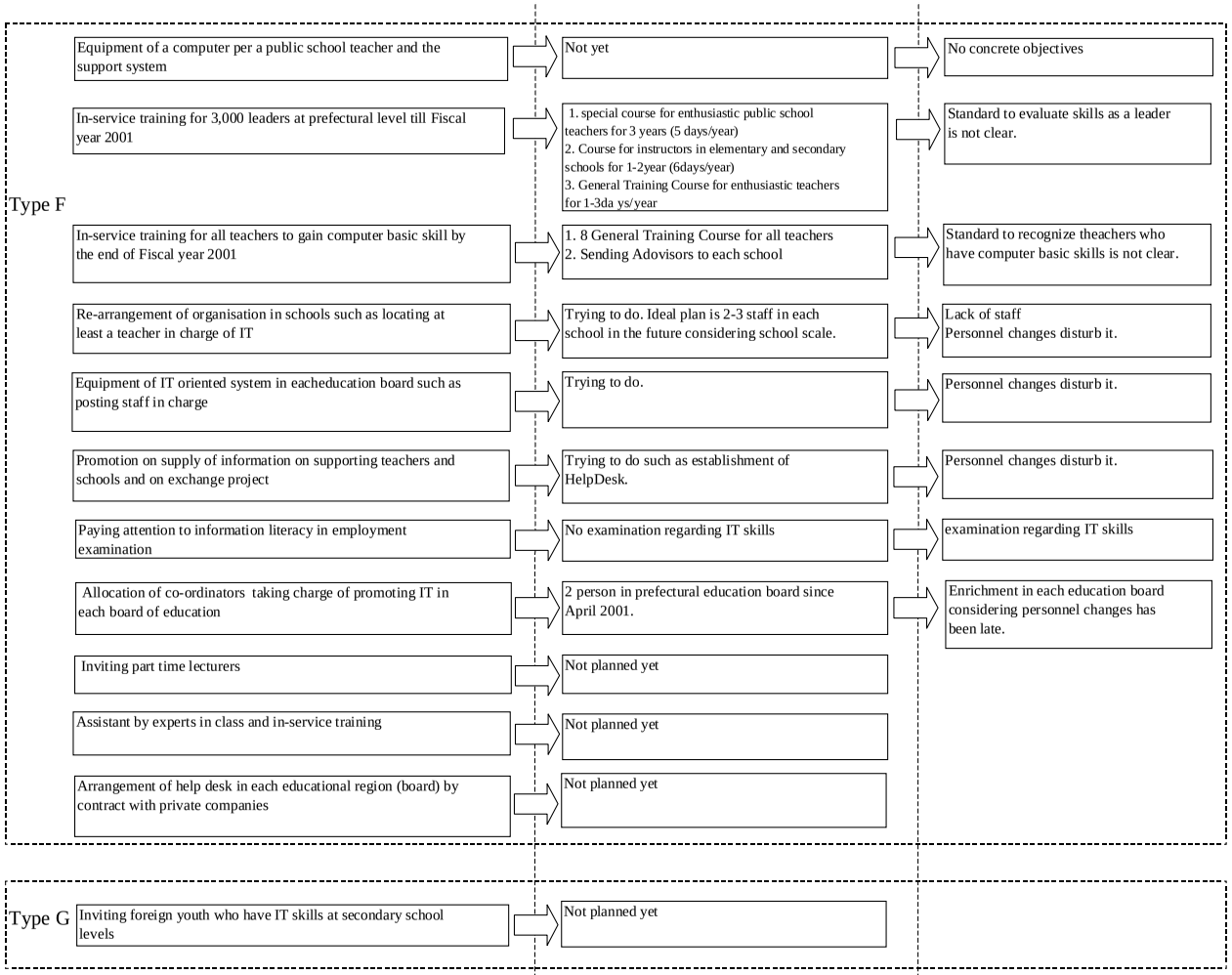


Note: Type A: Teaching Methodology, Type B: Students, Type C: School Management, Type D: Common for A, B and C, Type E: Common for A and B, Type F: Common for A and C, Type G: Common for B and C

Source: By Authors

Appendix 2. Current Situation and Problems on IT Education in Hiroshima, Comparing with National Strategies



Note: Type A: Teaching Methodology, Type B: Students, Type C: School Management, Type D: Common for A, B and C, Type E: Common for A and B, Type F: Common for A and C, Type G: Common for B and C

Source: By Authors