Future School Promotion Project

April 2013

Ministry of Internal Affairs and Communications (MIC), JAPAN
1) Effectiveness of computerization in the educational field has been globally proven. In its study of ICT-utilization, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) found that the score was higher in the objective test given in the ICT-utilized class than those without, and pupils' knowledge, understanding and motivation to learn was higher. Moreover, it has been pointed out that classroom ICT utilization raised teacher-pupil bidirectionality, promote inter-pupil collaboration in learning new materials as well as increasing the teacher's opportunity to render “personalized teaching”.

2) In Japan, computerization in classrooms trail behind many countries. In the top-level countries in the OECD Programme for International Student Assessment (PISA), computerization of classrooms is pursued in wide-scale*, Japanese level of ICT-utilization in the lowest level among them.

* Korea drew up the “Smart Education Strategy” in 2011 in which its major thrust is to facilitate computerization of all Korean primary and secondary schools by 2015.

**Analysis of Objective Test Results in Primary Schools**
(Source: “MEXT Research on the Information Education”, (FY2006))

**Utilization of Computers in Primary Schools**
(Source: PISA 2009 Results of digital reading comprehension)

Computer utilization rate in our country's classrooms is below-average in all subject and remains at a low level.
- National Language: 17th place among 29 OECD countries
- Math: 17th place among 29 OECD countries
- Science: 17th place among 29 OECD countries

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**New Strategy in ICT (Education)**
(IT Strategic Headquarters Decision, May 11, 2010; Work Schedule, IT Strategic Headquarters Revision, July 4, 2012)

- **Strategic Policy**
  Through the use of ICT, i) By facilitation of “collaborative learning”, develop bidirectional learning environment in the classrooms, ii) Reduce teacher’s burden in classrooms and iii) Create an environment of the 21st Century in which pupils will more easily upgrade their ICT-utilization capability, thereby reducing the public disparity in information utilization and promote ICT-based lifetime learning opportunities in the society.

- **Work Schedule**
  - FY2012: Experimental study using model project, etc.
  - FY2013: Installation of in-school LAN, ultrafast Internet connection and other environmental improvements
  - FY2020: Development of school education fit for the 21st Century
### Conference on Experimental Study on Advanced Education Using ICT*
(Under joint auspices of the Senior Vice Minister of the MIC and the Senior Vice Minister of the MEXT)

* A conference that coordinates MEXT and MIC projects conducted in same project schools

First meeting: Nov 14, 2011; second meeting: Jul 2, 2012

### Study Innovation Project Conference
(Under the auspices of the Senior Vices Minister of MEXT)

First meeting: Aug 3, 2011; second meeting: Feb 6, 2012, third meeting Jun 1, 2012

- **Elementary and junior high school WG**
- **Special support education WG**
- **Working Group to Identify Issues in Utilization of ICT in Schools**

### Study Group for Promotion of Future School
(Under the auspices of the Se State secretary of MIC)


### Local Conferences
Co-convened by MEXT and MIC in the 20 project schools (10 primary schools, 8 junior high schools and 2 special support schools); members consist of learned persons, members of the boards of education, expert curriculum teachers, etc.
Division of Roles between MIC and MEXT

MIC and MEXT cooperate in the project for ICT using in the education, each carrying separate roles, in each of the project school (10 primary schools, 8 junior high schools and 2 special support schools).

To foster the skills to live in a 21st Century society, conduct a variety of experimental studies tailored for pupils in various types of schools, ages, curriculum contents and other factors with following objectives:
1) Verification of the effectiveness/influence of education using digital textbooks and materials
2) Development of teaching methods
3) Compilation of model curriculum digital contents, etc.

To foster the skills to live in a 21st Century society, provide an environment of wireless LAN (Wi-Fi) and a tablet-type computer per pupil and develop an experimental program as shown below with an objective to compile a guideline.
1) Sort out optimal technical requirements for development and operation of ICT equipment and ICT–network environment (including the cloud computing facilities).
2) Summary of know-how to develop and operate in-school ICT environment
Outline of the Future School Promotion Project

To promote utilization of ICT in education, institute ICT-environment in classrooms and conduct experimental studies with an emphasis on the technical aspects with the objective of compiling guidelines (manuals); information so obtained will be used to expand the coverage of ICT-utilized teaching to other schools.

Accomplishments to date and program for the near future

Provide 1 Tablet PC to each pupil in the class, equip Wi-Fi-accessed LAN and implement classroom teaching using the equipment to verify necessary know-how in ICT environment operation, security requirements, etc. The results of this project will be considered in study groups under the auspices of the Senior Vice Minster of MIC and compiled as guidelines.

Time Frame

4 years (project start: FY2010, project end: FY2013)
- Primary schools (FY2010 – FY2012)
- Junior high schools and special support school (FY2011 – FY2013)

Accomplishments to date

Experimental studies started in 10 primary schools in FY2010

Starting in FY2011, 8 junior high schools and 2 special support schools have been added to the project and concurrently the “Learning Innovation Project of MEXT was started in the same 20 schools.

Programs of near future (subsequent to administrative review of the project)

The experimental studies will further continue throughout FY2013 in cooperation and finally conclude the results.

Budget

2013 request amount ¥494 million
Request amount for FY2012 ¥1.1 billion

- FY2011 Development of the Guideline 2011; publication
- FY2012 Development of the Guideline 2012; publication
- FY2013 Development of the Guideline 2013; publication
- FY2014 Development of the Guideline 2014; publication
Example of effort at elementary school (1)

Honden elementary school in Katsusika-ku (Tokyo)

<table>
<thead>
<tr>
<th>Exercise in the use of IWB</th>
<th>The state of the use of tablet PC</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Using the digital simili paper in the tablet PC, pupils in groups practice collaborative learning on IWB. Such exercises were used to spread collaborative learning to be used by the entire class</td>
<td>• In addition to use in Japanese language, arithmetic, society courses, etc., through the use of ancillary devices such as digital simili paper and USB camera, coverage of curriculums have been expanded to drawing and manual arts, music and even to physical education</td>
<td>• The project confirmed that teaching skills of experienced teachers are reflected on test results obtained in ICT-utilized teaching, implying that skill improvement of younger teachers is important</td>
</tr>
</tbody>
</table>

【5】In the fifth grade “Society” class, teams of 4 pupils were asked to develop speech presentations on digital simili paper on the tablet PC. Note the use of drawings and emphases using colored characters.

【6】In the second grade “Living Environment Studies” class, collecting information in a local shopping area and recording their data in the tablet PC. They edited the materials at the school, presented their reports and recorded comments made by their classmates.
Example of effort at elementary school(2)

Ashiro elementary school in Higashimiyoshi (Tokushima)

<table>
<thead>
<tr>
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<th>Problems</th>
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<tr>
<td>• In “Science” experiments IWB, tablet PC, USB camera are used. Each experimental result is photographed and transmitted to IWB for display to all pupils for discussion</td>
<td></td>
<td>From health considerations, pupils create a small program of moving contents once each day to exercise in eye-movements</td>
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<tr>
<td>• Once a week in the morning hours, all-grade “handwriting drill” using the handwriting recognition function of the tablet PC</td>
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<tr>
<td>• Fourth to sixth grade pupils are permitted to take home a tablet PC on weekends to perform the “handwriting drill” or use the “flash teaching materials.”</td>
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</table>

A pupil is studying with hand writing text in the morning
A pupil is photographing the results of a science experience (sedimentology) using a USB camera and taking it into the tablet PC (sixth grade science class)
At home, pupil is executing “flash teaching materials”
**Joutou Junior High school in Wakayama city**

### Current status of Use of Tablet PC and IWB

1. English: Take the digital camera image of the treasure into the PowerPoint in the tablet PC, add comments in English and send the image displayed on the tablet PC to IWB for presentation (second grade)
2. Visiting Canada: Each pupil takes a set of Wi-Fi router (WiRT) and Android Terminal to the Canadian homestay. Pupils establishes contact by e-mail to their home and the school and have TV conferences through Skype with the third graders
3. During the summer vacation, pupils take home tablet PC and WiRT to work on a music project through the vacation

### Issues & Point to Remember

1. Each time at image transmission, IP must be reset on the tablet PC (Remedied in Sep)
2. Free version of Skype is capable of only one-on-one connections, to establish multiple class contact, a TV system with multiple contact capability is required.

**Outside School Activities (Canada and Elsewhere)**

- Presentation
- MEXT digital textbook
- TV Conference
- Sharing Image Data

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For more information, please refer to the attached images.
Example of effort at Junior High school (2)

- Jouetsu Education University Junior High School in Jouetsu city

<table>
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<td>In the English class, IC recorder and video camera are used to record presentations. The recorded materials are used for individual learning, self-evaluation or mutual evaluation later</td>
<td></td>
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</table>
  - The recordings gathered in the tablet PC by individual pupils are displayed on IWB for content presentations and group learning |
  - Write up an outline of the proceedings and used in student assembly activities with use of a tablet PC |
| The materials in storage were useful to teachers to follow individual pupils’ growth |
  - Two-way contact of tablet PC’s was attempted on the outside of the school building but the communication environment was not suitable enough for networking. Considerations are now made for means to improve communications capability outside of the school building |

A pupil checking his own presentation on tablet PC (Eighth grade at English class)

A pupil making presentation of his group’s report on IWB (Eighth grade at Society class)

Sharing of the outline stored in tablet PC helps smooth proceedings of the student assembly (Student council activities)
Example of effort at supportive school

Furusato Special-needs School in Toyama

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<td>Teachers and ICT engineers cooperated and produced teaching devices such as an interactive digital picture book, “Big Turnip” (Japanese language: home-visit program), as well as the “sound-wave shape software” which displays the loudness of human voice in visualized wave form (Science: junior high)</td>
<td>• Because tablet PC consumes a large amount of current, the batteries must be recharged often</td>
</tr>
<tr>
<td>• For severely handicapped pupils who cannot handle the pen for handwriting for the tablet PC, the staff developed a handwriting device by pasting conductive tape on a ping pong ball</td>
<td>• The access speed of the Wi-Fi LAN is very slow and freezes in the midst of regeneration of moving images from time to time. The operating speed of the LAN as a whole must be increased</td>
</tr>
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(Primary School Section) Teacher develop curriculums which pupils are interested in. Many seemed to prefer physically active programs wherein they use their whole body

(Junior High School Section) During self-study period, individual pupil set up objectives relative to their study and daily living and regularly check their progress

(Home-Visit Program) Enjoying the picture book using the ping pong ball with conductive tape as a switch. Many other digital learning materials are used in the classroom
Since ICT can be an effective tool to strengthen the relationship between pupils’ homes and the school, children take home the tablet PC. Listed below are some cautionary points involving taking home the tablet PC and implementation cases for last year.

○ In order to share in the school the learning outcome made at home by using the same application, some modifications were required to environment setting or applications
  - Means to establish secure connection ⇒ Preparation of data card to modify the network connection set up in the tablet PC
  - Method of data synchronization ⇒ Modify applications to function as stand-alone system
    Development of a system to take the homework results in the in-school server

○ To assure the charge of the tablet PC battery, it is necessary either to take the AC adapter of the tablet PC or ascertain that the battery is fully charged before leaving school

○ Make certain that the guardians know the date and the reason for the pupil taking the tablet PC home

○ The PC’s weight is substantial, so that it would be a good idea to prepare a carrying bag for the tablet PC or to sort out other burden

How pupils take PC home (image)  Children taking home the tablet PC in carrying bags  Using the tablet PC at home
It is conceivable that classrooms and gymnasium will be used as the shelter in disaster time, and school’s ICT environment will be available as a base for information transmission and reception.

Regarding using the school ICT system in disaster time, some things you should know about its use and cases where ICT system was actually used are as follows.

- Provision of Internet environment to disaster victims or volunteers through pupils’ tablet PC
  - There is a way to bypass pupils’ domain and access the school’s Internet domain directly by victims or volunteers by changing the OS setup.

- Provision of the school’s Internet connection environment through disaster victims’ own PC, etc
  - Communications card will be available for lending at school which will let the disaster victims directly connect to the Internet without going through the school ICT system.

- Utilization of the school ICT system for service operation by municipal workers
  - Tablet PC usable by municipal workers are prepared and the communication means are ensured, for municipal workers to carry out emergency services just after the occurrence of disaster.

- Provision of disaster information to victims utilizing the school ICT system
  - Provision of emergency earthquake warnings and information for victims including on IWB.

- School will be equipped with tablet PC batteries, solar powered battery chargers, etc. capable of maintaining the ICT system and Wi-Fi capability and recharging batteries of victims’ cellular phones, etc.
Summary of Guideline 2012 – Some Results of the Experimental Project (the Number of Learning Sessions and Evaluation in Primary Schools)

- In primary schools, the number of sessions in which collaborative occurred increased overall.
- Questionnaire results: 1) Children took very well to ICT-utilized learning, 2) Teacher’s skills in teaching with ICT are definitely improving.

Summary of Experimental Learning Sessions in Primary Schools

<Frequency of the occurrence of collaborative learning>

- Frequency of collaborative learning increased overall, especially in learning arithmetic.
  - In arithmetic, occurrence increased by 7.8%. Occurrence increased 4.7% in the first year, 1.9% in the second year.
- In the second year, the sessions which involved the entire classroom utilizing ICT environment increased.
  - Especially in “6. Discussion on the same issue participated by the entire class” and “5. The entire class discussed the presentation of an individual pupil”

<Pupils’ Responses>

- Concerning ICT-utilized learning, 70 to 90% of the pupils felt good about in both the first and the second year.

<Teachers’ Responses>

- The skills in leading the classroom in ICT-utilized learning definitely improved.
- Even in items where the classroom leading skills utilizing ICT were slowly developed in about a half year after the beginning of the experimental study, the skills improved significantly after one year.

Note: From the top of each item of bar graph, “proportion of teachers who can lead class” is displayed by pale gray, the prostate (at the start of ICT introduction under the project (around Oct 2010)), dark gray, the state at the beginning of early FY 2011 (Apr to May, 2011) and black, the state at the end of FY2011 (around Feb 2012).
Summary of Guideline 2012 — Some Results of the Experimental Project (Evaluation in Junior High Schools and Other Achievements)

• Although ICT system has just been introduced into junior high schools, teachers are increasing skills in ICT and leadership in classrooms. The system is highly evaluated among pupils.
• In addition, positive comments on the effect on classes from teachers, open class participators and guardians have been received.

Summary of Experimental Learning Sessions in Junior highschools

<Assessment on Teachers>
○ Although ICT system has just been started in operation, teachers are increasing skills in leading ICT classrooms in all items of assessment.

<Pupils’ Responses>
○ More than 80% of the pupils responded positively in “interests in class, motivation to learn and classroom behavior” as well as “improved teachers’ environment.”

Note: Proportion (%) of pupils who made positive responses

<table>
<thead>
<tr>
<th>Category</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest, motivation, classroom behavior</td>
<td>81.1</td>
</tr>
<tr>
<td>Knowledge, understanding/skill</td>
<td>73.4</td>
</tr>
<tr>
<td>Thinking, judgment, expressions</td>
<td>64.0</td>
</tr>
<tr>
<td>Improved teachers’ environment</td>
<td>82.2</td>
</tr>
<tr>
<td>Improved students’ environment</td>
<td>77.9</td>
</tr>
<tr>
<td>collaborative learning and collaborative education</td>
<td>74.9</td>
</tr>
</tbody>
</table>

<Other result>

<Teachers’ Responses>
○ “My teaching method changed” “Stimulating”
○ The ICT system is wonderful because it includes even hand-writing skills
○ The system should be installed in all levels of education, etc.

<Open Class Participators>
(total increased to 2,242 participators)
○ Voices such as delight because most pupils are concentrating and feelings of hopeful anticipation of the result of the ICT system installation aiming at enhancement of achievement, and others

<Guardians’ Responses>
○ Very surprised to see that the child is so involved in learning
○ If home learning is more strongly tied to school sessions, it would be better yet, and others.

<Other Effects>
○ Ability in writing and interest in learning is increasing.
○ collaborative learning stimulated pupil-to-pupil interaction.
○ Items displayed by children are diversified.
○ Ties with classmates are strengthened and the cases of bullying can be expected to decline.
○ The number of studies presented in academic society has increased.
○ Contributes to the municipal capability to educate children
○ Socio-economic effects, etc.
Thank you!