Educational Reform in Japan

- Retrospect and Prospect -

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1. An Overview of the History of Educational Reform

For a very long time, Japanese schools have supplied classroom teaching in a ‘lecturing all at a time’ style, which is featured by two “Ts”; teachers and textbooks, as the most prominent components. Television, the third “t,” joined there in 1950’s, which was broadcast by NHK, Japan Broadcasting Corporation, in the name of the educational TV programs. The third “t” could not give a fundamental change to the teaching-learning styles in Japanese schools, however.

Even though they were provided with TV programs, teachers used the programs only to call students’ attention to the problems at issue, which was then inevitably followed by reading the textbooks for the sake of correct interpretation of those points and by further development such as experimenting and making observation trips. The more crucial thing is that all those in the students’ learning process were totally prepared and controlled by the teachers with regard to their planning, instruction, and management. These types of learning, like TV programs developed therefrom, had been conducted every corner of Japan.

The situation, however, began to change towards the end of 1970’s, when computers came to be introduced into classrooms. Their arrival triggered an emergence of a new style of learning, there is, individual learning where each students proceeds at his/her own pace in the process of interactions with computers. It was the first time in the history of the modern school education system in Japan, since its establishment in 1872, that such a way of learning has been implemented in Japanese schools. This new approach to learning has received various characterizations such as ‘individualization of learning,’ ‘automation of learning,’ or ‘two-way/interactive learning.’

These computers have spread into schools all over the country in no more than twenty years, with the aims and the methods of their uses changing drastically during the same period. There might be no other educational medium ever which is comparable with computers in regard to the rapidity of their expansion and the frequency of changes in their purposes and methodologies during so short a time. From that, the
history of educational use of computers are divided into four terms and characterize each of them as follows:
1) 1970’s - the middle of 1980’s
The period of CAI: the rise of individualized education
   - CAI was mainly used in mathematics, and then the stream went to English and sciences.
   - The base of these activities first resided in the Educational Technology Research Centers in national universities. The center of gravity, then, shifted to each computer room in junior and senior high schools.

2) The middle of 1980’s - Early 1990’s
The period of computers as a tool for learning and expression
   - Computers were used for graphics, databases, simulation, word processor and presentations.

3) 1990’s
The period of multimedia in education
- In 1992, the Ministry of Education, Culture, Sports, Science and Technology* (*Abbreviate it to “Ministry of Education” from the following use) published a guidebook for the promotion of utilization of multimedia in schools.
   - Interactive learning with CD-ROM spread throughout Japan by the middle of 1990’s.
   - ‘Media-mix’ approaches came to draw much attention: in this method, teachers would choose and combine multiple educational materials, such as CD-ROM educational TV programs, self-made video programs, textbooks, and 3D materials, to produce a necessary and targeted effect corresponding to the aims of the teaching/learning in a question.

4) Late 1990’s
The period of the Internet for learning, searching information, and inter-school and international exchange
   - “The 100 Schools Project” was launched in 1995, which was followed in 1997 by the “New 100 Schools Project”
   - Application of e-mail, WWW, TELNET, and video conference systems

5) Current - Future
The period of Reform of National Curriculum and IT education
   - “The Information and Computers” course in junior high schools, which is now an elective, will be shifted to a compulsory subject in 2002.
In senior high schools, a new course “Information Technology” will be introduced in 2003 as a compulsory subject for all students.

During the last two decades, revolutionary changes in the means and ends of the use of computers in education have cropped up one after another. What is more, these changes are gaining speed. As a result, their seeking the residual images of CAI in the computers has confused many of those teachers who pioneered this field at the earliest stages with CAI. This contrasts very much with the situations in schools, which have no previous records with computers. These latter schools have got equipped, all of a sudden, with the newest models of machines such as Windows 98 or 2000 and are connected with the Internet from the outset; in these schools, teachers as well as students are making fairly free use of those computers without any confusion.

However, it is not only between veteran teachers and younger ones that we see a dichotomy in their attitude toward computers: rather, we can observe a divergence of uses, which differ from one subject to another. For example, in the classes of arts, music, and languages, especially in junior high schools, introduction of computers as a tool for students’ activities of expression is still the most predominant style. In social students and sciences, on the other hand, media-mix approaches are widely applied both in junior and senior high schools, which feature CD-ROM software that has been highly improved qualitatively, along with the other media such as educational TV program and printed materials. In foreign language classes, situation theoretic approaches characterized by interactions between visuals and learners are coming to the fore, while in mathematics classes, the behaviorist way of thinking featured in CAI still underlies those programs with 3D-visual images by computer graphics. Thus, with regard to both the specific application of computers and the theoretical basis on which each of those practices relies, a significant variation is recognized among subjects.

2. New Movements for School Reform Baked by Computer Network

1) Declaration by the Ministry of Education
The number of schools that actively adopt the Internet for classes has been growing sharply, and the Ministry of Education, in order to support this line, announced a new plan that it will be connected to all schools in Japan, including elementary schools, junior and senior high schools and other schools, with the Internet by the year 2001.

2) Network Model Area Plan, from 1998 to 2000
The ministry of Education and the Ministry of International Trade and Industry (MITI) have jointly implemented a three-year plan since 1998, which aims for connecting 1050 schools in 30 areas by the 1.5MB cables.

3) Practices at ‘Internet Schools’
The Ministry of Education has been designating schools that initiate experimental programs for advanced teaching and learning with special resource to the information
The examples below show some of the highly motivated initiatives of these, which is called, ‘Internet Schools.’

a) Environmental Education

- Students made their observations of the growth of a plant of the same kind and measured the critical timings, such as generation, flowering, and fruition, using the same criteria. They exchanged their own data with the others through the Internet or Videoconferences.
- Students made an investigation of Social problems, like NOx and Sox as air pollution problems, water contamination in rivers, lakes and Inland Sea, acid rain and noise pollution around highways. In the activities, those data were sent to the host computers of their own project, such as those in a hosting senior high school, in teachers' colleges and in the Globe Plan secretariat. The data were processed and compared there, and the results were returned to each school. Instances of collaborative learning of elementary schools with junior high schools are also reported.

b) Education for International Mutual Understanding

- Students of Takaoka Commercial High school, in Toyama Prefecture, made their own plans for the school excursion to Korea through high school students.
- Students of Japanese classes in the U.S. and Australia and students of a commercial high school in Nagoya published a “Web Magazine” as a product of their various exchanges on E-mail and CU-SeeMe.
- NHK Educational TV production in April 1999 started a fifteen-minute program named “The Encyclopedia of World Foods,” which targets upper-grade students of elementary schools. After watching the first episode, children were encouraged to cook Indian type of curried food, which was compared with Japanese ‘curry with rice.’ Two weeks later, the second episode was broadcast which provided various data on curry. Children were given information about several elements such as religion, climate, varieties of rice like Indica and Japonica, and customs, and they also learned to relate those elements with food. The topics in the line up of this program include Italian, French, Mexican, Philippine, Chinese, and German cuisine, which is followed by Japanese *sushi* and British tea and cakes.

Thus, after watching the TV programs, children cook the dish and compare it with that in the order countries. After those activities, or even in the course of them, children are expected to exchange their own experiences or questions by E-mail or Videoconference. They can also acquire much more detailed information from the Web of NHK ETV.
c) “Okome Project”: Full digital interactive learning project

NHK Educational Television started another 15 minutes program named “Okome (Rice)” in April 2001. The targets are also upper-grade students of elementary schools. NHK has planned to broadcast 20 programs per year about Okome, such as Rice production in the world, Rice as commercial goods, Struggle against noxious insects in rice field, Rice and autumn festival, and so on.

Continue to the program, students search their own problems using the digital clips, or electric dictionary, already set up as the developmental learning materials from TV programs, like “Four seasons in the rice field,” “Ecology in the rice field,” “Asian rice production zone,” “Improvement of rice breeding,” “From strong rice to tasty one.” Sometime additional activities at the rice fields, or interview to farmers, these are continued outside the school.

Each school exchange their survey report questionnaires, observation memo, digital pictures to each other through the Internet, and letters. They also refer to NHK ETV, Okome Web quite often, and send the E-mail to the staffs.

3. New Millennium Project in Japan

1) The plan of the Internet Connection through nation-wide public schools

* Two computers for each normal classroom and six computers for each practice room.

* Connecting each classroom by LAN until 2004

2) Improvement students’ basic scholastic proficiency for understanding their class easily.

* Improvement the 20 students per class system for fundamental subjects and advance placement class

* Implement national academic achievement survey, 1% students of each Academic grade from 1 to 9

3) Train teachers as real “professionals of education.”

* Introduce the opinion type training system according to teachers’ requests

* Establish a system where teachers have working community experience, cf. Take working experience at companies
* Information and Communication Technology requested throughout the curriculum, such as utilizing the Internet system in music, art, science, and integrated project.

At that time, teacher requested new predisposition, such as media literacy, curriculum designer, and coordinators.

**Reference Tables**

Table 1. Computers at Public School

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>School Number (A)</th>
<th>School Number with Computer (B)</th>
<th>B/A (%)</th>
<th>Total Number of Computer (C)</th>
<th>C/B (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary school</td>
<td>1999</td>
<td>23,686</td>
<td>23,140</td>
<td>97.7</td>
<td>297,845</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>23,607</td>
<td>23,344</td>
<td>98.9</td>
<td>367,292</td>
<td>15.7</td>
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<tr>
<td>Junior high school</td>
<td>1999</td>
<td>10,432</td>
<td>10,426</td>
<td>99.9</td>
<td>334,213</td>
<td>32.1</td>
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<tr>
<td></td>
<td>2000</td>
<td>10,418</td>
<td>10,418</td>
<td>100</td>
<td>382,981</td>
<td>36.8</td>
</tr>
<tr>
<td>Senior high school</td>
<td>1999</td>
<td>4,161</td>
<td>4,161</td>
<td>100</td>
<td>317,886</td>
<td>76.4</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>4,146</td>
<td>4,146</td>
<td>100</td>
<td>339,489</td>
<td>81.9</td>
</tr>
<tr>
<td>School of the handicapped</td>
<td>1999</td>
<td>920</td>
<td>910</td>
<td>98.9</td>
<td>12,163</td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>925</td>
<td>921</td>
<td>99.6</td>
<td>14,100</td>
<td>15.3</td>
</tr>
<tr>
<td>Total</td>
<td>1999</td>
<td>39,199</td>
<td>38,639</td>
<td>98.6</td>
<td>962,107</td>
<td>24.9</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>39,096</td>
<td>38,829</td>
<td>99.3</td>
<td>1,103,862</td>
<td>28.4</td>
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</table>

Table 2. Public School connecting to the Internet

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>Connecting rate (%)</th>
</tr>
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<tbody>
<tr>
<td>Elementary school</td>
<td>1,747</td>
<td>3,230</td>
<td>6,497</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.6</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>27.4</td>
</tr>
<tr>
<td>Junior high school</td>
<td>1,304</td>
<td>2,375</td>
<td>4,461</td>
<td>12.4</td>
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<tr>
<td></td>
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<td></td>
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<td>22.7</td>
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<tr>
<td></td>
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<td>42.8</td>
</tr>
<tr>
<td>Senior high school</td>
<td>719</td>
<td>1,557</td>
<td>2,651</td>
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<td></td>
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<td>37.4</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63.7</td>
</tr>
<tr>
<td>School of the handicapped</td>
<td>103</td>
<td>201</td>
<td>334</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>21.9</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36.8</td>
</tr>
<tr>
<td>Total connecting school</td>
<td>3,873</td>
<td>7,363</td>
<td>13,945</td>
<td>9.8</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>18.7</td>
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<td></td>
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<td></td>
<td>35.6</td>
</tr>
</tbody>
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4. Some Complements

One of the most pressing issue is not to equip the facilities nor to renew those machines, but rather to reeducate teachers. There are at present no effective measures to stop the tendency of children’s diminishing in number, and, thus, the average age of teachers has risen up to 39. We cannot expect, for the time being, that we will be provided with enough room to hire those newly graduated as teachers of IT education. Therefore, the Ministry of Education is planning these three years to encourage 9,000 incumbent teachers to get a certificate to teach information basics to the students in academic courses in senior high schools. The intensive training course will be started in summer of 2000, where the instructions will be provided from the Educational Centers at distance and also from the Ministry of Education by the way of the communication satellite. I may not be the only person who is skeptical about the effectiveness of this method of teacher education, i.e., an intensive course in a short period with unsatisfactory level of interactivity guaranteed by the use of the Satellite. It is difficult to imagine that these training are enough to guide teachers into taking the initiative in leading such new IT education in the 21 century, as mentioned before.

Rather, what we should realize the first is the system of IT coordinators who support the IT education in schools: they are to be hired at the Education Boards of each district on a three-year contract, like AET’s, and to make rounds of visits to every elementary, junior and senior high schools in the district to instruct and support the students in IT classes. At present, this is implemented in very restricted area, but we must expand this system to every corner in Japan, with receiving a full assistance of the Ministry of Education in both financial and dimensions. This system will then work hand in hand with the reeducation of incumbent teachers to improve the quality of IT education as a whole.

References

Source: [http://gauge.u-gakugei.ac.jp/](http://gauge.u-gakugei.ac.jp/) 09/2001