A QUICK OVERVIEW OF PRESENT TECHNOLOGY IN JAPAN

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In order to examine the future of children, we must consider the concept "mobile". The term "mobile" means the use of portable wireless telephones such as PHS (personal handiphones system) to use the internet wherever one wishes.

The present state of desktop computers

Recently, there have been more and more students who stay at the university all night. In the final analysis of this problem, it comes to the question of machines and telecommunications.

There is the example of Keio University's Shonan Fujisawa Campus. During the finals season at the beginning of July, many students stay up all night in front of desktop computers doing their work. Why does this happen? One reason is that there is a need for printers to print out the reports.

On one hand, there is the argument that the students should carry portable notebook computers and use the telecommunications system from a distant place.

However, connecting to the network from home involves telecommunication changes. At times, these can rise up to hundreds of thousands of yen.

Moreover, there is the problem of telephone circuits. The circuit at home usually has low capacity and is slow. On the other hand, at the university, one is able to use excellent fast circuits at all times. Also, this expense is included in the tuition fees which are paid beforehand, so that everything is free.

Recently, NTT started the "telehoudai", which is a service that allows one to telephone as much as one wants. From 11PM until 8AM, one is able to use the line for a fixed price. One major problem of this service is that users don't feel the need to hang up, so that the circuits become congested and in the end one is unable to use the line.

Also, in the case of cabled communications, there is always a restriction of place. For example, there are many buildings in Tokyo with electric sockets every 2 meters on the floor of the office. But, however many sockets there may be, if the cord of the plug is even 1 meter short, everything is meaningless.

With simple mobile phones such as PHS which encompasses 32Kbps, we are able to make speedy telecommunications. We can connect these to computers and do mobile networking. This has been in practice since April 1998.

Mobile

There are 3 conditions for practicing this kind of mobile networking. First of all, there is the need for miniaturization of machines so that they become portable.

Second, there is the problem of the reception of radio waves. Even in new buildings in Tokyo, at some points one is unable to receive the waves. The basement is one such place. Recently, more places have been made in the subway with antennas for the PHS. There is a need for infrastructure to receive the information on radio waves in order to fulfill the term "anywhere".

PHS uses radio waves from ground facilities, but in the future, people will start to use waves from satellites. With a small number of satellites there is not much influence, but in the near future, by 2002, the present number of 150 satellites is estimated to increase up to 1200. With 10 times more satellites than at present, not only developed countries, but developing countries and places in the jungle will benefit.

The third is the problem of electricity.

With desktop computers, all electricity comes from a power socket in the wall. Notebook computers use batteries to be carried around. However, one must always keep an eye on the power. There is a need for spare batteries and a schedule for recharging.

Of course, at present, technology innovation to reduce electricity consumption is in progress. For example, with new semiconductors, the electricity consumption is reduced to about one fifth. Further, with IBM non-aluminum copper circuits, it is reduced by about one half. Using these kinds of ideas, a battery that lasted only one hour becomes able to last 5 or even 10 hours.

Information underdogs

On the other side, there is the problem of information underdogs. On June 5th, President Clinton made the following remarks on this subject:

—We know from hard experience that unequal education hardens into unequal prospects. We know the Information Age will accelerate this trend. The three fastest growing careers in America are all in computer-related fields, offering far more than average pay. Happily, the digital divide has begun to narrow, but it will not disappear of its own accord. History teaches us that even as new technologies create growth and new opportunity, they can heighten economic inequalities and sharpen social divisions. That is, after all, exactly what happened with the mechanization of agriculture and in the Industrial Revolution.

As we move into the Information Age we have it within our power to avoid these developments. We can reap the growth that comes from revolutionary

technologies and use them to eliminate, not to widen, the disparities that exist. But until every child has a computer in the classroom and a teacher well-trained to help, until every student has the skills to tap the enormous resources of the internet, until every high-tech company can find skilled workers to fill its high-wage jobs, America will miss the full promise of the Information Age.—

In Japan, there are experiments to relieve the information underdogs by uniting the web and former systems. One such experiment is called "hybrid mail", which is e-mail delivered by the postal service.

In a study group called "Post office of the 21st century", organized about 3 years ago, there have been frequent comments among young people who are familiar with the web, that there will be no need for postal services in the future. This opinion takes the view that in the transitional period, except for the ten thousand people who can use the internet, the rest of the one hundred million who cannot may suffer inconvenience, but before long everyone will be able to use the internet.

President Clinton has indeed remarked that in order for all American citizens to connect to the internet, they will install the network in every school and make sure that everyone masters the internet as a compulsory part of education.

The problem that has surfaced here, is that in the period before everyone becomes able to use the internet, people such as the elderly will become information underdogs. Accordingly, to allow these underdogs to receive the benefits of high technology, the following experiment has been undertaken in Japan.

The postal service is very traditional but has a nation-wide network. This has been united with the internet. Through this service, the gap between those who can use the network and those who cannot will be greatly reduced.

This service, called hybrid mail, is a unification of the web and postal delivery. For example, a child is able to use the internet and e-mail freely. His mother lives in the suburbs and does not possess a computer. The child sends an e-mail to a post office near to her home, where the e-mail is printed out and sent as normal postal mail. This kind of system allows people living anywhere within the limit of Japan's postal service, which means everywhere in Japan, to receive e-mail.

The one problem is the price. Postal mail costs 80 yen, but hybrid mail is 110 yen. In order to save 30 yen, students may seal the letter and bring it to the post office by themselves. However, students send out a great deal of e-mail each day. Rather than printing one out, sealing it in an envelope and sending it out at a post office it is much easier to send an e-mail and have it sent out as hybrid mail. This may even lead to an increase in the use of postal services.

Besides this kind of use, a publishing company's questionnaires to readers are being sent by hybrid mail. They are used to receive comments on books, and the publishing company writes replies to each answer. This is enormous work. With hybrid mail, by sending the mail through computers and circuits, the extra 30 yen may be cheap as the cost.

Hybrid mail saves the cost by printing out the letter as close to the recipient as possible. This obviously allows the service to become cheaper, so that if the price becomes equal to, or less than normal mail, there will probably be more users.

As explained above, hybrid mail connects something already completed such as the postal services, with the web. In other words, the footwork of the delivery system and the network come together to create a new equal society. This kind of "net-footwork", or combination of network and footwork, is one destination of the mobile networking system.

Also, with the spread of internet technology, we are able to care to people who suddenly become information underdogs by being hospitalized, for example due to an accident. Activities, such as independent shopping using the internet, will probably become possible at any moment. A "virtual window" which allows one to meet friends without the restriction of visiting hours, may become reality. The most important thing for hospitalized patients is to be able to live as normal a life as possible.

Computer input by speech has recently become possible, so that there are new choices for people who have difficulties with the keyboard.

Children's adaptability

If the elderly cannot get used to the new machines, we are able to offer ideas such as the hybrid mail. How about the case with children? We have done an experiment to study how children adjust to new terminal units and systems.

In 1996, fifteen children from Hiroshima gathered in Tokyo for four days and three nights in an event called "Joyful Multi Media Family Camp". The children also tried out the hybrid mail mentioned above. When we let them handle Color Zaurus which had just come on the market from Sharp at that time, they quickly mastered it.

In 1997, we held the same type of event called "Multi Media Camp '97": Tokyo University joined Keio University in this event. Forty people, including twenty children and twenty parents, gathered from all over Japan, and about fifty students assisted them in the experience of multimedia through workshops.

Children walked with portable terminals during orienteering, and by playing with these, they learned all the functions.

The portable terminal used here is called Power Zaurus, sold on the market since July 1997. The size is small enough to be put in a handbag. It has a digital camera, and by connecting to a PHS, one is able to use the internet.

The children quickly master such machines, which are handed out during the period of four days and three nights. Usually, it only takes a day to do so. University students handled these machines during the same time, but even students from Keio University who are familiar with computers, took the same or perhaps more time to master their use. On the contrary, there were times when they learned how to use them from the children. The reason for this is that the children cannot read much of the instruction manual, since they are only in fifth or sixth grade. However, the twenty of them, by consulting each other, go on and on and master it. It is similar to the knack of learning a language. Even without any grammatical knowledge, children are always the first to master a language with beautiful pronounciation.

Children have extremely good adaptability. This leads to the conclusion that as with languages, rather than starting when old, one should start young. Instead of teaching the facts and arguments through textbooks first and then putting is into practice, it seems better to let them learn naturally as above.

Also, at the beginning, in order to let the children become friends with each other, we did an experiment using the Print Club. By exchanging Print Clubs, which are stickers with photos of the face, they become friends. It is important that this kind of a relationship is built.

Children seem to be information underdogs, but are actually not so. They possess much potential, and by adapting to the environment they are able to master at an extremely fast speed. One condition for this is that it must be enjoyable. In other words, the problem is the contents.

First of all, children love games. It is very difficult to teach children about PHS telecommunications, but using the system first as a game makes it much easier to understand. During this Multi Media Camp, we used a game called "Tama-Pitch". A "Tamagotch" is installed in a normal PHS.

The tamagotch can visit other tama-pitches through the air.

At this camp, the children gathered from places far apart, so we borrowed twenty-five tama-pitches from Bandai and sent them to each child two weeks before the camp. Within a day, the children started contacting each other.

The children use the tamagotch in the game; for example, if the tamagotch becomes sick, it needs a friend to come and visit, or else it will die. Within two

weeks, the children were able to understand the PHS telecommunication system through the game. Afterwards, when they connected the Power Zaurus mentioned above to the PHS, without any explanation, they could easily understand that the contents were the same.

It is very difficult to teach methods without goals, but by learning in order to play, children learn automatically.

The children of the future, or the "net generation", will be able to have perfect command of "mobile" including both network and footwork.

The spread of mobility

By August 1997, 32 million cellular phones and PHS had been sold in Japan.

The number has been increasing by one million per month, and it is very large considering the number of normal telephones which is 60 million. The number of cellular phones and PHS is over half of that of normal telephones, and is steadily increasing. This adds up to over ten million more in a year, so that we can expect changes in lifestyles, especially of young people. There has been an increase in the number of students who do not own telephones at home. This means that the idea of mobile telecommunications has started to become established. On the other hand, the number of normal wired telephones has been falling by 50,000 per month since January 1997. At this pace, soon the numbers will reverse, and the main telecommunication units will become mobile phones and PHS. Wired telephones will remain, but become secondary.

The situation in developing countries, especially in Asia, is that there are very few wired telephones, but many cellular phones. For example, China is a leading power in computers, following Japan, and is expected to become the number one superpower in the near future. Connection to the internet is also increasing at great speed. From these facts, we can conclude that the main force will become mobile, and with the miniaturization of personal computers, the desktop-oriented environment will be replaced by a mobile environment with portable computers.

Allan Kay, a key figure in the birth of the internet and an advocate of the present personal computers, visited Japan in May. 1997 to participate in the International Multimedia Symposium. On this occasion, he commented, "At first, computers had an 'institutional' period. In other words, large computers were placed in large companies, government offices, or universities. This is the period of what are called main frames. However, with innovations in technology, we go into the second period, the 'personal' period. The typical form, with a mouse, keyboard, and monitor, appears. This type is presently in its golden age. What is predicted to happen in the 21st century is 'intimate'." In short, this means mobile. An

example that Allan Kay used was a picture of a small child using a computer in the woods or in the middle of a town.

In the Multi Media Camp as well, we have started to use the internet fully from this year. From the planning stage, it was used to open to the public all the plans, including the details of the program and their application. The homepage was uploaded from the beginning of July, and then was much accesses. All members kept an eye on the progress of the plans, using the web to cooperate with each other on the production of this event. They were able to reach mutual agreement by owning common information on the process that the students exchanged with each other through the e-mails. All the records are still saved.

We have used the same method in "Infrastructure of Media Environment". This is a course in the graduate school. For example, the syllabus, or the schedule of the course, is shown on the internet for the students to see.

In the beginning, the course goes according to the schedule, but situations cause the schedule to change, one after another. "Tamagotch" for example, which was covered during the course, was not at first in the plans. Also, the contents of the class, including photographs taken with a digital camera, can be seen on the web, instead of taking notes during class.

"Operation: Tamagotch obtaining" is something that we covered in this class. On May 24, at 7:30 AM, the TA (teaching assistant), while netsurfing, found information that there would be a sale of 2000 Tamagotch in Ikebukuro, Tokyo. He immediately went there, and found many people already forming a long line already. The photograph of this long line at 9:20 AM is shown on the homepage. Many people had found the information almost the sale of Tamagotch on the net. There were even many mothers who had brought their children. We can see that a large number of people do shopping from information on the internet.

In short, the information achieved on the network, or through the waves, is changed to footwork. This is the first step of "net-footwork", which is combination of footwork and network.

There is another example. We were able through the internet to contact a school far out in the mountains in Kumano, Mie Prefecture, called Kohnoue Middle School. At present, there are 8 students there with 7 computers including ones connected to the internet, and they use them enthusiastically. Their use of the computers is extremely active, as much as the students at Keio University. However, one of the students felt that once having started to use a computer, he would be confined to the room and unable to play in nature outside, so he decided not to use computers. This can be thought of as the right thing.

The ideal is that the use of e-mail is active and the information is integrated with reality and footwork. Life only becomes actual in reality, and this includes

footwork, handwork, and various kinds of experience. We are unable to go into this world carrying a desktop computer. When using only desktops, one is apt to have the geocentric illusion that one is at the center of the world, and ignore the need for mobility. However, when one goes to the actual scenes with mobile units and enters an "intimate" situation, as Allan Kay says, there is an unlimited amount of information from the network, which is waiting to be supplied.

The world of desktops, which is confined within itself, seem organized at first glance, but is self-limiting to the utmost and can therefore become weak. The chance of developing a "computer mania" is large.

Even ten years ago, at an extraordinary session of the Educational Council, the problem of information was widely discussed, for they were apprehensive about isolation from reality and the lack of nature and human life.

One solution to this is the mobile network. In the future, the network will be included in the everyday lives of the common people, as for example, where there is a mobile unit inside a shopping basket. To think that the present state of the network is the ideal is an extremely dangerous thought, and we must recognize that the changes in mobility just starting how will be the real source of intelligence. Does new intelligence come from somewhere in the internet? With this in mind we realize that we are only picking out things written somewhere else, in a database so that is could be thought of as an extension of complete memorization or imitation.

The only times one thinks by oneself is when one experiences various things at actual scenes and lets them infiltrate and inspire creativity.

In conclusion, the important changes of the 21st century are the development of mobility and net-footwork, which is in psychological words, a new type of humanly-oriented method which includes both physical and tacit intelligence.