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Introduction

CHILDREN ARE BORN AS INFORMATION SEEKERS, "BRIGHT AND DARK SIDES OF MULTIMEDIA FOR CHILD DEVELOPMENT"

Noboru Kobayashi MD
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Babies first cry when they are born, and calm down within a few minutes to the alert state (neonatal alertness). Then they begin to look around and apparently can notice the mother's face and those of others[1]. This indicates how a child is born as an "information seeker". This is further proven by psychological studies showing that the more information on object in the environment offers, the longer the neonate and young infant stares at it. They are already curiosity-minded[2].

Almost all the babies in Japan will be exposed to television (TV) soon after birth, since all families have television at home and further the home itself has so little space that the TV has to be placed in a same room as the baby. Although they are apparently indifferent to the TV at the beginning of life, they soon start to glance at it on hearing it within a month after birth. When they begin to sit, they start to watch the screen intently. At approximately the age of 3 months, 30% of infants start to stare or possibly to watch the screen. When they begin to crawl, they try to reach the TV. When they start to stand, they try to switch to change the channel. When they become able to stand and walk, they enjoy seeing their favorite character continually on the screen. At 12 months, according to our study, they may watch TV for nearly 2 hours per day. This behavioral development of the baby with respect to TV gives important insights into the fact that children are information seekers[3].

It is well accepted that the capability to seek information of the neonate and infant must be genetically determined, although we have to admit that there is significant individual difference. This fact is clearly shown by the following consideration of human evolution.

Anthropological studies have shown that our ancestors appeared in Central Africa nearly 5 million years ago, and soon started to move from there to the south and the north, probably to find a better place to live. Thereafter they moved further out from Africa to the Middle East, a million years ago, and this was followed by emigration into Europe, Asia and the other continents. They were certainly motivated to such emigrating movement by the search for information[4].

We know that people have invented various means of communication to exchange information throughout our history. Our ancestors used biological means such as behavior, facial expression and probably cooing at the beginning, and then started to speak as the vocal cord developed. As information for daily life was increased by improvement of the arts of hunting, gathering and dwelling, they started to make cave paintings to record the information, and this was followed by inventing writing symbols, letters, characters, and words as the means for improving this recording. The production of paper, pen, ink and other things facilitated writing. They then developed printing devices to record information in books in the 15th century and later in newspapers in the 16th century. Accordingly the amount of recorded information greatly increased[5,6].

In the last century, when electric power was harnessed, the telegraph and telephone were developed. Then television, interconnected computers, and finally the Internet followed in this century. This quest for tools of information and communication has paralleled our biological evolution since the beginning, and the tools have continuously improved, and never disappear after their invention[6].

These considerations show that the information seeking of human beings is genetically determined from the neonatal stage as well as the starting of human history. At present, children in the affluent world are now living in multimedia societies. They are exposed to multimedia at home and at school as well as in the community. For instance, in Japan, in addition to TV, modern electronic fads include television games, Karaoke and PDA in the 1980s, and pagers, cellular phones, Print Club. Tamagotchi and Pocket Monster have emerged in the 1990s. Each has two specific features, "mobility solo" and "play". Even in the 1980s, it was reported that 60 to 70% of children enjoyed games at home, and nearly all schools at present have 10 to 70 computers, depending on the grade[7].

The parents of the children, who are now enjoying multimedia, have grown up with TV since the beginning of life. When the children of now are grown up and become parents, what will happen for their children? We have to consider this point at present for the 21st century.

Even now, the use of multimedia is widespread enough to have an effect on child development. In Japan, we can notice a considerable change in the behavioral pattern of children. As an example, adolescents are searching for friends using handy phones, pagers (beepers) and the so-called Print Club in addition to the standard ways at school and at home. Among them, the Print Club teaches us the need to study the effect of the multimedia on child development. The Print Club is a type of camera machine box that prints photo-seals of the face, postage-stamp sized snapshot stickers, located at arcades,

game centers and stations, where young girls can pose alone or together with friends. A sheet of the stickers is printed within a few minutes. They plaster the stickers, or exchange them with others to be plastered in their notebooks for making peer relationships. Of course, they communicate with each other over the Internet or by other digital means to introduce themselves in some cases in addition to showing their own stickers[7].

Why did the Print Club become so popular in Japan? The only child is predominant here, without brothers and sisters. Parents often work in the day time and leave children alone in many homes. Most families are nuclear in the urban society. Children have to grow up with much less relation to parents and other family members at home than before. It can be said that Japanese children are starving for human contact in many ways, including peer relationships. This is why the Print Clubs have grasped the girls minds so rapidly, for they wish to initiate friendship and to boast about the number of friends. In addition, they can reproduce a mirror image of themselves with portrayal of a fancier self, and also memorabilia. There may well be narcissism in their feeling for the Print Club. In another aspect, this may be related to the Japanese custom of exchanging name cards as the back ground of this new behavior. In addition, like PDA and pagers, the manifestation of the Print Club may well be related to mobility in the development of electronic fads.

The multimedia have certainly a bright side as well as a dark side for children. The bright side is shown by the application of the multimedia to education, which requires more studies and research in education science, and to the entertainment of children, if they are properly used. Particularly, children with serious illnesses in hospitals and those with handicaps in institutions are much benefited in many ways by the multimedia.

The dark side includes separation from nature, passive participation, and overload with negative information such as violence and sexually explicit material, which expolit criminal activities. In addition, there may be developmental problems in social relations, including peer relations. Isolation from direct participation among family and friends, especially in the adolescent stage, may produce unexpected influences in the future.

We know that those girls now enjoying the Print Club will grow up to adulthood anyway, and that the multimedia will be improved in future, probably more mobile and handy. We have to keep our eyes open with a media-ecology-mind to see, what is going on at present among children and plan for the next century, when the multimedia will be diffusely infiltrated into society.

As the Guest Editor of this special issue, and also the planner and the organizer of the CRN International Symposium 98, "Augmented Childhood, Evolution of

Child Development in the Multimedia Environment", I sincerely hope that this issue will be useful not only to pediatricians but also to any professional concerned with children and contribute to their better future in the 21st century.

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EXPANDING CONCEPT OF LEARNING TO LEARN

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The concept of "learning to learn" is both new and old. It is old because the phrase was used and elaborated in the early 1960s by Jerome Bruner and others, and the original idea perhaps dates back to John Dewey in 1920s. The rapid rate of accumulation and obsolescence of scientific and social knowledge in that period made people doubt whether the receptive learning of currently accepted knowledge was an appropriate education for future citizens. The accumulated knowledge would be quantitatively too large for one person to store in his brain, and even if it were possible, a good portion of that knowledge would become useless within a few decades. So educational leaders rightly emphasized the need to switch the goal from accumulation of knowledge to the ability and readiness to learn new or needed knowledge.

The concept of "learning to learn" thus included intrinsic curiosity, critical thinking and contextualization. This concept was a driving engine of the curriculum reform movement which took place in the early 60s and received worldwide popularity. Instead of learning everything, students should acquire the ability to learn so that effective learning could take place whenever environmental need or intrinsic curiosity demands it. The ability to learn in this context was still about the learning of contents although these could extend far beyond the contents of textbooks.

The concept, however, has assumed a new look in the early 80s, with the advent of the so-called information revolution. The information media have been computerized at great speed. The knowledge and skill to handle those media have become crucial for effective learning. Media and computer literacy are now one of the important targets of school education. Not only the contents, but the means to reach those contents are subjected to learning. Like reading, which was the medium of learning, later turned into the content to be taught, computers have now become a content of teaching. In the '80s, computer literacy meant familiarity with hardware and software. Literacy training included keyboard skills, programming with Basic and Fotran, etc. It was believed that learning in the computer era would be built on those skills.

However, technological advances soon made those skills unnecessary for learning through computerized media. Without any knowledge of hardware or software, and without special training, one can explore the vast world of information on the internet. The ability to learn again become more closely linked to the acquisition of the cognitive map of the sphere of information. In a way,

it seems that after 70 years of exploration we have returned back to John Dewey.

Aside from computerization, a new learning task is emerging for the citizens of the new century. As globalization of economy and industry proceeds, the world is becoming more and more interdependent. In the 20th century education aimed at personal excellence of individuals. In the 21st century the readiness to understand people, help people and cooperate with people across national and cultural borders will be needed on top of personal excellence. Learning to learn the thoughts, attitudes and feelings of others is the new learning task. Not enough has been discussed about the means to foster this learning.

Recently, the Ministry of Education issued the final revision of a document titled "The Program for Education Reform". This will be treated as the guideline along which educational reform in the coming years should proceed. It will be reviewed by councils and implemented gradually from 1999.

The document starts by pointing out that, up to now, Japanese education inclined to be a one way teaching of knowledge and tended to underplay the ability of independent learning and thinking. Also, having been preoccupied by equality in education, sufficient attention was not given to variety of personality and ability. The educational potentiality of families and local communities declined. Problems like school bullying, school absenteeism, misconduct and violence among youngsters are related to this basic problem.

Following this analysis, the Ministry identifies four major directions for reform. The first priority is the "education of mind".

What they call the "education of mind" is to foster the respect for social rules, and the sense of justice, ethics and empathy, which jointly form the wisdom and the will for better and more harmonious living.

Apparently, the need to foster these skills and the will to understand others and to empathize with them is felt by the Ministry. They are rather unimaginative, through, in proposing ways to make students learn those skills and attitudes. Their proposal is little more than curriculum humanization and moral education. And for that matter, nobody has spelled out convincingly what we should do to foster this new "learning to learn".

However, skills in understanding people are accumulating in social and clinical psychology, and the formation of the "theory of mind" has become a hot topic in developmental psychology.

Hopefully, this expanded concept of "learning to learn" will be the catalyst for revitalizing education in the coming century.

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CHILDREN IN JAPAN AND MULTIMEDIA

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Abstract: Many parents in Japan today are very concerned and have daily problems with their children over the following kind of issues concerning video games, multimedia, and similar devices.

1) Is children's enthusiasm for video games actually harming their growth (physicially or mentally)?

2) Is there any way that video games can help children in the future? For example, will playing these games help children learn to use computers or develop their power of thought?

3) Will excessive enthusiasm for TV games undermine our basic lifestyle? Is the time they spend studying at home or playing outside actually decreasing?

4) Will the methods of communication brought about by computers, pagers, and cellular phones weaken human relations among children?

5) Will being immersed in a virtual world created by computers result in a diminished sense of reality?

The causes of this uneasiness may be traced to parents' own anxieties and concerns about the exceedingly rapid growth of the "information society" of today, together with the fact that their children are directly caught up in the deluge of this information and multimedia society. The development of media has coincided with the growth of today's adults, but children are immersed in a media-filled environment from the day they are born. In Japan, there are now children who can play video games before even learning to write. No one can predict what kind of adults these children will grow to be in the future, and it is fair to say that the most parents and children in Japan are being tossed about on the waves of this information explosion. At this international symposium, we hope to hear the many views that are held around the world concerning children and multimedia.

In my report today I shall attempt to clarify the relation between children and the media, based on the recent results of surverys conducted by the Benesse Educational Research Institute. These surveys deal with the actual situation of children and multimedia from many perspectives, including the children's multimedia experience as well as communication with parents.

Chaotic Aspect of the Information Era

As the correlation between science technology and the development of society has progressed, we have entered a chaotic era in which advanced information technology has created highly intricate effects on our life.

In the realm of science technology, industrial products such as automobiles and electrical appliances seem to have fully developed, although the improvement of design and function still continues, while the media, (such as

computers) continue to develop. This technological advancement of media is so rapid and creates such drastic changes in the nature of life and environment that we are almost overwhelmed by the deluge of his information and multimedia society.

The multimedia situation has become complex because different media are available simultaneously, ranging from printed products, the internet and handy phones to mobile phones.

This indicates that we live in an affluent multimedia society. However, from a different point of view, this overwhelming presence of the media leads to a society

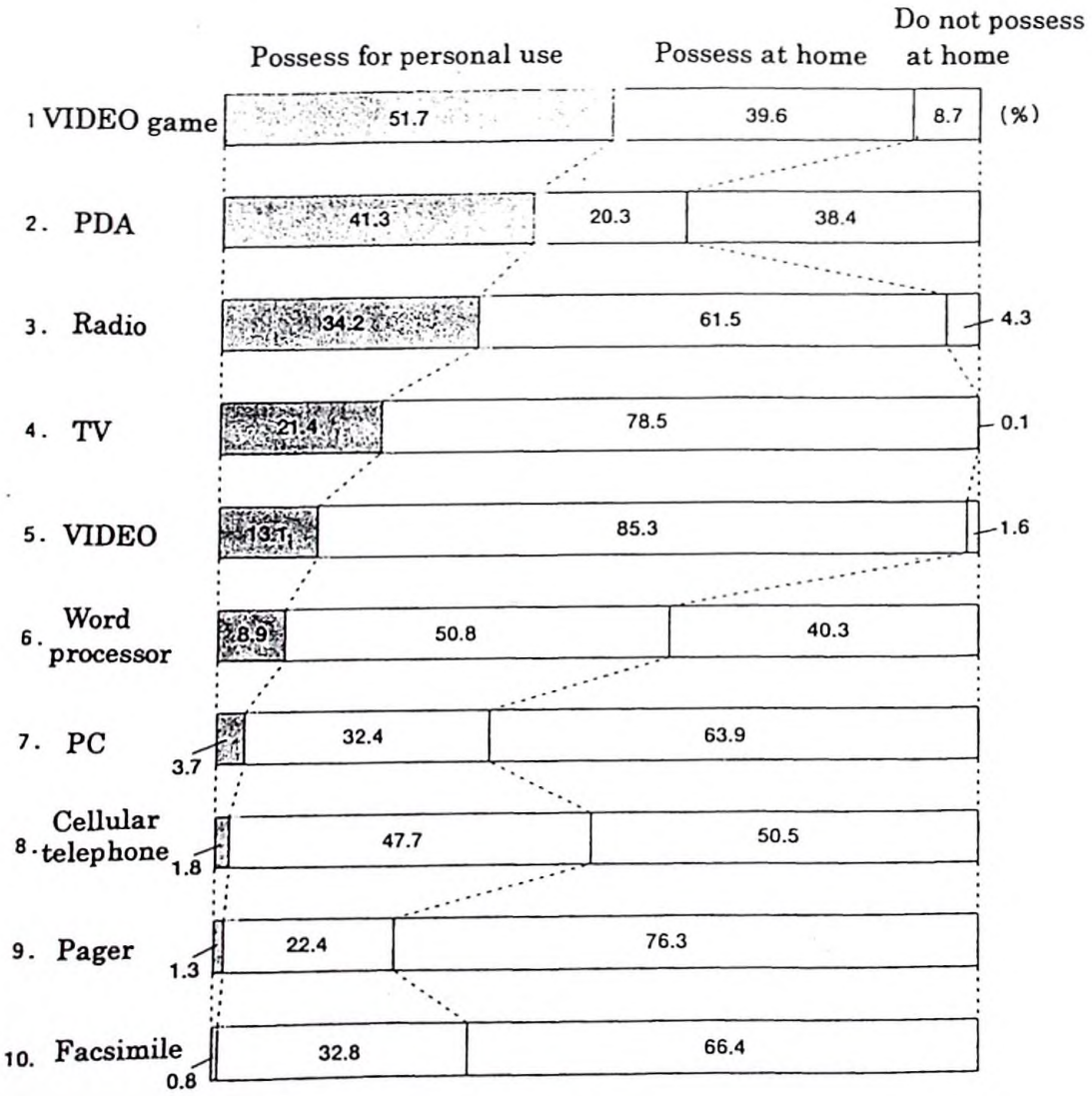

Fig. 1: Use of Multimedia.

in disorder, where people are being tossed about on the waves of the information explosion.

For example, we often come acrros the following scene in the train: a person is using a handy phone as a communication tool, while the next person looks disturbed as she is reading a book. There are also other passengers who think this behavior is a public nuisance. This scene in the train symbolizes Japanese society today.

The diversity of these media and their penetration undermine each person's lifestyle and the difference in values among the various generations. A generation ago, the experience and involvement in historical events or social changes (e.g. wars) formed the identity of each generation and these events helped to distinguish the generations. Today, the experience of different media, TV programs or music forms each lifestyle and the identity of each generation. Currently in Japan, evaluation of the development of the media and responses to it are diverse and not consistent, which makes judgement of the media more complicated.

Regarding the reaction and interaction with new media, a huge gap exists between adults and children. This new gap is manifested in the various disciplinary problems which are surfacing in the home and at school.

Children's Adaptation to New Media versus the Anxiety-ridden Adults

Benesse Corporation conducted a survey on the "Children's Multimedia Experience" with the cooperation of Professor Takeshi Tamura, Assistant

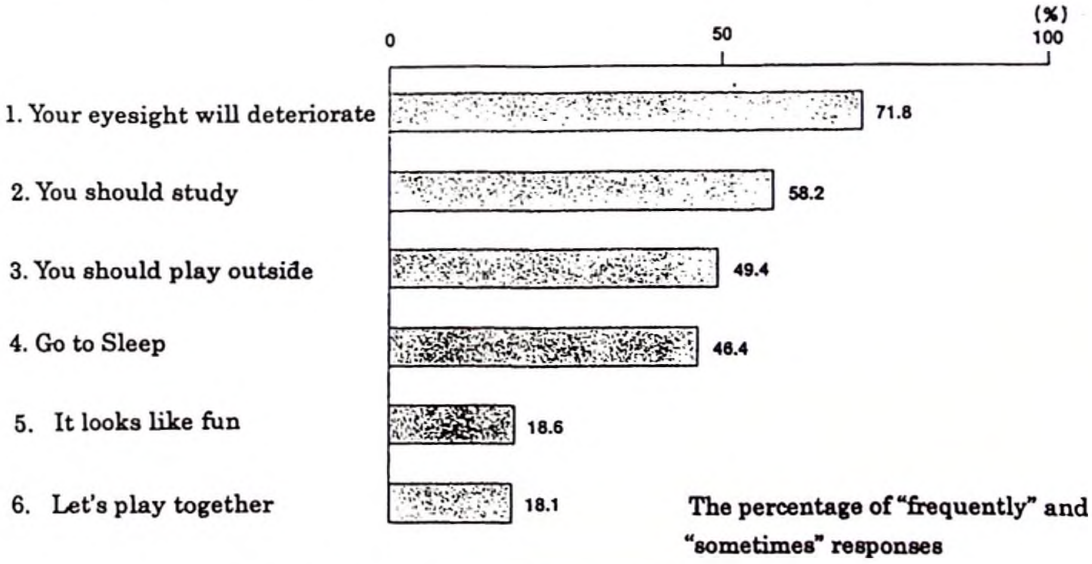

Fig. 2: Pavents' Comments While You Play Video Game.

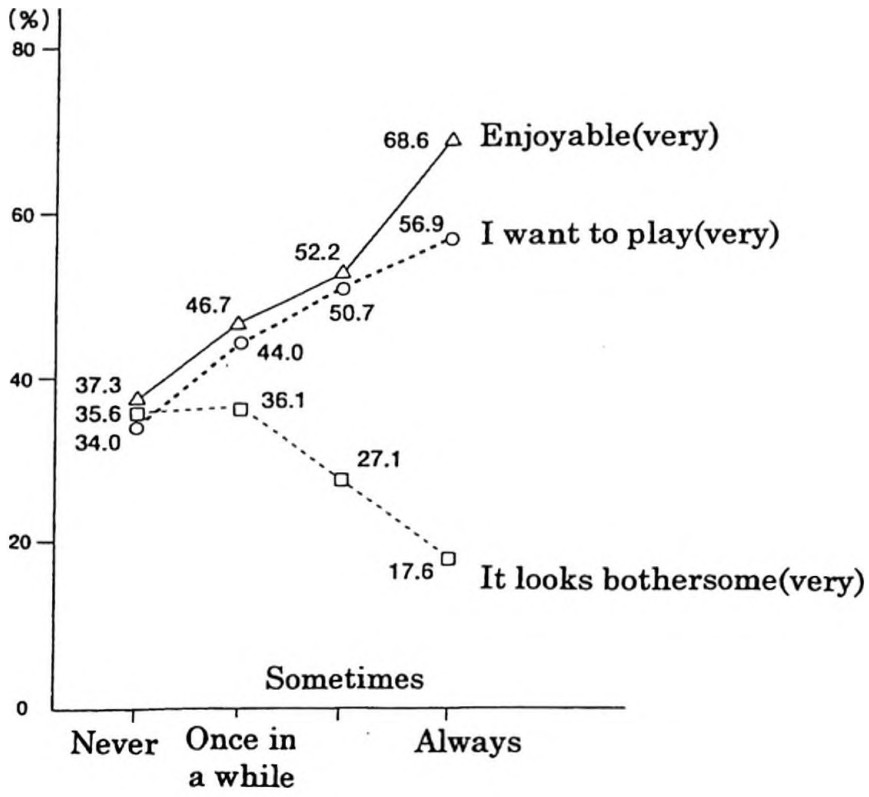

Fig. 3: Studying with Computers.

Professor at Tokyo Gakugei University in March 1997. The sample consisted of fifth and sixth graders in the Kanto area (Tokyo, Kanagawa Pref. Saitama Pref., and Chiba Pref.). We received responses from 2,514 children. I would like to share the following data with you.

Figure 1 shows what kind of media equipment children possess. From this figure, we find that about half the children have their own video games. Among the children who answered they have video games at home, more than 90% of children has video games at hand. 35% the of children answered that they had personal computers at home.

Figure 2 shows that parents tell children when they play video games. 72% of children are told, "You will get poor eyesight". 60% are told, "Study instead of playing video games", and 50% are told, "Play outside instead of video games".

This result tells us that most Japanese children use new media such as video games. Parents feel uneasy and complain that children devote too much time to those games. Strangely enough, it is the parents who bought the video games for the children, as they do not necessarily have strong beliefs about prohibiting

children from playing video games. In many Japanese families, trivial disputes over electronic media like video games are going on every day.

Figure 3 shows the correlation between the frequency of children using personal computers and their perception of computers. We can see that the more frequently they use computers at school, the more they feel it is enjoyable.

While many children enjoy learning with computers at school, most schools in Japan are not fully prepared for classes with computers. Although equipped with computers, they are mostly unused and covered with dust. The reasons for this may vary but mainly focus on the following.

Firstly there is a dissonance between the school evaluation system and the pleasure children experience learning with computers. In Japan both children and parents are exceedingly concerned with examination results and school performance, which tend to be based on printed materials. This may mean that working with computers, although enjoyable, may not necessarily contribute to enhancing school performance.

In addition, there are still many teachers who doubt the educational effects of incorporating computers into the curriculum and are even "allergic" to computer use.

As described above, there is a large difference between children and adults in the interactions with new media at home or school, whether for studying or playing.

Importance of Balancing Media and Self-control

Pagers and handy phones, which have become popular among youth recently, are other examples indicating the difference in adaptability to media between adults and children. It should also be pointed out that the game software industry for children has grown to the one of the most profitable businesses in Japan.

There is no doubt that children adapt to new media with impressive ease and do not hesitate to tackle them. However we need to assess whether these new media are of positive effects when considering the growth of children. Adults design these media for children's pleasure, and manufacturers mostly aim for high profits regardless of the effects on children. The kind of influence these new media have exerted on children has not yet been determined.

Even if we can make use of visual images, computers and simulation for educational purposes, human thought mainly depends on the power of abstract thinking and articulating symbols (languages). Thus there are some people who doubt whether visual images or simulations can improve those faculties.

Consequently, I suppose that the convenience of the media could impair the power to think in some respects, just as frequent automobile use weaken the leg muscles. Another example is that if you only rely on computers or an electronic organizer for scheduling, you will panic if it is broken.

In order for humans to live in modern society, it is absolutely necessary to be able to walk or run, not only ride in comfortable cars (in advanced nations, people jog for the sake of their health). It is the same will the media; much consideration should be given to choosing what kinds of media and how often one should use them.

One of the educational goals of the 21st century is to teach children how they should balance their desires and self-control in using the media.

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COUNTRY REPORT: SINGAPORE

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Singapore is an island state in South East Asia, lying at the southern tip of the Malaysian Peninsula, between Malaysia and Indonesia. It has a population of three million people living on 632.6 sq km and is a focal point for South-East Asian sea routes.

Over the past decade, Singapore has developed substantial national informational technology (IT) capabilities and infrastructure. This was in preparation for the new challenges of the information age. "The World Competitiveness Report" has, in recent years, placed Singapore among the top nations in the world in terms of strategic exploitation of IT by companies, computer literacy of workers and telecommunications infrastructure.

The vision of the Singapore government is to transform Singapore into the Intelligent Island where Singaporeans will be able to tap into vast reservoirs of electronically stored information and services to improve their businesses and recreational options. Text, sound, pictures, video, documents, designs and other forms of media can be transferred and shared through a high capacity and high speed nationwide information infrastructure named the Singapore ONE (One Network for Everyone). The network will interconnect computers in virtually every home, office, school, and factory. The computer will thus evolve into an information appliance, combining the functions of the telephone, computer, TV and more.

Education is just one of the many areas where this vision will have its effects. The Masterplan for IT in Education aims to integrate information technology (IT) into education so as to equip the younger generation with skills that will enable them to meet the challenges of the 21st century. This involves shifting the focus of learning from the reception of information towards an emphasis on finding relevant information and learning to use it to solve problems. IT will be an essential tool in effecting this change.

In an IT-enriched curriculum and school environment, a child will be able to enhance his learning through an expansion in the resources available as well as the development of self exploration and self discovery skills. Linkages between the school and the world through multimedia will expand the learning environment. Teachers an pupils will be able to tap into a growing wealth of educational material outside the school. The opportunities for communication and collaboration between other educational institutions and the communities are

made available. Computer literacy is just one of the beneficial spin-offs from this scheme. These new avenues will help pupils develop the perspectives required to work and live in an increasingly borderless world.

Our local schools have been given the autonomy to deploy IT resources develop new teaching and learning strategies. This is backed by much technical support funded by the government. The teaching staff is also in the process of being trained in the use of IT as well as the development of new teaching materials and methods. In the near future, pupils will enjoy a pupil to computer ratio of 2:1.

Singapore's only resource is her people. We place great emphasis on the education of our young and believe that use of multimedia in education is part of the answer.

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EDUCATION IN AUSTRALIA

Jenny Aland
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Abstract: School-based adoption of Multimedia: An Australian Perspective.

This paper will look first at the work of Young Media Australia – a national community-based, information, research, training and advocacy organization working in the field of children, young people and mass media.

The adoption rate of multi-media, including information technologies, in school systems across Australia will then be examined.

Issues relating to the use of school-based multimedia, including the internet, will also be identified.

Education and training in Australia can be thought of as a continuous medium which is delivered in four sectors – pre-school education; compulsory and post-compulsory schooling: vocational education and training; and higher education (the latter two of the four sectors being known collectively as the tertiary sector) – supported by an infrastructure for State and national coordination, planning and policy formulation.

The term 'education' has traditionally been used to denote the processes of obtaining knowledge, attitudes, skills or socially valued qualities of character and behaviour. Education is regarded as a lifelong process, initiated at birth, developed in schooling and subsequent formal pathways of learning, and continued thereafter. Training is a more specific type of learning, whereby certain skills are developed to a standard of proficiency for subsequent application in the workplace. The value of training lies in its practical relevance.

Historically, the large part of education has usually been conducted in formal institutions, while training took place at the workplace (or 'on-the-job'). Over time, on-the-job training was found to be incomplete without some additional formal instruction. This led to the evolution of a separate training sector focusing primarily on the development of specific work-related skills.

While education may be regarded as 'people oriented' and training 'skill oriented', the distinction between education and training is not clear-cut. Moreover, in recent times the boundaries between the two have become less clearly delineated. Reforms and initiatives in the latter part of the twentieth century have seen

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Extracted from the 1997 Year Book, Australian Bureau of Statistics, pages 233-236.

education extend even further beyond formal institutions, and training beyond the workplace. Education and training are now both perceived as parts of a lifelong learning process that enables individuals to take their places in a skilled and changing labour force, to lead fulfilling personal lives and to become active members of the community.

Commonwealth and State Government Responsibilities in Education

The governments of the six Australian States and the two Territories have the major responsibility for education, including the administration and substantial funding of primary, secondary and technical and further education (TAFE). The Commonwealth Government also plays a significant role in education policy, programs and funding. Total government expenditure on education in 1994-95 was $23 billion, which represented 5.6% of the Gross Domestic Product.

The State governments administer their own systems of primary, secondary and technical and further education through government departments and agencies responsible to State Ministers.

The Commonwealth Government has direct responsibility for education in Australian territories [Norfolk Island, Christmas Island and the Cocos (Keeling), Islands] under the Minister for the Environment, Sport and Territories. The Commonwealth Government also has special responsibilities for Aboriginal and Torres Strait Islander people and for migrants, as well as the power to provide financial assistance for students.

Moreover; the Commonwealth Government is responsible for international relations in education. The education responsibilities entail grants to schools; student assistance; overseas students; awards and exchanges; tertiary education; language policy; educational research and statistics; publications; education for Aboriginal and Torres Strait Islander people; multicultural education; Asian and women's studies; and education and the arts.

The Australian Constitution empowers the Commonwealth Government to make grants to the States and to place conditions upon such grants. The Commonwealth Government is principally responsible for the funding of higher education institutions, and provides supplementary funding for schools and for technical and further education. Apart from its significant financial role, the Commonwealth is involved in promoting national consistency and coherence in the provision of education across Australia.

Preschool Education

All States and Territories have a policy of making preschool education available universally for children in the years prior to school entry. A majority of the States

and Territories have made considerable progress towards this goal. Most preschools are conducted on a sessional basis (i.e., sessions of two to three hours for two to five days per week). Preschool programs generally favour the free play approach with emphasis on children's social and emotional development through creative activities. Parents often contribute by assisting at some sessions or by the purchase of play materials and educational resources. Attendance fees are not usually charged in those states where preschools are goverment-run, but in others fees may be payable to private or voluntary organisations.

Primary and Secondary Education

School Attendance

School attendance is compulsory throughout Australia between the ages of 6 and 15 years (16 years in Tasmania).

Each State or Territory has its own specific requirements. Most children commence primary school at about five years of age. Primary schooling generally begins with a preparatory or kindergarten year, followed by 12 grades to complete a full secondary course of study. While the final two years of schooling generally fall outside the compulsory stage of education, in 1995 83% of students remained at school until year 11 and 72% remained until year 12.

School Organisation and Operation

Primary schooling provides a general elementary program lasting for seven or eight years until year 6 or 7. Students enter secondary schools at year 7 in some State systems and at year 8 in others. Secondary education is generally comprehensive and coeducational. Most students attend schools reasonably near to their homes. Usually primary and secondary schools are separate institutions, but in some country areas there are area or central schools which provide both levels of schooling. Non-goverment schools follow a similar pattern, but a significant, though declining proportion are single sex institutions. In Tasmania and the Australian Capital Territory, attendance for the final two years of government schooling is at separate secondary colleges.

Generally, schools in Australia have a considerable degree of autonomy, most State departments have established regional administrations which are responsible for matters such as planning school buildings and deploying staff while a central curriculum unit provides general guidelines on course planning. In general, individual schools determine teaching and learning approaches within the guideliness and offer options within resources available and the attitudes and interests of students. Some systems encourage school-based curriculum

development and, in the case of Queensland and the Australian Capital Territory, school-based assessment in place of external examinations. In Victoria a combination of school-based assessment and external exams culminate in the Victorian Certificate of Education. While schools usually have a parents' association, there has been encouragement of greater community participation in general decision-making at school level in some systems through parent representation on school councils and boards.

Curriculum Development

Curriculum development in Australia is the responsibility of the State and Territory governments. The Commonwealth Government plays an important role in promoting equity and social justice policies in the delivery of education, and encouraging national collaboration on school curriculum matters. Since 1988, the Commonwealth, State and Territory Ministers for Education have been working together on school curriculum issues.

As part of the agreed National Goals for Schooling, the Ministerial Council for Education. Employment, Training and Youth Affairs approved eight key learning areas: English, mathematics, science, technology, studies of society and the environment, the arts, health and physical development, and languages other than English. Between 1989 and 1993 the Commonwealth and States embarked on the development of curriculum statements and profiles in each of the key learning areas.

There has been widescale adoption of the national curriculum statements and profiles, or variations of them. Almost all States and Territories are using the statements and profiles as a basis for their curriculum development at both primary and secondary levels, but are incorporating variations which reflect local policies and priorities.

The statements provide a framework or curriculum development in each area of learning. The curriculum profiles are designed to assist in the improvement of teaching and learning in schools by working on the principle that good assessment focuses on what is valued and also provides a framework or reporting on a student's progress and achievements in each of the learning areas. They outline what students should learn in each learning area and to what level of complexity. Interwoven through them are a number of cross-curricula perspectives as well as principles o inclusivity, ensuring that the profiles use gender inclusive language and that the knowledge, skills and understanding identified are inclusive of the knowledge, experiences and interests of women and of Aboriginal and Torres Strait Islander people.

Primary Schooling

In primary education, the main emphasis is on the development of basic language and literacy skills, simple arithmetic, moral and social education, health training and some creative activities.

In the upper primary years there is development of the skills learned in the earlier years. English, mathematics, social studies, science, music, art and craft, physical education and health are studied. There are also optional subjects such religious instruction and, in some schools, foreign and community languages, and instrumental music.

Students in Australian primary schools usually have only one teacher for all subjects, and are promoted each year on the basis of completing the previous year, rather than on achievement. In schools where open plan learning styles have been adopted, the method of team teaching (more than one teacher to a class) and multi-age grouping of students is occasionally practised.

Secondary Schooling

In secondary education, in some systems, the first one or two years of secondary school consist of a general program which is followed by all students, although there may be some electives. In later years, a basic core of subjects is retained with students being able to select additional optional subjects. In other systems, students select options from the beginning of secondary school.

The core subjects in all systems involved the eight key learning areas. Optional subjects may include, for example, a foreign language, a further humanities or social science subject, commerce, art, crafts, music, home economics, a manual arts subjects, agriculture, physical education or health education. Some schools offer optional courses in subjects such as consumer education, conversational foreign languages, word processing, commerce studies, driver education, dram and leisure-time activities.

In senior secondary years, a wider range of options is available in the larger schools and there is an increasing tend towards encouraging individual schools to develop courses suited to the needs and interests of their students, subject to accreditation and moderation procedures.

Students in Australian secondary schools generally have a different teacher for each separate subject areas, though, like primary schools, variations may occur where open-plan or more flexible methods have been adopted. Promotion is, again, generally chronological, but students may be grouped according to ability after an initial period in unstreamed classes.

Post-compulsory schooling in Australia is undergoing considerable change, with an increasing emphasis on the incorporation of vocational programs into the senior secondary curriculum. Under the Australian Vocational Training System, students at school may obtain vocational education and training sector certificates as part of their senior study and undertake some parts of their programs in the workplace.

Examinations and assessment at each level are carried out by individual schools except year 12 in those systems which have retained external examinations at year 12 level. Students attaining the minimum school leaving age may leave school and seek employment, or enrol in a vocational course in a TAFE institution or a private business college, or many TAFE courses, completion of year 10 of secondary school is a minimum entry requirement. For those continuing to the end of secondary school (year 12), opportunities for further study are available in TAFE institutions, higher education institutions and other post-school institutions.

Students' eligibility for entry to higher education institutions is assessed during, or at the end of, the final two years of secondary schooling. Five States and the Northern Territory use different combinations of school assessment and public examinations. In Queensland and the Australian Capital Territory, eligibility to enter higher education is determined from moderated and standardised school assessments. Several education systems are currently reviewing their senior secondary school assessment procedures.

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COUNTRY REPORT ON MULTIMEDIA AND INTERNET FOR CHILDREN AND YOUTH IN TAIWAN

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Abstract: The actions of Taiwan government for promoting information education have being carried out since 1996. The main goal is to educate students of primary school and high school about the basic information knowledge and the internet. The actual actions will be described. There are many kind of multimedia CD titles in Taiwan market right now. The major types of multimedia CD titles will be discussed. And the difficulties of developing materials of CD titles will be discussed.

Actions of the Goverment

Effective actions has been taken by the government. Actions of those included both for industries and the education systems. For the education systems, planning regular budgets every year to establish the personal computer classrooms, designing the standard curriculums of information technology for the primary schools and the high schools, training all teachers of the primary schools, the high schools, the collages, and the universities, encouraging the publication companies to publish books for teaching students how to use the personal computers and the internet, holding annual exhibitions in major cities to educate all people, and many other actions to promote the use of computers. The influences of government's actions are wide and positive. The bases are firmed to the future.

The goverment recognized that using computers in the future is able to make people work more efficiently, and then promote the competitions of Taiwan. At the beginning, there were many things needed to be carried out. The key, however, is the people who can use the computers.

The most powerful action that the goverment took is the execution of the plan of education the students of the primary schools and the high schools since August 1996. Every student must learn how to use the personal computer. This leads to the most students are highly interested in the use of personal computers.

On the other hand, the uses of internet and e-mail were promoted, too. More and more people, children and adults, get into the internet. The capacity of internet was enlarged for several times to meet the needs of users. Right now, a project that hopes 3 million internet shops will be opened is being carried out. Hopefully, this project will be done in the next two years.

According to the goverment report on 8th January 1998, in average, one forth of families in Taiwan have a personal computer. The hardware is ready for children and youth for both at home and in their school.

To summarize this section, the users are mature, the environment of information is going to be ready in the near future. Especially, the preparation of information education is being carried out. Our children and youth have learned the basic knowledge of information age.

The needs of software, especially the multimedia CD titles, are rapidly increasing.

Main Kind of Multimedia CD Titles

Today's computer technique has brought us to a new era. Especially in the children software market, as the CPU speed getting faster and the popularity of using the CDROM drive which is rather expansive 2 or 3 years ago and is much slower in accessing speed. It is also effected by the cost down of the main memory and the large storage device. (DRAM & HARD disk drive). The starting role is then lead to the CD title hence there are lots of new comers in this off-spring field to make more and more oppurtunities in this ramp-up market.

Multimedia equipment are mostly built in the combination of video signal and audio signal processing unit controlled by the central PC based system including the large storage and compact disk device. When the CDROM carries the 650M bytes information including sound, audio, video, it becomes the best choice in children education and amusement. In facing of the different kinds of CD titles it is very hard for the parents to make a decision in taking one which might be most possibly came from the U.S. and introduce some different concept of culture to their kids. Owing to the lack of selection children have to play with the foreign cartoon or education software in their childhood. In Taiwan the best selling CD titles are games. There are less then ten companies dedicated themselves in the children education products. Hence CD titles for the kids are few in the market.

As the personal computer is getting more and more popular the internet users, the increasing quantities of CDROM drives lead to an increasing demand of software. The situation is that while the children are using computer software occurred as stated below:

1) Few kinds of software alternatives in choosing
2) The foreign software's barrier in language and culture
3) The native makers are few in their production quantities
4) The game products share the main portion of the software market

The population in Taiwan R.O.C. is about 20,839,000 according to the government publication. The children (aged from 0-14 years old) population is 24.84% that is around 5,000,000. The percentage of households that own PC is 81% and 35% can access to the internet according to the publication of Institute of Information Industry. Also it is estimated that 98.7% of the schools have PC and 22% have access to internet. The most used multimedia related electronic equipment are video player, stereo, handycam, TV set, computer, etc. in the family and in the school.

From the same source we also have that there are 220,000 people own a pager, and the most interesting thing is that there are 100,000 kids among the pager users. The multimedia market is still growing up yet the lack of various CD-titles can obvious be seen to have much work to demand. There are actually few choice for parents to

The CD title in the market often seen is divided into several types listed below.

a) The I/Q education titles
b) The RGP adventure knowledge titles
c) The interactive animation titles
d) The living books
e) Story
f) Encyclopedia
g) Language
h) Painting for the kids
i) Cartoon
j) Primary school and middle school material
k) Others

Because most of the CD titles in the market are the foreign made product (i.e., Disney land, or Bat man, encyclopedia...) The local product share only little portion in this market. And most of the local product focus on the language education especially English and some IQ games. The foreign product are mostly the living books or cartoon or encyclopedia.

Another new kids favorite is the interactive education titles. Most of the CD titles require the minimum 486 system with windows 95 and windows 3.1, CDROM drive, main memory 4 to 8M Bytes Dram, HDD space 5M bytes, VGA, sound blaster card, for example, in 1996 there is a series of smart kids CD sold 2000 kits within the first announced two months.

The kit include 5 CD titles selling at NTD 2000 which telling the stories in language. Chinese dictionary, mathematics, multi-language teaching, and some creative initiated intelligence courses. It is a CAI based title kit.

The bed story includes the multi-language based pronounciation and delicated motion pictures. Using the space town and beautiful pictures to introduce the primary school mathematics 4 rules of operation. (add, minus, multiply, divide) called "the winner of mathematics".

Another CD title is about the toy and intellectual RPG to train the kids' ability of reference and reasoning. As for the English tutor CDROM is cooperated with the famous local kid private class to break though the traditional ways in learning English from the games. The most special title is the Chinese multimedia dictionary to let the kids understand the traditional culture.

The CAI (computer assisted instruction) CDROM is very welcome to the most of the family in our country. CAI is the combination of the teaching theory and computer tools to present the content of lecture.

In a vivid way. It is also the helpful tool in assist school teacher or the individualized student self learning software. The user can adjust the learning speed according to the ability, time, schedule. Some of the software might be able to response to the student in accordance to the user's response. This means the possibility of individualized self learning and the learning by funny playing. The multimedia CAI will be the trend in the future since the picture, sound effect are impoved a lot. The CAI will get to the multimedia, internet based, and multi purposed. In the future only one personal computer the students can take their courses at home. And the government (department of education) compressed the CAI CD including 373 software. The CD content as stated below.

1) primary school: Mathematics, nature

2) middle school: Mathematics, English, Physics

3) others: high school subject, live and communication training, etc.

Another CD includes the 260 similar courses and some kindergarten native language subject, educating games, health knowledge, etc.

The CAI CDROM can include many subjects, the user can be from the kindergarten to the college students. The application is in such a wide range. The sprits of design a CAI CD title is to design the different contents according to the different subject and students, so the promotion of the CAI CDROM need different field of specialist, teachers who design the material to be introduced, programmers who design the titles, multimedia related experts say photographer, painter, etc. The department of education assign the schools and subcontracts to the private companies to develop the CAI software. Meanwhile they train a lot of school teacher in CAI application and design to enhance the quality of the CDROM production to help more students and prepare for the future information based society.

Difficulties of Developing CD Titles

There are different difficulties of developing CD titles for different companies. Basically speaking, there are three major difficulties: the software house is small scale, the local market is small scale, and the good material or scripts are not clearly defined.

For the small scale of the software companies, most CD title makers are quite small. They have relative low intention to develop a very high quality CD title since the cost is too high to stand. This leads to the products are not so good in either the contents or the presentation skills.

For the small local market, the average sales quantity of a normal CD title is about 1000 pieces to 2000 pieces. The revenue from each product can not offer a good team to survival.

For the lack of the good script definitions CD title makers and the buyers have great different views. Not only for the material or scripts but also the presentation skills. Because the skills of presentations are quite different, different people rank the same presentation skill with great differences. It is an art.

Despite these difficulties, companies in Taiwan work hard and try to find some breakthrough.

Concluding Remark

Children and youth in Taiwan have great opportunities to lean the use of personal computers, and thus have great opportunities to learn by PC either through the multimedia or through the internet today. The lack of good CD titles will stand for several years. There is no common definitions on what is a good multimedia.

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MULTIMEDIA AND CHILDREN IN TURKEY

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Abstract: Multimedia will be regarded as essential tools for children to create their new world. The effects of television on young children's life have been well studied. Television differs, however, from other media, including the movies, in its pervasive impact on children. Children spend more time watching television than any other activity except sleeping. Overall 31% of children spent at least 4 hours a day watching television during weekday and 71.7% during weekend in Turkey. Television's influence on children is a function of the length of time they spend watching and the cumulative effect of what they see. Television may be a cause as well as a solution for many serious childhood problems. Excessive viewing of television has also been linked to aggressive behavior, violence, childhood obesity. On the other hand, television may act as a socializing agent and as a learning tool if the recommendations of American Academy of Pediatrics is learned by pediatricians, parents and broadcasters.

The use of home personal computers in urban residence increased from 3.2% in 1993 to 6.5% by January 1998 in Turkey. Around 20% of computer households reported owing a modem. Internet has been using only for 5 years in Turkey. Nearly 40% of computer households also used CD-ROM equipment. The percentage of schools that have a computer laboratory is only 2.64%. On the other hand, multimedia allows students to move away from a uniform education for everyone to assert individual identity, liberalize education and management. It seems likely that, within the next few years, most of the countries with substantial internet infrastructure will use the internet as the major medium for disseminating information, including information on children. To prepare students for such a world demands that educational systems make the best possible use of all knowledge and technologies currently available.

Multimedia will be regarded as essential tools for children to create their new world. The mass media may be a particularly effective way to reach preschool children and their parents in communities in which poor socioeconomic condition is prevalent and to educate them[1,2].

General Information of Multimedia in Turkey

Turkey's population was 56.5 million according to the 1990 census. Turkey has a young population. Overall 33% of the population is under 15 years of age[3].

Multimedia-related electronic equipments which were usually seen in the homes of our country are television (86.7%), radio cassette player (76.7%), telephone (57.6%) and video recorder (11.4%) (Table I). Around 2.1% of Turkish households owned computer in 1993. Urban households were more likely to have the convenience of all of these multimedia-related electronic equipment's than rural households[3].

Table I: Percentage of Households Possessing Multimedia-related Electronic Equipments, by Urban-Rural Residence, Turkey 1993.

	Urban (%)	Rural (%)	Total (%)
Television	92.8	75.5	86.7
Video recorder	15.6	3.6	11.4
Radio cassette player	79.2	72.2	76.7
Music set	22.0	5.3	16.0
Telephone	68.4	37.9	57.6
Computer	3.2	0.2	2.1
Total number of households	5563	3056	8619

Table II: Time Spend for Watching Television According to Age Group, Turkey, 1995 (%)

	Amount of television viewed per day during weekday			Amount of television viewed per day during weekend		
Age group	1 hr	2-3 hr	≥ 4 hr	1 hr	2-3 hr	≥ 4 hour
5-7 y	19.5	47.0	33.6	12.8	22.8	64.4
8-11 y	13.7	58.4	27.9	2.6	23.6	73.8
12-15 y	11.1	55.3	33.6	3.1	19.9	77.0
16-18 y	15.4	56.4	28.2	5.1	30.8	64.1
5-18 y	14.3	54.7	31.0	5.2	23.0	71.7

Table III: Percentage of Households Possessing Multimedia-Related Electronic Equipment's, Urban Residence, Turkey 1998.

	Urban
Television	96.1
Radio	90.9
Telephone	81.8
Cellular phone	10.1
Pagers	2.5
Computer	6.5
Internet	1.2
Total number of households	4380

Table IV: Total Number of Computers in Schools According to Regions and The Aim of the Usage, 1998

Regions	The Aim of Computer Usage		
	Education	Management	Total
Mediterranean	2573	400	2973
Eastern Anatolia	1473	222	1695
Aegean	3268	1639	4907
East-southern Anatolia	1488	369	1857
Black Sea	3054	515	3569
Marmara	5261	1805	7066
Cental Anatolia	4375	944	5319
Total	21492	5894	27386

In 1995 a study was performed to detect the effect of television on family and children in Turkey[4]. It was found that 98% of the families have at least one television and 29.7% of families had at least two televisions. Overall 31% of children spent at least 4 hours a day watching television during weekday and 71.7% during weekend (Table II). Most of children (82%) decided himself/herself the types of programs watched and 58% of parents did not limit their children's viewing time. Interestingly 64.2% of children watched television with his/her family and 15.6% of them watched alone. Only 25.8% of children discussed the content of programs with parents[4].

In Turkey the percentage of the total number of children's programmes in five channels was found to be 11.53% per week (109 programmes) and the percentage of the total period of children's programmes was 8.15% per week (3,235 min). Violence was found to be present in 62% of all the television programs in 1993[4].

In 1998 96.1% of urban households owned at least one television (Table III)[5]. Of them, 86% received basic cable and 6% received pay cable, 4% received Cine 5. Survey results showed the use of home personal computers in urban residence increased from 3.2% in 1993 to 6.5% by January 1998. Around 20% of computer households reported owing a modem. Internet has been using only for 5 years in Turkey. Nearly 40% of computer households also used CD-ROM equipment. There is no value for rural areas.

The percentage of schools that have a computer laboratory (one computer for every two students and 20 computers for one laboratory) is 2.64% (1967 schools). Overall there are 21,492 computers for education and 5,894 computers for management in all the schools (Table IV)[6]. The government recently announced

a project to have schools and libraries connected to the internet. Schooling 2001 aims to provide student learning outcomes through integrated computers and bringing world wide information resources to school classroom.

The Influence of Television on Children

After the family, television is probably the most important influence on child development and behavior[1,4,7,8,9]. Children spend more time watching television than any other activity except sleeping. Low income children spend more time in front of television than others. Television's influence on children is a function of the length of time they spend watching and the cumulative effect of what they see.

Television like a PC can also promote pro-social behavior[1,8,9]. Television can exert its strongest pro-social influence in the area of learning and cognitive development. "Sesame Street" has created demonstrable increases in children's abilities with simple arithmetic and the alphabet as well as the pro-social attitudes of racial harmony, cooperation, and kindness. In fact, some studies conclude that young disadvantaged children achieve better in school if they watch one to two hours of television per day, although more than this is detrimental to academic performance at all ages.

Academician group, consisting of programmes, pediatricians, psychiatrists, teachers had made broadcast of "Sesame Street" in Turkey in 1989[10]. This program was designed to improve educational and instructional benefit to pre-school Turkish children. The preliminary study of "Sesame Street" was carried out in 1991 to investigate the impact of program on preschool education. The proportion of "Sesame Street" watching among studied 147 children was 95% (Table V). Among study population, 88% of children enjoyed "Sesame Street" and wanted to turn on for "Sesame Street". 37% of them watched alone and 52% watched it with family and 9% with friends. Following watching "Sesame Street" 53% of children had started to count numbers and 26% had started to pun and 65% had learned the names of geometrical figures. 34% of children improved their vocabulary.

Television may be a cause as well as a solution for many serious childhood problems[1,8,11-13]. Excessive viewing of television has also been linked to aggressive behavior, violence, childhood obesity. Because of the amount of time spent in front of television set, television exerts a so called displacement effect, pushing aside more active pursuits like playing outside with friends or reading books. For some children, the world shown on television becomes the real world. Children exposure to television and television violence is a predisposing factor behind half of the violent acts. Centerwall[11] also concluded that the introduction

Table V: The Results of the Preliminary Study of "Sesame Street", 1991, Turkey

Children's viewing frequency	
Every day	75%
Every other day	7%
One or two times a week	12%
During viewing	
Imitation	37%
Speaking with characters	13%
Answering questions	68%
Asking questions about subject	34%
Participation with hand movement	11%
Change in behavior following watching "Sesame Street"	
Brushing tooth	45%
Washing hand	33%
Speaking good	34%
Social interactions	27%
Eating behavior	20%
Parents mentioned the difference of "Sesame Street" from other programs	
More enjoyable	35%
More educational	83%
Attractive	26%
No difference	1%

of television in 1950's caused a subsequent doubling of the homicide rate, ie, long term exposure to television is a causal factor behind approximately one half of the homicides committed in the United States. Gortmaker et al.[13] was reported that the incidence of being overweight were 8.3 times greater for youth watching more than 5 hours of television per day compared with those watching for 0 to 2 hours. Reductions in activity might contribute to the increase in incidence of obesity. Sexual implications are attached to advertising for a broad variety of products, including many that appeal to children[12].

Television is a powerful medium and powerful influence on the life of children[9]. With respect to television, there is much than can be done, as physicians, as citizens, and as parents[1,7,9,12,14];

• The television industry and the general public might not be sufficiently convinced or aware of the negative impact on children of television violence, yet. Pediatricians should act as educators and persuaders concerning responsible approaches to what is presented on television[1,7].

• Community should support legislation making broadcast of high-quality and non-violent children programming a condition of license renewal and seek a revival of legislation mandating at least 1 hour per day of programs of educational and instructional benefit to children[1,7].

• Alcohol, cigarette and toy advertising on television should be eliminated[7,14].

• Local and national pediatrician groups should sponsor parent/child education efforts regarding how to watch television. Parents should be advised to limit their children television watching to no more than one to two hours per day. Families should participate in the selection of the programs that their children watch. Young children sometimes have a hard time knowing what is real and what is not. Parents should watch television with their children and then talk about it after it ends. A poor program might turn out to be a good learning experience if mother or father is here to help child get the right message. The television should not be used as an electronic baby-sitter. Parents should not forget that their own television-viewing habits will often be adopted by their children[7,9].

• Pediatrician have an important role as experts in the child health and development in the prevention of harmful effects of media. Pediatrician should work with broadcasters to stop the promotion of violence during children's programs, family shows and sport telecasts[7,15].

• Pediatrician should continue to urge the television industry to alter the portrayal of sexuality in non-news programing to reflect realistic consequences and responsible behavior and to decrease the association of stimulating sexual messages[7,12].

• Pediatrician should take "television histories" when they see patients with behavior problems, learning problems, poor school performance, or obesity[1,9].

Children programmes should be included in programmes for family viewing[1]. Producers should be aware of the Convention on the Rights of the Child Finally the Convention on the Rights of the Child have articles on the role of mass media in child education as well as the articles that protect children from its violent effect.

The Influence of Computer and Internet on Children

Using computer in the future is able to make people work more efficiently. Every student must learn how to use the personal computer. Children are fast learners and become familiar and competent with the new multimedia. The use of computers will increase in educational situations. Multimedia incorporates seeing, hearing and experiencing into the learning process. It will enhance the

development of thinking, learning and computer skills. Today's students need some types of information to be available in formats that are more easily updated than the standard book format. Educational CD-ROM are available so that the child can learn at his/her own place, at school or at home. Internet is a place where children from all over the world can express and share their opinions[1,2,16,17].

Internet makes possible for students to[2]:

- break down barriers, including physical, cognitive, geographical, cultural and economic.
- learn in way that accommodate their own learning styles and kinds of intelligence.
- learn basic skills and all subjects more effectively.
- access and manage information.
- practice and improve communication skills.
- communicate with peers and experts anywhere.
- move beyond memorization to deeper understanding.
- practice working both independently and collaboratively.
- assume greater responsibility as a learner.
- explore and expand intelligence.
- continue learning throughout life.

Multimedia also allows students to move away from a uniform education for everyone to assert individual identity, liberalize education and management Computers were found to support writing by student with learning disabilities.

Computerized education intervention was found to be useful for improving health status in several areas of care like diabetes mellitus. The children with autism was shown to increase reading and communication skills through an interactive multimedia computer program[18-20].

In the last several years the role of internet in disseminating information of all sorts has grown dramatically. It seems likely that, within the next few years, most of the countries with substantial internet infrastructure will use the internet as the major medium for disseminating information, including information on children. This statement is of course only applicable to children in countries with good access to electronic communication equipment. There is a risk that the gap will widen between developed countries and developing countries also with respect to competencies in electronic multimedia competence. Support materials should be developed by educational sectors which provide solutions to equity issues including distances, students with disabilities, economic disadvantage and quality access to information and communication technology. To prepare students for such a world demands that educational systems make the best possible use of all knowledge and technologies currently available. On the other

hand the freedom on the web might expose children to the wonders of vast information and also to potentially undesirable material. So certain safe guards in an attempt should be taken to protect children[2,17].

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INTRODUCING THE INTERNET TO PRIMARY SCHOOLS IN JAPAN

100-School Networking Project, NTT Konet Plan, and Related Projects

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The Ministry of Education has declared that the internet will be connected to twenty-thousand elementary schools, ten thousand junior high schools, and six thousand senior high schools by the year 2003. We must, however, overcome many difficulties before introducing the internet in primary education. Since the 1980s, I have been a member of a teachers computer networking group studying the educational possibilities of computer networks in schools. I first met most of the members who are collaborating today on research for educational uses of the Internet through local computer networks. There are now many elementary school teachers who are nationally active in promoting the educational uses of the internet.

Furthermore, on the eve of the Internet boom in Japan, I was able to connect an elementary school in Hiroshima to the internet under the authority of the Ministry of International Trade and Industry and the Ministry of Education's "100-School Networking Project" in 1995. Then in 1996, NTT (Nippon Telegram and Telephone Corporation) inaugurated the "Konet Plan" with the cooperation of the Ministry of Education. In 1995, I also organized an elementary teachers' research group in support of the educational uses of the internet. This study deals with that educational supporting system and its use.

The Suzuhari Elementary School UUCP Connection

Before 1992 in Japan, the internet was an academic computer network limited to colleges. The first commercial internet service provider was not established until 1993. Before this time then, there was no way to connect elementary schools directly to the internet.

In 1994, I worked together with the Suzuhari Elementary School in Hiroshima in an experiment to connect schools directly to the internet. CSI (Chugoku Shikoku Internet Council) played an important role in this trial. CSI is the academic provider for the Hiroshima area, and most universities there are connected to CSI for their Internet access. Because of their concern for primary education, however, CSI accepted the Suzuhari connection, and further, owing to their continued

support, we were able to apply to JPNIC (Japan Network Information Center) to register Suzuhari's own domain name: suzuhari-es.asakita.hiroshima.jp.

Table I. Domain Information for Suzuhari Elementary School (25 June 1998)

next1> whois -h whois.nic.ad.jp suzuhari-es.asakita.hiroshima.jp/e
[JPNIC database provides information on network administration. Its use is]
[restricted to network administration purposes. For further information, use]
['whois -h whois.nic.ad.jp help'. To suppress Japanese output, add '/e' at]
[the end of command, e.g. 'whois -h whois.nic.ad.jp xxx/e'.]

Domain Information:	
a. [Domain Name]	SUZUHARI-ES.ASAKITA.HIROSHIMA.JP
g. [Organization]	SUZUHARI Elementary School
j. [Address]	Suzuhari 1896, Asa-cho,Asakita-ku, Hiroshima-city, Japan
l. [Organization Type]	Municipal Elementary School
m. [Administrative Contact]	KS100JP
n. [Technical Contact]	MT077JP
p. [Domestic Nameserver]	ns.suzuhari-es.asakita.hiroshima.jp
p. [Domestic Nameserver]	marrella.mri.co.jp
s. [Network Number]	202.249.140.0
[State]	Connected
[Registered Date]	94/07/15
[Connected Date]	94/09/30

For the Suzuhari experiment, we selected the UUCP connection protocol, a part-time connection using public telephone lines. UUCP allows only for E-mail transfer, but the running cost is low: 2000 yen per mouth. To supplement this connection, Yasuda Women's University supported the opening of Suzuhari Elementary School's World Wide Web homepage on the university's server. Suzuhari receives E-mail at user@suzuhari-es.asakita.hiroshima.jp, and the homepage can be accessed at http://www.yasuda-u.ac.jp/suzuhari-es/index.html (the present URL is now http://www.suzuhari-es.asakita.hiroshima.jp). With this initial connection, Suzuhari Elementary School became the first elementary school domain in Japan.

The 1000 Cranes Project

The Suzuhari Elementary School homepage gain recognition throughout the world because there were few elementary school homepages at that time. As 1995 was the 50th memorial anniversary of the atomic bombing of Hiroshima, this became the topic of the homepage and in February 1995, we received the following E-mail from California:

Table II: E-mail from Alianza School

Hello! I just found the Suzuhari School home page on the WWW. I'm doing a project with my 3rd and 4th grade class in Watsonville, CA, and I would love to have a sister school in Hiroshima to exchange e-mail about Sadako and the 1000 paper cranes . Please let me know if anyone at your school might be interested in participating. Thank you very much for any help you can give.

Fred Mindlin, Alianza School, 440 Arthur Rd., Watsonville, CA 95076 USA

Miss Sadako Sasaki is an atomic bomb victim who tried to make a thousand paper cranes before her death: the symbol for "Realized Dreams" in Japan. She died, however, from the effects of atomic radiation received during the explosion, when she was twelve years old and was unable to complete her goal. Since her death, Sadako has become a symbol of peace for children. Mr. Motohiro Tamai, a Suzuhari Elementary School teacher, talked about the e-mail with his class and decided to help the Alianza School project. They sent information about how the Children's Peace Monument was established. Yasuda Women's

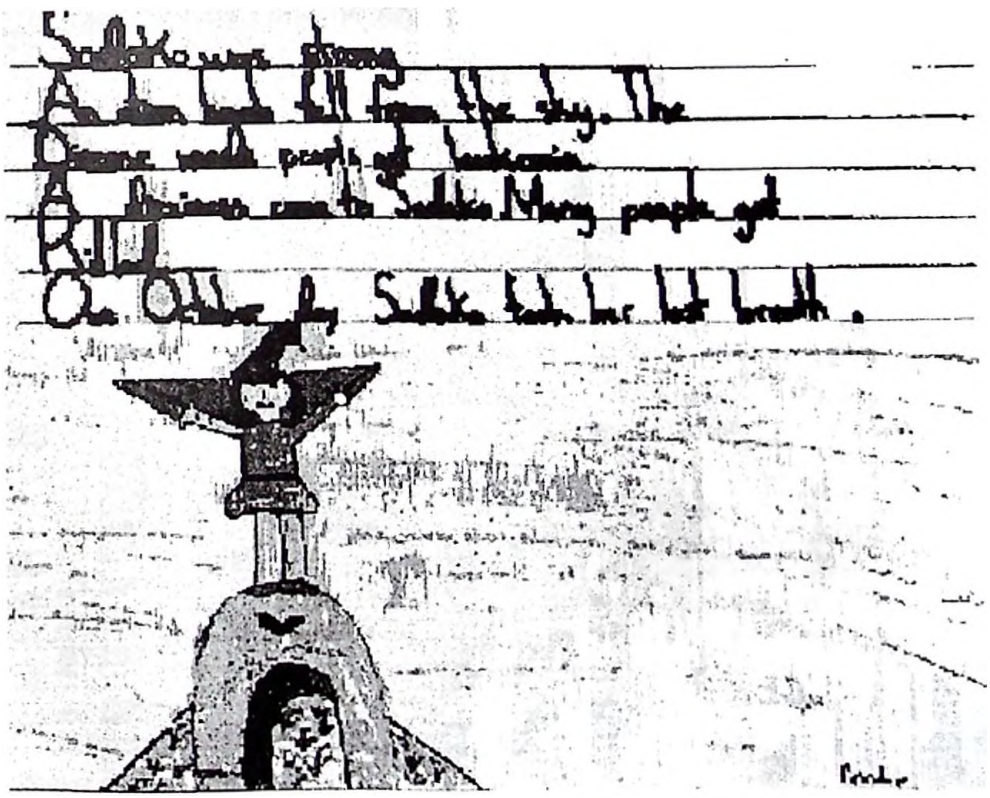

Fig. 1: 1000 Cranes Project Home Page Symbol.

University helped to open the 1000 Cranes Project Homepage. The URL for the project is http://www.csi.ad.jp/suzuhari-es/1000cranes/. The children of the two schools exchanged information by e-mail and through the WWW homepage.

In November 1995, Nagatuka Elementary School opened their homepage. Their headmaster is also an atomic bomb victim and during a school organized peace ceremony he talked about his experience when the atomic bomb was dropped on Hiroshima. His talk was uploaded to the Nagatuka Elementary School homepage in both Japanese and English and awakened a great response throughout the world.

In 1996, 5th grade students of Nagatuka Elementary School started their "Kids' 1000 Cranes Project." They announced on their homepage: "Please send paper cranes! We will take them to the Children's Peace Monument in Hiroshima Peace Park. Let's pray for the victims and that our world might live in peace together." Thirty-thousand schools gathered from around the world in this project, and fifty-thousands paper cranes were received. This Kids' 1000 Cranes Project still remains active in 1997 and 1998.

Yoshijima-higashi Elementary School also opened their school homepage. It contains their "Machinto: Last Message from a Little Girl" project. Machinto is a children's theatrical about a little girl who was an atomic bomb victim. The

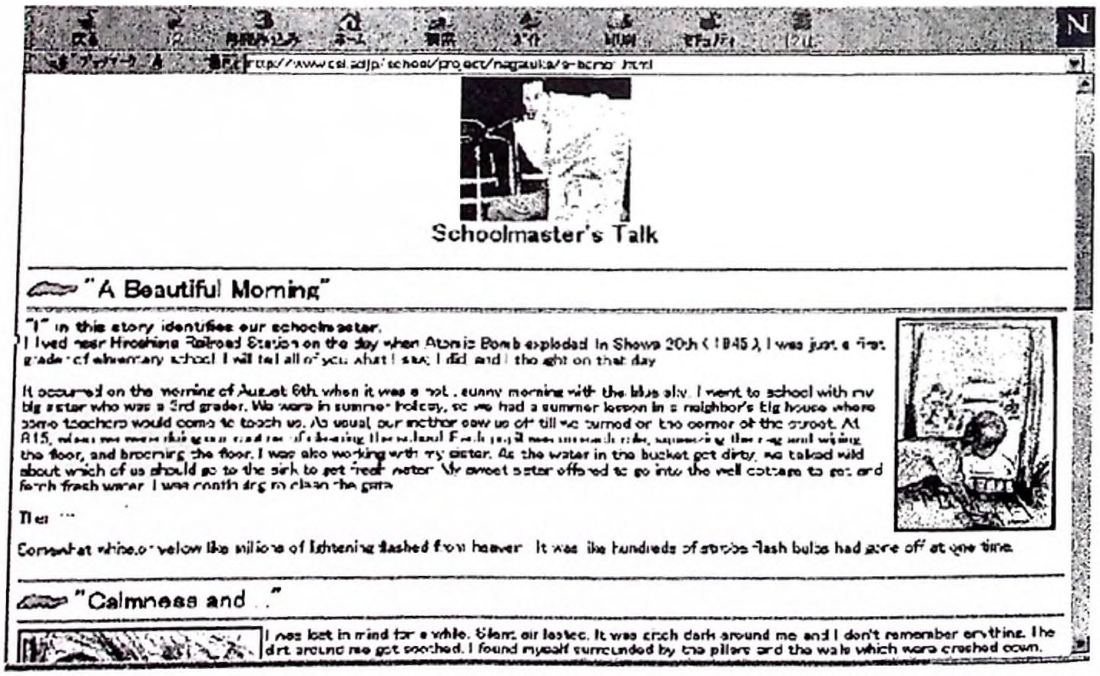

Fig. 2: Nagatuka Elementary School Headmaster's Page
(http://www.csi.ad.jp/school/project/nagatuka/a-bomb1.html)

Fig. 3: Kids' 1000 Cranes Project Homepage
(http://www.skr.or.jp/~kids/project/98/index_e.html)

URL for the Machinto page is http://next1.yasuda-u.ac.jp/machinto/htm/index.html. This homepage remains active in 1998.

Suzuhari Elementary School, Nagatuka Elementary School, and Yoshijima-higashi Elementary School are municipal schools in Hiroshima. The teachers have experience in using the network for education and several university professors have joined in support of their work.

100-School Networking Project

100-School Networking Project is a joint project of the Ministry of Education and the Ministry of International Trade and Industry. It examines the worthiness of the Internet in the education of elementary, junior high, and senior high students. IPA (Information Technology Agency) and CEC (Center for Educational Computing) started this project in 1993, and a call for participation was released in 1994. At this time, the term "Internet" was still new and Suzuhari Elementary was the only elementary school connected to the Internet. At this time, large commercial computer networks such as Nifty-serve or PC-VAN played an

important part in providing internet access and most teachers learned about the 100-School Networking Project through the commercial computer networks. Nevertheless, 1543 schools applied to the first call for participation.

In June 1995, 18 elementary schools, 29 junior high schools, 40 senior high schools, and 25 other schools were connected to the internet. Suzuhari Elementary School was also involved. Twenty-four-hour full-time IP connections and internet client/server machines were installed in all the schools. At this time, CSI supported the schools in the Chugoku-Shikoku area.

The 100-School Networking Project remained active from 1995 to 1997. During these two years, this project developed various applications for the educational use of the internet. Most schools used their equipment successfully. Suzuhari Elementary School changed their connection from the UUCP to a full-time IP connection. They have their own homepage at http://www.suzuhari-es.asakita.hiroshima.jp/. A newly formed 100-School Networking Project will continue until March 1999, and 108 schools maintain their internet connections now. At this time, 66 of them plan to continue their connection beyond 1999 because they have been able to find support, but 42 schools will not be able to continue their connection after 1999.

NTT Konet Plan

The name "Konet" is coined from Japanese "Kodomo," which means "child," and network. NTT (Nippon Telegram and Telephone Corporation) started this project with cooperation from the Ministry of Education in 1996. In the fall of that year, 297 elementary schools, 369 junior high schools, and 39 special education schools--for a total of 1,014 schools--were selected. This project has been called the 1000-School Networking Project. Under the Konet Plan, ISDN dial-up equipment was installed in all the schools with as NTT PHOENIX video conference system and some client computers to all the schools. NTT donated a total of 300 million yen to this project.

The internet connection for the Konet Plan is a part-time ISDN dial-up and the connection charges depend upon the use, so that all the schools must be able to pay for these connection charges. However, the NTT PHOENIX video conference system has the same problems and several of the schools used up their annual budget within two months.

It seems that the Konet plan focuses primarily on the possibility of multimedia in education and many schools often use the NTT PHOENIX system. Using the internet is one part of this plan. The last Japanese last prime minister Ryutaro Hashimoto chatted with some school students using this PHOENIX system. There are thousands of educational uses for multimedia and networks in the Konet

plan, but it must change from a dial-up connection to full-time IP connection. They must learn to use the global Internet Protocol for their multimedia access.

The Multimedia Inter-classroom Linkup Project: "HAIKU Get-together"

Suzuhari Elementary School is located in the northern part of Hiroshima and is a member school of the 100-School Networking Project. They have a 64Kbps full-time IP connection. Misakaji Elementary School is located in the middle northern part of Kure, and is a member of the NTT Konet Plan. They have an ISDN 64Kbps part-time dial-up connection and the NTT PHOENIX video conference system.

In May, 1997, a plan was formulated to make exchanges through school@csi, a teachers' Internet mailing list. Sixth grade classes from both schools joined this project. At this time, there was no base link for the 100-School Networking Project or the NTT Konet plan. For the 6th graders, the final presentation and appreciation was considered very important for their HAIKU practice. We planned to link these two classes through the use of multimedia. For this project, we made the multimedia inter-classroom linkup system using an Internet video conference system called CU-SeeMe and the NTT PHOENIX system. To connect

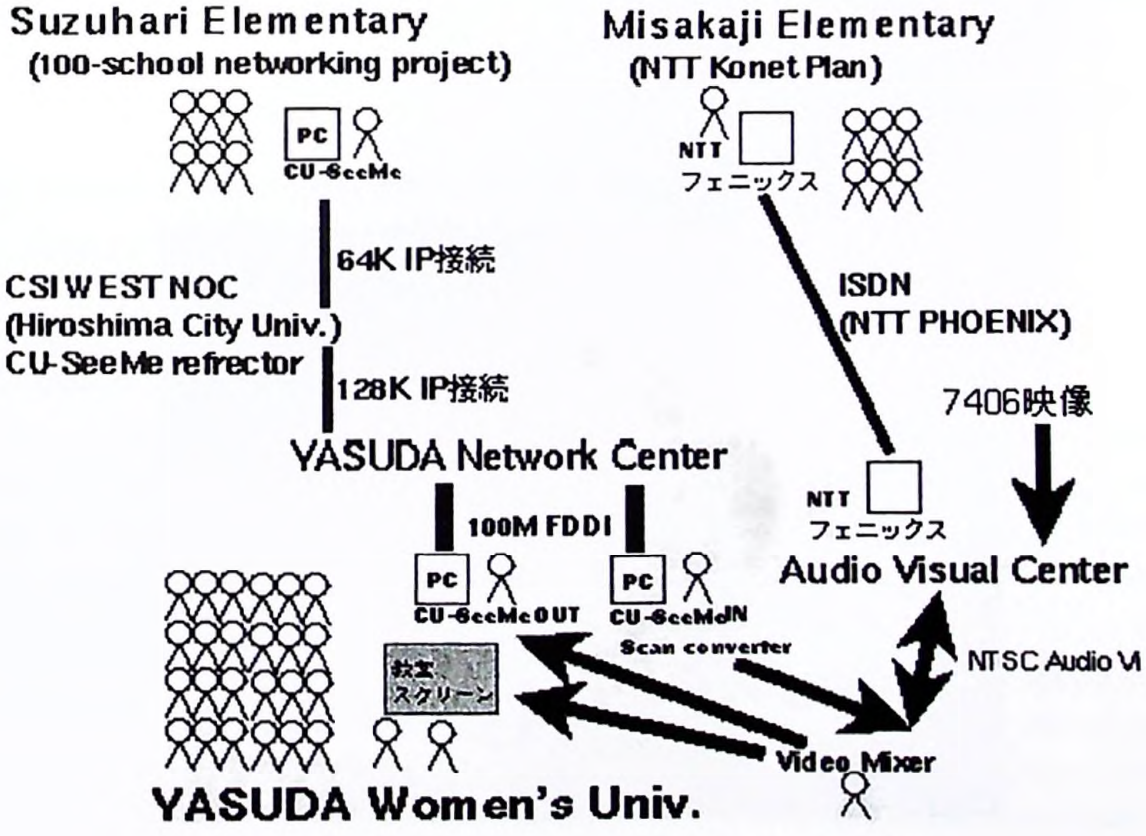

Fig. 4: The Multimedia Inter-classroom Linkup System.

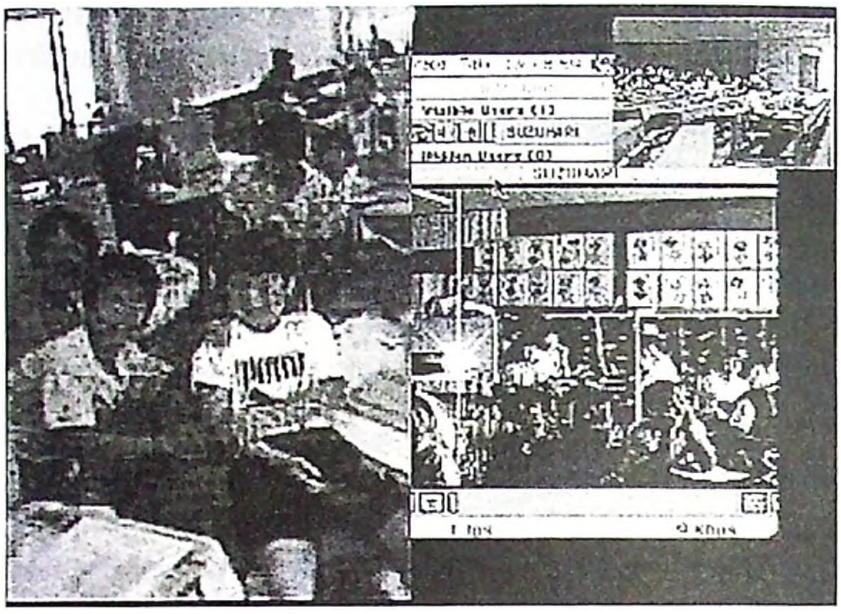

Fig 5: A Snapshot of "HAIKU get-together" 1
(left side: Misakaji Elementary, lower right: Suzuhari Elementary, upper right side: Yasuda Univ.)

Fig. 6: A Snapshot of "HAIKU get-together" 2

these video conference systems, we used a digital video mixer. The video mixer uses an NTSC video signal, and both CU-SeeMe and NTT PHOENIX can transfer NTSC signals.

Before the actual inter-classroom linkup, both classes exchanged their HAIKU poems using e-mail. Within their classes they picked their favorite works and wrote their impressions about the selected HAIKU poems.

June 10 was set as the day for the multimedia inter-classroom linkup project. At 8:30AM, Suzuhari Elementary School, Misakaji Elementary School, and Yasuda Women's University were visually linked through the Internet and an ISDN (PHOENIX system) connection.

After this practice, most students expressed their satisfaction with their experience of speaking with other students, but we had some trouble with the audio part as the Suzuhari audio channel occasionally went down.

Table III: Misakaji Students' Impressions of "HAIKU get-together"
(Total 28 students)

POSITIVE	NEGATIVE
Enjoyed (16)	We couldn't hear the audio channel (13)
We want more practice 8	Practice time is too long (7)
	Visual quality was bad (2)

The Virtual Comes True through the Internet

For children, the internet and related multimedia itself are "virtual" media. The communication goes through steps in which messages that arrive from a correspondent are then printed out by a teacher and shown to the children. This shows that we have entered the virtual realm.

Children sent out calls via the Internet and the results were clearly evident when folded paper cranes began to fill an auditorium, or when the HAIKU one child wrote provoked instant impressions from students in a distant classroom. What these examples present us with is not the void of the virtual world, but rather the emotions that accompany the children's true feelings.

The possibilities for the educational use of the internet lie in the creation of emotions through the person at the other end and from the virtual world around us. Students can benefit from using the internet by being able to have these experiences. This virtual experience holds the key to inspiring the students' pursuit of further learning.

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THE USE OF MULTIMEDIA IN THE CHILDWATCH INTERNATIONAL RESEARCH NETWORK

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Abstract: The article describes the background and the activities in the Childwatch International research network in using electronic communication. The network has a core of 30 institutions world-wide that work together to establish Childwatch International as a tool for international cooperation and for mutual support in capacity enhancing within child research.

One of the main objectives of Childwatch is to develop overviews of the activities of central research institutions within child research and to facilitate the flow of information between the institutions. The information strategy of Childwatch has explicitly aimed at taking advantage of the opportunities represented by modern electronic communication technology.

Childwatch launched the idea of establishing Children's House in Cyberspace. Which is an electronic meeting place for those working for and with children at the professional level, whether within research, programming, planning, advocacy, legislation or policy-making.

Network of Institutions

Childwatch International is a global not for profit network of institutions involved in research for children. The aim of the network is to initiate and coordinate research and information projects on children's living conditions and the implementation of children's rights.

The research network has a core of 30 institutions world-wide that work together to develop Childwatch International as a tool for their international cooperation and for mutual support in capacity enhancing within child research.

Childwatch International emerged in 1993 from a process of informal consultations among child researchers from different parts of the world. With a variety of disciplinary backgrounds and thematic interests they represented a broad spectrum of academic and research institutions. They wanted a good overview of relevant research activities and they wanted to exchange information and initiate new projects in areas of common concern.

Globalization, Children's Rights and International Cooperation

The increased globalization of economies and of politics has lead to a globalization of childhood which inspired to a wish for regular contact and collaboration among the researchers initiating the network. The globalization represents new challenges in child research and just as many aspects of childhood are similar around the word, there are also significant regional and structural differences that need to be studied.

Another concern shared by the researchers was the possible implications of the UN Convention on the Rights of the Child on their research. The Convention on the Rights of the Child provide a common platform for discussing how research could benefit children and support the implementation of the Convention. The Convention and the child rights movement bring a new language and terms of reference for those who work with and for children, as well as new obligations and challenges for governments.

The increased globalization and the Convention on the Rights of the Child represent major opportunities for the research community to look at new issues relating to children, for identifying gaps in knowledge, to match the international and regional developments with adequate data. These perspective also provide new opportunities for collaboration.

A new research approach is necessary to get the relevant understanding of children and the environment they grow up in. This process needs to be interdisciplinary, and has been given, by professor Noboru Kabayashi the Japanese term KODOMOGAKU.

Kodomogaku-Childwatch Objectives

Kodomogaku calls for interdisciplinary and broad based study of children. This approach is also reflected in Childwatch International objectives:

- To promote an inter-disciplinary approach to child research and a holistic understanding of children;
- To promote effective dissemination of the results from child research to the general public;
- To encourage and support a dialogue between researchers and desicision-markers on the development of strategies for the implementation of the Convention on the Rights of the Child and other international agreements concerning child welfare;
- To identify new issues to be included in the global agenda for child research and initiate projects to address them.
- To support capacity building and capacity strengthening within the field of child research, particularly with partners in countries in the South.

Implementation of Objectives

Childwatch International has explored a variety of ways to promote the network and to gain experience and has initiated important activities:

- Research projects, such as Indicators for Children's Rights: an effort to identify already existing data to use in monitoring implementation of the Convention and test its applicability in some selected countries;

- Identifying new research areas or defining new approaches to old ones, such as: Children and Environment; Child labor and child work; Street children;
- Facilitating and assisting activities to develop and strengthen research agenda and capacity in areas relevant to children's development and well being;
- Taking advantage of the internet and other electronic communication tools, to develop effective information exchange and interaction between researchers and research institutions, and to facilitate information on ongoing child research.

Taking Advantage of New Information Technology

Since its inception, one of the main objectives of Childwatch has been to develop overviews of the activities of central research institutions with child research and to facilitate the flow of information between the institutions. The information strategy of Childwatch has explicitly aimed at taking advantage of the opportunities represented by modern electronic communication technology.

Many of Childwatch's partners are now using e-mail as their main mode of communication within the network, both in individual communication and in communication within groups (m-lists). Childwatch has taken an active role in promoting the use of the internet to present and seek information, and several Key Institutions now have their own home pages. Childwatch has hosted a seminar for Key Institutions IT-representatives for mutual learning and increased skills in using the internet for research purposes. Childwatch is aware of the uneven distribution of and access to the internet and has assisted in improved access to the communication opportunities.

The internet also provide the opportunity to do research on-line. An example of that is establishment of directories such as the European Directory of Child Research Institutions. To do research online requires new methods and severe consideration on how to develop and present solid and valid data and research.

A natural part of using the opportunities represented by the internet, Childwatch launched the idea of establishing Children's House in Cyberspace. The idea is to create an electronic meeting place for those working for and with children at the professional level, whether within research, programming, planning, advocacy, legislation or policy-making. This initiative has been met with overwhelming and positive responses from organizations and institutions who want to place their information in Children's House, or who want to establish links to their own databases.

Children's House in Cyberspace

Together with Key Institutions and other organizations involved in children's issues, particulary within programming, Childwatch has established Children's

House in Cyberspace, an electronic meeting place where professionals can exchange information that serves the well-being of children, and translate the benefits of research and programming into policy and practice.

Through the World Wide Web, reliable information regarding ongoing research activities, programming, international events, electronic conferences and interactive databases can be accessed. Children's House aims at serving as an instrument for dialogue, discussion and dissemination of knowledge on the situation of children.

The goals of Children's House in Cyberspace is not just dissemination of information but also the active communication and exchange of views.

The House was launched in 1996 and has an increasing number of users. In 1997 there were 400,000 visits to Children's House.

Children's House in Cyberspace is structured along subject matters or themes and each theme presented at the Internet is managed by a Moderator, with experience in the theme. The group of Moderators constitutes the House Committee, which makes decisions on developments and adjustments of the organization of the House. You can find Children's House in Cyberspace at http://childhouse.uio.no.

New Themes On the Global Research Agenda

Childwatch is interested in exploring the opportunities represented by the internet for advancing research. This is done through support to global projects based on collaboration between different research institutions an example on how the internet is used in a research project is the Growing up in Cities project, supported by UNESCO and Childwatch International. The project is described in a separate paragraph below.

Another example of a global research agenda is to organize the Childwatch, Research and Activity Teams, so-called ReAcTs. Research and Activity Teams are reflecting a mode of collaboration and involvement of Childwatch Key Institutions in common research projects, that take the that reflect the added value advantage of the combined and coordinated sources of knowledge and capacity represented by the Key Institutions and individual partners in the research network. Through a process of consultation in the network themes for ReAcTs are formulated and initiated. A recent ReAcT is the significance of political and economic transformation in the everyday lives of children.

The theme augmented childhood in a multimedia environment represents an excellent opportunity for Childwatch International research network to take part in the process of capturing and formulating new terms for the research agenda.

The conference augmented childhood: The evolution of child development in the multimedia environment has fueled the interest at Childwatch for initiating research in this area and recently Childwatch made a proposal for a new ReAcT: The impact of media and information technology on the lives of children. Within the research community as well as in media and the general public there is an emerging discussion on what multimedia and information technology mean for children. Particularly the following issues feature frequently:

- positive aspects; for learning, personal development
- negative aspects; reinforced culture of violence, sedentary childhood
- variations in access to such media and to the technology
- increasing gaps between rich and poor countries.

Growing up in Cities

The Growing up in Cities project is a historical, international and interdisciplinary and participatory action research project based on children's rights and using electronic communication in the project development.

In the Growing up in Cities project the internet is actively used as a working tool between the researchers. Throughout m-lists researchers communicate about methods and the Internet is used for exchanging information between the researchers, the children involved and as a way of reporting as the research project develops.

The project is a replication of a study in the UNESCO project Man and Biosphere program. The Architect Kevin Lynch, conducted a study in the 1970s on children in 5 cities around the world by making surveys and mapping and observing the neighborhoods and the children's use of the neighborhoods. Kevin Lynch and his research associates interviewed the children and adults in the chosen neighborhoods of the city. In 1995 a plan for replicating the study was adopted and today the project goes on in cities, of which 3 are the original sites.

The project compares children's perceptions with parents and other adults experience and view, for example municipal and official representatives. These interviews helps in getting a picture on how the environments effects children's lives. For the three historic sites a comparison on changes over time will be carried out.

Method used: photo-mapping of area; observation of children's use of their environment;

Interviews with children about:

a) Their perception of community and environment;
b) Their priorities for change and improvement in their neighborhoods.

The historical and dimension of the project allows for analyses of comparison: How are changing global economic and social forces affecting the environment of urban childhood?

In the replication of the study an important dimension has been added to the original project: The rights of the child and children's participation. The researchers are talking with, listening to and respecting children's and young peoples views and perspectives on their own situation and neighborhoods and community. The researchers work actively with the children and accept and promote children as actors and partners in changing and affecting their environment.

The general basis for the project is participatory action research methods, but the project allows for various methods to be used. The researchers are involving the children and young people in evaluating and discussing their community environment, developing strategies and proposals for improving the environment, and in building partnerships in doing this. These methods bring to the children education for action, learning life skills, gaining self-confidence, developing social and environmental responsibility and developing capacity for democratic action.

The research teams at the sites/neighborhoods are linked through electronic mail, but also cooperate in reality. The eight research teams have met on several occasions to develop the foundation, an update of the Kevin Lynch approach and to prepare the project and agree on terms for reporting. The researchers uses each other creatively and actively: they are continuously discussing and assessing the development of the project and are putting questions and observations out through the e-mail. Some sites have developed web-sites, and use them to put out current information and requests for feed-back.

Children's drawings and photos appear on the web pages. The children are becoming interested in the lives and situation of the other children involved.

The children have expressed a wish to communicate with the children at the other sites, see their drawings, hear about their proposals. The language barrier has to be overcome and the researchers struggle to get the children to connect.

The perspectives of the Growing up in Cities project are multiple:

The project is an example of implementation of children's rights, with a strong component on environmental action the project has links to the Habitat and Agenda 21 perspectives, and to the UNICEF Child-friendly cities in the electronic communication and children are learning through action, learning life skills, democracy and responsibility.

More detailed information about Childwatch International is available at the Internet: http://childhouse.uio.no/childwatch/

Cities in the growing up in Cities project. Cities underlined are historic sites.
Argentina: Salta, Buenos Aires, Australia: Melbourne, India: Bangalore, Norway: Trondheim, Poland: Warzaw, South Africa: Johannesburg, United Kingdom: Northampton, United States: Oakland, California.

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SOCIAL INDICATORS OF CHILD WELL-BEING AND THE WORLD WIDE WEB: CONSIDERING YOUTH AS USERS

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Efforts to comprehensively monitor the well-being of children and youth have been expanding rapidly during the 1990s in the United States and Worldwide. These social indicators of child and youth well-being are becoming indispensable tools of social policy for planning, identifying and pursuing social goals, and for holding governments and the larger society accountable for improving the well-being of children and youth.

The broad dissemination of this information to the public has been an important goal of both public and private producers of the data. The internet is fast becoming the preferred medium for these efforts. In the last two to three years, there has been an explosion of social indicator data on children and youth available through the Internet. This trend is certain to continue for years to come and is likely to accelerate.

An important task for the next several years is to organize access to this explosion of data, making data more easily accessible to users, and connecting the data to specific user groups who are active on the internet. These users include: administrators and policy-makers at all levels of government; the research community; journalists; nonprofit advocacy groups; private organizations that work with youth; and citizens.

A potentially important user group that is rarely considered when designing reports or planning dissemination strategies is the children and youth themselves. This group is among the most sophisticated in using the internet to collect information, and has a large presence there. As adult producers of social indicator data on children and youth make plans for disseminating and organizing this information generally over the internet, it is important that they give some thought to children and youth as potential consumers of this information.

In this paper I briefly describe the growing importance of social indicators of child and youth well-being in the United States and internationally and the expanding role of the internet as the medium for dissemination of this information. I then discuss a modest effort by Child Trends, Inc. to improve access to this information through the design of a Web site that organizes links to the many

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internet sites containing social indicator data on children and youth, primarily in the U.S. I then present strategies for site design and outreach that will make these data more accessible to youth, and finish by discussing some implications for research.

Social Indicators of Child and Youth Well-Being: Their Growing Importance

What are Social Indicators? Social indicators are defined in this paper as measures of well-being that can be tracked so that trends over time can be monitored. They may include both direct measures of well-being (e.g., the percent of children with chronic health problems), and indirect measures of the social and ecological environments affecting children and youth (e.g., children in poor families, or youth living in dangerous neighborhoods). A comprehensive set of indicators would certainly include measures of health, social development, academic capacities and achievement, economic security, and so on.

How are Social Indicators Used? Social indicators of child and youth well-being are used for a variety of purposes both scientific and political. Common uses include[1]:

- description, for the sake of knowledge;
- monitoring, to inform policy formation and social program design;
- goals-setting and tracking, to focus government and private activities towards a common set of social goals (e.g., to reduce infant mortality to 6 per 100,000 births by the year 2000);
- accountability, to hold agencies, governments, and the larger society responsible for improving the well-being of children and youth; and, in limited circumstances,
- evaluation, to identify programs and policies that positively (or negatively) affect the well-being of children and youth.

Social Indicators in the United States. During the 1990s there has been a substantial increase in the use of social indicators of child and youth well-being at all levels of U.S. government: national, state, and local. These programs include comprehensive initiatives to improve all aspects of child well-being; more focussed efforts to improve health or educational outcomes; the expansion of existing social monitoring activities; and programs to hold governments accountable for improving child well-being. The programs have resulted in increased amounts of data on children being gathered, and a growing number of publications that report trends in the well-being of children and youth on a regular basis.

At the national level, a consortium of 17 federal agencies[2] recently produced the first edition of an annual report to the President titled "America's Children: Key National Indicators of well-being." The report contains trend data on 25 indicators of child and youth well-being. It is designed for a popular audience, and is intended to focus the nation on a limited set of measures covering key

aspects of well-being. A second, more comprehensive and detailed report of over 90 indicators is produced by the U.S. Department of Health and Human Services on an annual basis[3]. In addition, these agencies produce their own reports that focus on particular aspects of child well-being, or which include child data as part of more comprehensive reports on the population[4].

States and local communities in the U.S. have also been very active in the production and dissemination of social indicator data on their children. This is in part the result of a broad movement in the U.S. to devolve power over the design and execution of social programs away from the federal government to the state and local levels. This "devolution" has increased the need for good state and local data on which to base policy design and planning. A number of states have embarked on comprehensive planning efforts in which social indicators reflecting the well-being of the entire population play an important part. Others have focused particularly on children and youth, though they look at all aspects of well-being. Most states have programs in particular areas such as health and education in which social indicators are important tools for monitoring, goals-setting, and so on[5].

In addition, the Annie E. Casey Foundation has funded Kids Count organizations in each of the 50 states to produce annual reports on the well-being of the children and youth in their state. Data are reported for the state and for each country within the state. Some state organizations have been producing these reports for over six years. The reports are intended to focus the public on children's issues within the state and within their own communities.

International Social Indicators. Social indicators of child and youth well-being have become more available and more important internationally in recent years. The International Convention on the Rights of the Child, a document that has been signed by nearly every country in the world[6], calls for all signatory nations to develop the means to track progress in the areas covered by the Convention, and to report results to the UN on a regular basis. Childwatch International, a global network for child research, is working with a number of countries to develop data systems to track the well-being of their children and youth.

For the last fifteen or more years UNICEF has produced their annual "State of the World's Children" report which focuses primarily on basic survival-related measures of well-being across many countries. This report has documented substantial improvements in child morbidity and mortality in many countries over that period of time, due in part to UN programs that assist countries in the development of effective national programs.

Efforts to collect and report data on children and youth that are comparable across nations have also increased substantially in the last decade. A recent review identified nine surveys that provide comparable data on many dimensions

of well-being, many of which are fielded on a regular basis. Examples of such data sources include the UN sponsored Healthy Behavior of School-Aged Children survey and the Third International Math and Science Survey, which provide data on youth in over 25 countries[7].

The Growing Role of the Internet as Dissemination Media for Social Indicators

In the last several years the role of the internet in disseminating information of all sorts has grown dramatically, and data on children and youth are no exception. All of the 17 U.S. federal agencies in the Interagency Forum on Child and Family Statistics have their own web sites, and most or all distribute reports on the Web. Increasingly they are offering online access to whole surveys. Over the next couple of years many agencies plan to make the internet the primary medium through which reports and data are distributed. Both of the major reports on child and youth well-being mentioned above are already available on the internet for downloading and simple online browsing. Hundreds of individual reports that feature or include data on children are also available from the Web sites of individual agencies. The Census Bureau is intending to put the entire year 2000 Census up online with a user friendly interface that will allow anyone to develop their own custom reports on any topic covered by the Census, for any geographic unit down to the neighborhood level.

The same thing is happening within the states. The form in which the data are available varies and can include: reports which can be downloaded; tables and graphics that can be browsed online; and Geographic Information Systems (GIS) that allow on to compare data across regions within a state and to access data from different sources for the same locality. The amount of social indicator data and the form they take can vary substantially across states, and from agency to agency within states. The amount of coordination that takes place among agencies in planning dissemination over the Internet is also variable, though it is minimal in most states. Nongovernmental organizations are also moving quickly to the internet. Many of the state Kids Count groups funded by the Casey Foundation are or will soon be disseminating their annual reports through their own Web sites.

Though the U.S. is among the most aggressive countries in moving their data onto the internet, this is also happening in many countries around the world. It seems likely that, within the next few years, most of the countries with substantial internet infrastructures will use the internet as a major medium for disseminating information, including information on children. International organizations such as the UN and the European Union are also moving in this direction.

Nongovernmental organizations such as Childwatch International and our hosts, the Child Research Net, are making social indicator data available through their Web sites.

Making what is Available on the Internet more Accessible to Everyone

The explosion of child and youth social indicator data now becoming available on the internet has substantially increased its availability to many user groups who would like to use it. Unfortunately, available does not necessarily mean easily accessible. To be accessible, the information must be in a form which is easily understood by the user and easily located. The challenges associated with putting social indicator data into a form that is easily understood by most potential user groups are many. These issues have been receiving substantial attention from those who produce social indicator data, since they are commonly concerned with reaching broad audiences, though the unique potential of the internet for enhancing presentation of such data is only beginning to be explored.

For this paper, however, I am focusing instead on that other dimension of accessibility, namely the ease with which data on children and youth can be located on the internet. The explosion of such data on the internet shares the features of any explosion, namely that it is fairly chaotic and disorganized. This is to be expected, coming as they do from so many different sources and developed for so many different purposes.

There at least two ways in which information is organized on the internet. First, there are the internet search engines which in the U.S. include Excite, Lycos, Yahoo, Info seek, Webcrawler, and others. These function through the use of keyword searches. They are excellent all-purpose organizing tools, but can often lead to long and incomplete searches. Second, there are topic-specific Web sites that identify and organize information in other Web sites in ways that will be useful to users interested in that particular topic. Such sites, if well designed, can dramatically increase the accessibility of relevant information, functioning as a single point of entry for the most pertinent information available on the internet on a particular topic. They organize links to other sites, providing brief descriptions concerning the contents of each site. Many of the search engine sites listed above also organize sites by topic.

Child Trends, Inc. has begun a project to develop such a Web page for social indicator data on child and youth well-being[8]. The focus of our site is on U.S. data, though key international sites will also be included. The site is still in the design stage. We have decided to limit our ambition in order to develop a site which is useful but capable of being developed quickly and maintained at low cost. The design is still in the early stages, and your suggestions are welcome. Table I shows the current draft of the design, with site links organized by substantive area (or topic) and geographic area.

Substantively, sites are organized into five topical areas, plus a separate listing for crosscutting sites that report on many dimensions of child an youth well-being. These are further sorted according to whether they focus on international, national, or state and local data.

Table I: Indicators of Child and Youth Well-being: Available Web Sites Organized by Substantive and Geographic Areas

By Substantive Area		
International	National (U.S.)	State and Local
• Crosscutting Reports	• Crosscutting Reports	• Crosscutting Reports
• Education	• Education	• Education
• Health	• Health	• Health
• Economic Security	• Economic Security	• Economic Security
• Population	• Population	• Population
• Social Development	• Social Development	• Social Development

By Geographic Area	
International	United States
• International Organizations	• National
	• Specific States and Localities
• Australia	• Alabama
	• Mobile
• Canada	• Alaska
	• Anchorage
• Japan	• Arizona
	• Arkansas
–	• California
–	–
–	–
–	–
• Zimbabwe	• Wyoming

The geographic organization (located on the bottom half of the table) identifies data in sites that pertain to particular countries, states and localities. The major focus will be on state sites since they are the most numerous, although increasing numbers of countries and cities in the U.S. do maintain sites with data relevant to the well-being of children and youth. Within each state we intend to list major government sites as well as the sites of the state Kids Count organization when they are online. We are not currently planning to further organize sites by topic within state since at present there are a limited number of relevant sites in each state.

Using the Internet to Make Data About Youth Available to Youth

The Web site that we have begun to develop is being designed primarily to serve the needs of a variety of audiences who already use this sort of information and are familiar with it including federal, state, and local government staff who work on children's data and children's issues; journalists; advocates; and researchers. Adults all. However, there are a number of reasons to consider youth among the potential users of this site, and to take their needs among others into account in the design of the site, and in plans to market the site to users.

First, youth have a strong presence on the Internet in the U.S., and there is reason to believe that their presence will continue to grow as the home ownership of computers grows The President recently announced a $400 million project to have all schools connected to the internet by the year 2002. Youth are also more familiar with the internet as a research tool than most adults.

Second, youth may have many uses for such data. These include:

- Academic use. As student they could take advantage of the site to do research on topics that are relevant to their own lives and those of their peers. Such a site might, for example, greatly facilitate a research project on trends in teen birth rates, as one could conceivably gather data on trends at the international, national, state and local levels including, perhaps, the city in which on lives.
- Informational use. Youth have a demonstrated interest in basic information about themselves. There are a growing number of Web sites that are designed for youth and about youth. For example, the Yahoo site has a special section called Yahooligans, which caters to child and youth interests and needs in many areas. Some sites are even designed by youth. For example, Children's Express is a highly successful news-oriented Web site that is run by children and youth.
- To inform social action. Many youth in the U.S. are involved in groups whose members provide social services to the community. For example, many high schools now require some minimum number of hours of community service in order to receive a high school degree. Church youth groups, and organizations such as the Boy Scouts and Girls Scouts encourage community service of various sorts. Access to social indicator data on children and youth, particularly for their own communities, could help youth to identify needs that can be met through community service projects.

Third, the Web offers a unique and low-cost opportunity to get input from youth on measures of well-being that are most important to their lives. A number of researchers have emphasized that children and youth should have significant input into how society defines and monitors their well-being[9]. Such a notion is clearly present in the International Convention on the Rights of the Child. And yet, at least in the U.S. (and probably elsewhere) such input is very rare when social indicators of child and youth well-being are being identified for tracking, reporting, and so on.

Implications for Child Trends' Web Site. There are several strategies which Child Trends (and others who provide data on children and youth on the Web) can pursue as we consider the needs of youth for data on children and youth. First, we can design the site in ways which will increase its utility for interested youth. Second, we can work with sites where youth are active, listing our site with them as a link, discussing how they might make the best use of the site, and soliciting feedback on simple changes that will improve the utility of the site for youth.

For many purposes, thankfully, the things that will make our Web site useful to youth are also the things which will make it useful to the average adult user, namely, that the sites we organize be sorted and described in a way that make it easy for the user to locate the data he or she needs. Beyond that, however, it may be useful to develop an additional list of key links to those sites most likely to be of interest to youth. For example, sites that focus on youth (as opposed to child) indicators could be helpful. Sites that take maximum advantage of the multimedia capabilities of the internet may also be of more interest to youth. In addition, to the extent that youth are using the information to inform community service decisions, they may be particularly interested in data for their particular community. To help youth to interpret the social indicator data they find through the web site we could develop a tutorial section that would teach youth by answering basic questions such as "What is a survey?", "What is a time trend?", and "What is a social indicator?" These represent some obvious places to begin, though ultimately we would certainly need to ask the youth themselves for suggestions on ways to make the site more useful for their needs.

A complementary strategy requires working with those sites that already serve the needs of youth, especially academic, news-related, and service-oriented sites. Such sites might include the following:

- Children's Express: This is news service run by children and youth ages 10 to 18, with bureaus in seven cities, five in the U.S., and two in England. Several of the bureaus have Web sites. They report on children and the issues affecting children's lives.
- Yahooligans: This is a section within the Yahoo Web site devoted to children and youth. It has organized many Web sites into both recreational and informational areas of interest to these groups.
- UNICEF Voices of Youth: This Web site is a place where youth from all over the world can express and share their opinions about the rights of children and youth. In addition, youth can take part in interactive global learning projects organized through UNICEF.

Once our own Web site is running, Child Trends is considering developing a more complete list of such Web sites and contacting Web administrators to elicit interest in using our Web page, including direct links from their site to ours.

Implications for Research on Children and the Internet

An effort such as the one I have just described could benefit greatly from greater knowledge of how youth actually use the internet for research, for recreational purposes, and so on. Unfortunately, I have found very little information of this sort available. One project that may shed useful light on these issues is the

project "Cyberkids: Children's Social Networks, Virtual Communities, and on Line Spaces" directed by Drs. Bingham and Valentine of the University of Sheffield and Dr. Holloway of the University of Loughborough, and sponsored by the Economic and Social Research Council in England. This project will examine the ways in which children use internet communication (or computer mediated communication, to use their term) as part of their everyday lives. Other projects that examine and categorize the types of Internet sites youth visit, how often, for what purpose, and so on, would also aid those who would like to take the needs and interests of youth into account when designing Web sites.

Conclusion

In the United States and many other countries a great deal of effort is being but into the construction, collection, analysis, and dissemination of social indicators reflecting the well-being of children and youth. To date, only sporadic efforts have been made to make these data available to an obvious audience, the children and youth themselves. The internet represents an opportunity to bring the data to this audience in ways that are accessible and useful to them. This paper is a modest attempt to consider their needs as part of a more general effort to make data on children and youth more accessible to all interested users of the Internet. A great deal more can and should be done to make these data available to youth over the internet, and to shape both the data and the dissemination strategies in ways that better meet their particular needs and interests.

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MULTIMEDIA FOR EDU – TAINMENT OF CHILDREN IN ASIA: THE CASE OF TELEVISION IN SEVEN ASIAN COUNTRIES[1]

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"I like what I get is the same thing as I get what I like"

Most mass media programmes are not produced with children's interest in mind. Like other commercial commodities these are produced for profit in the market place. However it is sometimes asserted that at he market place provides the people with what they like to get. The quotation, from Alice in Wonderland, cited above is a reminder to us that things are not as simple as that. As a group of professionals concerned about children living in a multimedia age, we must question the logic of such assertions.

It is now increasingly recognized that new communication technologies are creating a new type of community. These are variously referred to as intelligent communities, para-social communities, virtual communities, smart communities etc. In future, children will be socialized within this new and unfamiliar environment. The social institutions that are responsible for introducing children to this new environment are themselves quite inexperienced in dealing with this situation. Their methods of socialization are still influenced by old mode of thinking. For instance we speak of global villages, electronic super-highways, multimedia corridors, all metaphors borrowed from earlier periods of history. These are totally irrelevant in the emergent intelligent communities.

Social relationships in the intelligent communities will not depend on physical proximity. New communication technologies have made it possible for business to produce, consumers to purchase and workers to interact without the need for common physical location. Children must be introduced from a very early age to live happily in this new multi-media environment. We know that children interact with their environment intelligently. Yet they are vulnerable to influence because they are not experienced. Unless the socialization institutions such as the family, school, neighborhood make special efforts to orient children to live in the new multi-media environment they might grow up to be misfits, alienated from their surroundings. This will have deleterious consequences for the children themselves as well as for the society at large.

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1. March Hare at the Mad Tea Party in Alice in Wonderland.

This presentation is based on empirical work carried out by the Asian Media Information and Communication Centre, Singapore, in a number of Asian countries. The studies were conducted under the direction of the author. An article summarising these findings will appear in the Yearbook of the UNESCO International Clearinghouse on Children and Violence on the Screen (forthcoming).

In most Asian countries children under the age of 15 comprise around 40 percent of the population. This proportion is even higher in poorer countries such as India and Bangladesh. However only a very small proportion of TV programmes, radio programmes, cinema, books, periodicals and newspapers are made for children. While published data on the proportion of children's media are scanty, it has been estimated that in some Asian countries, such as India, Bangladesh and Sri Lanka this is less than five percent. The lack of information on Children and media is indicative of the lack of interest among research community and the ruling classes about this tissue. It is also indicative of the absence of an accepted policy regarding communication for children. This situation becomes all the more glaring when one considers the fact that in many poorer countries in Asia, a large proportion of children who should be in school are not in school. The proportion is particularly high in the case of Asian girls.

In those countries where the economies are growing rapidly and racing ahead to stay competitive, rampant commercialism has entered children's media programming. Programme related products are heavily advertised and marketed to children. Different media systems collaborate to produce and market children's products as part of their media fare. For instance the TV programme Teenage Mutant Ninja Turtle spawned comic books, computer games, movies and countless commercials over radio and TV to make it a household name.

In this situation what kind of television programmes are offered to children between the ages of 6 and 15 years in Asian countries? Do they get what they like or do they like what they get? What sort of a world is created for children by these television programmes? Do the TV programmes help children to understand the new multi-media environment to which they will enter? To what extent are the policy makers and programme producers in Asian television stations aware of children's rights as enunciated by UN?[2] What are the resources available for the production of children's television programmes in Asia?

These are some of the questions that the Asian Media Information and Communication Centre (AMIC) addressed in an empirical study of television and children in nine Asian countries[3]. A monograph containing the more significant findings is planned for publication in late 1998.

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2. Children have inalienable rights. This fact was endorsed by the adoption of the Convention on the Rights of the Child by the UN General Assembly in 1989. 187 governments are now State Parties to this international treaty including all nations in Asia-Pacific.

3. The countries are China, India, Indonesia, Japan, Malaysia, Nepal, Philippines. Singapore, Thailand and Vietnam. The study was partially funded by UNICEF. In addition to these countries data for Sri Lanka and Thailand are also included in this paper.

It is common knowledge that countries in Asia have many cultural, economic and social differences. At the very elementary level one could discern two Asias: the poorer Asia and the richer Asia. Access to television are different in these two regions of Asia. Bangladesh and Nepal, two of the less developed countries in Asia, have around 14 and five television sets for 1000 population respectively. The comparable figure for India and Indonesia are 67 sets and 46 sets respectively. In contrast to this in the richer parts of Asia ownership of television is quite wide-spread. South Korea has 416 sets per 1000 population and Singapore 224 sets. (Goonasekera and Holaday, 1998) There are also different types of ownership and management of television stations in different countries in Asia. The stations may be owned by private individuals or it can be a mixture of the two. These factors have an important bearing on development of television broadcasting in Asian countries. They also influence the policies that are followed in relation to children's television programmes in these countries. Table I is a summary description of the television scene in terms of the level of economic development and patterns of ownership in 11 Asian countries.

Table I: Television Ownership in Eleven Asian Countries

	Government	Private	Mixed
Less-Industrialized/Poor	China, Nepal, Vietnam	Philippines[4]	India, Indonesia, Sri Lanka
Industralized/rich			Japan, Malaysia Singapore, Thailand

What are the types of television programmes available for children in Asia? For purposes of this research television programmes were classified into 12 types. The 12 categories are: Animation or Cartoons; Puppets; Story Telling; Serial/Drama; Pre-school Magazine Information; Information/News; Magazine Entertainment; Quiz/ Games; Music; Religious; Cultural/Traditional There is also an "other" category to include those programmes that cannot be classified within these 12 categories.

Tables II, III and IV give data on the basis of this classification for two countries. The countries are India and Malaysia. India is from the poorer region of Asia and Malaysia is form the richer region. India has an open skies policy regarding reception of satellite television programmes by its citizens whereas Malaysia has imposed restrictions.

Table II gives data for Doordarshan in India. It is based on programme schedules for one week in January 1995. Two factors stand out in this data. One is the predominance of animation programmes. It is the single largest category of programmes (19.83%). This is so for many other countries in Asia. The second is the dominance of foreign programmes in this category (63.8%).

4. Philippines does have two government supported stations.

The predominance of foreign programmes is compounded by a more recent phenomena in the television scene in India. This is the transmission of programmes by foreign multinational television broadcasters such as StarTV, CNN and BBC World Service to Indian audiences. In addition India has its own satellite channels, some of which are up-linked from foreign points of origin such as Hong Kong (See table three). Here again the dominant type of programme for children are animation or cartoon programmes (41.8%) followed by drama programmes (20.9). India has not controlled direct access to satellite programmes by its citizens. However most of the foreign satellite programmes are distributed mainly through Indian Cable Companies. Most people in India cannot afford satellite reception dishes as they are too expensive for them. These people subscribe to the cable services which re-transmit foreign satellite services along with local programmes such as local language movies.

Table II: Telecast of Children's Programmes* Doordarshan India

Program Type	Duration in Minutes		Total Broadcast Time Per Year in Minutes (Hours)***	As Percentage of all Children Programmes
	Local	Foreign		
Animation	85	150	12220 (203.66)	19.83
Puppets	–	–	–	–
Story Telling	–	90	4680 (78)	7.59
Serial/drama	60	60	6240 (104)	10.12
Pre-school magazine	20	–	1040 (17.33)	1.69
Magazine information	70	–	3640 (60.66)	5.91
Information/News	–	–	–	–
Magazine Entertainment	110	–	5720 (95.33)	9.28
Quiz/Games	60	–	3120 (52)	5.06
Pop music	–	–	–	–
Religious	–	–	–	–
Cultural/Traditional	30	–	1560 (26)	2.53
Others***	450	–	23400 (390)	37.97
Total	885	300	61620 (1026.98)	100

	Total Broadcasting Per Week in Hours		Total Broadcasting Per Week in Hours
National DD	5.05	Bombay Regional	3.00
Metro DD2	5.30	Hyderabad Regional	1.00
Madras Regional	2.20	Bangalore DD	1.30
		Thiruvananthira	1.00

* Based on schedule for 1 week.
** Calculated on the basis of broadcast time per week 1995.
*** Covers variety programmes for children which include story telling, drama, quiz/games, music.

Table III: Telecast of Children's Programmes in Indian Satellite Channels*

Type of Program	Duration in Minutes Per week		Total Broadcast Time Per Year in Minutes (Hours)	As Percentage of all Programme for Children
	Local	Foreign		
Animation	60	780	43680 (728)	41.79
Puppets	–	–	–	–
Story Telling	–	–	–	–
Serial/drama	–	420	21840 (364)	20.9
Pre-school magazine	–	–	–	–
Magazine information	–	–	–	–
Information/News	–	–	–	–
Magazine Entertainment	–	–	–	–
Quiz/Games	150	60	10920 (182)	10.45
Pop music	30	–	1560 (26)	1.49
Religious	–	–	–	–
Cultural/Traditional	30	–	1560 (26)	1.49
Others	480	–	24960 (416)	23.88
Total	750	2010	104520 (1742)	100

	Total Broadcasting Per Week in Hours
Star TV	20
ZEE TV	4
SUNTV/ASIANET/RAJTV	3.30
JAIN TV	6
	33h 30m

Table IV: Telecast of Children's Programmes in Malaysia (RTM1, RTM2, TV3) (1994)

Programs Type	Duration in Minutes Per week		Total Broadcast Time Per Year in Minutes (Hours)	As Percentage of all Programmes for Children
	Local	Foreign		
Animation	–	390	20280 (338)	37.14
Puppets	–	180	9360 (156)	17.14
Story Telling	–	60	3120 (52)	5.71
Serial	–	30	1560 (26)	2.85
Pre-school magazine	30	–	1560 (26)	2.86
Magazine information	20	60	4160 (69.3)	7.62
Information/News	–	60	3120 (52)	5.71
Magazine Entertainment	60	–	3120 (52)	5.71
Quiz/Games	–	20	1040 (17.3)	1.90
Pop music	–	–	–	–
Religious	20	–	1040 (17.3)	1.90
Cultural/Traditional	–	–	–	–
Others	–	120*	6240 (104)	11.43
Total	130	920	54600 (909.9)	100

* Action packed drama.

Table IV gives comparable data for Malaysia which is a much wealthier country than India. Unlike India, Malaysia controls access of its citizens to foreign satellite broadcasts by requiring them to get a license to use a satellite dish. The data in this table are in respect of locally broadcast programmes in three Malaysian channels viz. RTM1, RTM2 and TV3. Here again there is a predominance of foreign material among children's programmes. Nearly 88 percent of all children's

programmes are of foreign origin. Controlling satellite access to its citizens alone is not enough to prevent the dominance of foreign programmes. Along side such a policy there should also be active encouragement of local programme producers to produce programmes for children. Market forces by themselves may not generate sufficient local television programmes for children.

How widespread in Asia are the characteristics of children's programmes we have described for India and Malaysia? Table V and Table VI give a summary of comparable statistics for seven Asian Countries. The statistics show a predominance of animation programmes followed by drama. Furthermore nearly 48 percent of all programmes for children are of foreign origin. The data also shows paucity of informational, cultural and preschool programmes among the total fare offered to children.

While these characteristics are common to many Asian countries there are also significant differences in policies regarding children's television in Asia. Some of these are described below.

In China[5] there are two kinds of programmes relating to children. One is programmes aimed directly at children. Such programmes include entertainment, education and news. The other type is programmes aimed at educating adults regarding their duties towards children. How familiar are the TV producers of the UN Convention on the Rights of the Child (UN-CRC)? Leading group of China Central Television (CCTV) in Beijing and particularly CCTV youth and Children's Department were aware of the UN Convention on the Rights of the Child. Contents of the Convention are consciously incorporated into TV programmes. Examples of such television programmes are those made for Children's Broadcast Day (December), International Children's Day (June) and programmes telecast on winter and summer vacations. Big Wind Mill and Tell It Like It Is are two television programmes that incorporated the principles of UN-CRC. Implementation of the UN-CRC provisions is often considered in combination with that of the National Programme of Action for Child Development in China.

In India[6] the total number of children's programmes in all channels is less than one percent. Most of these programmes are designed for upper class urban child. However these are not popular among this audience because of lack of entertainment. Not a single of the programmes recalled by the sample of children interviewed was made in India. When respondents from DDI were asked about

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5. Prof. Huang Chang Zhu, Deputy Director and Senior Research Fellow, Centre for Documentation and Information of the Chinese Academy of Social Sciences in Beijing was the lead reseracher for the study in China.

6. Ms. Lalita Eashwer of Kanoi Marketing Services, Madras, was the lead researcher for the study in India.

Table V: Availability of Children Programmes in 7 Asian Countries by Programme Type by Duration for One Year

Programme Type	Doordarshan India		India Satellite Channels		Malaysia		China		Nepal		Pakistan		Sri Lanka		Thailand	
	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)	Foreign (%)	Local (%)
Animation	4420 (7.17)	7800 (12.65)	3120 (2.98)	40560 (38.80)	–	20280 (37.14)	6760 (10.92)	14560 (23.52)	2080 (21.05)	–	–	7260 (15.38)	540 (2.13)	600 (23.02)	1040 (4.25)	–
Puppets	–	–	–	–	–	9360 (17.14)	–	–	–	–	–	–	900 (3.55)	38 (1.42)	–	–
Story Telling	–	4680 (7.59)	–	–	–	3120 (5.71)	2340 (3.78)	–	1560 (15.78)	–	–	–	4000 (15.81)	–	–	–
Drama/Serial	3120 (5.06)	3120 (5.06)	–	21840 (20.89)	–	1560 (2.85)	10920 (17.64)	–	–	–	10920 (23.07)	–	1140 (4.50)	1200 (4.14)	7800 (31.91)	–
Pre-school Magazine	1040 (1.69)	–	–	–	1560 (2.85)	–	–	–	–	–	1820 (3.84)	–	100 (0.39)	200 (7.00)	–	–
Magazine Information	3640 (5.90)	–	–	–	1040 (1.90)	3120 (5.71)	6240 (10.08)	–	1560 (15.78)	–	–	–	450 (1.77)	80 (3.16)	3120 (12.76)	–
Information/News	–	–	–	–	–	3120 (5.71)	–	–	–	–	–	–	–	–	–	–
Mag Entertainment	5720 (9.28)	–	–	–	3120 (5.71)	–	–	–	–	–	–	7280 (15.38)	300 (1.18)	200 (0.9)	3120 (12.76)	–
Quiz/Games	3120 (5.06)	–	7800 (7.46)	3120 (2.98)	–	1040 (1.90)	780 (1.26)	–	1580 (15.78)	–	10920 (23.07)	–	1500 (5.93)	–	3120 (12.76)	–
Pop-Music	–	–	1560 (1.49)	–	–	–	–	–	–	–	5460 (11.53)	–	1700 (6.72)	100 (0.19)	–	–
Religious	–	–	–	–	1040 (1.9)	–	–	–	–	–	3640 (7.69)	–	4000 (15.81)	–	4680 (19.14)	–
CUltural/Tradditional	1560 (2.53)	–	1560 (1.49)	–	–	–	1560 (2.52)	–	–	–	–	–	–	–	1560 (6.38)	
Others	23400 (37.97)	–	24960 (23.88)	–	–	6240 (11.42)	18720 (30.25)	–	3120 (31.57)	–	–	–	–	–	–	–
Total	46020 (74.66)	15600 (25.30)	39000 (37.71)	65520 (62.67)	6760 (12.36)	47840 (87.58)	47320 (76.47)	14560 (23.52)	9880 (11.20)	–	32760 (69.20)	14560 (30.76)	14630 (57.79)	10550 (42.2)	24440 (100)	–

Table VI: Telecast of Children's Programmes in 7 Asian Countries 1994/1995

Programme Type	Average Broadcast Time Per Year in Hours (%)		As Percentage of all Childrens Programmes
	Local	Foreign	
Animation	11312.66 (3.4)	82162.66 (25)	28.4
Puppets	900 (0.27)	9720 (2.95)	3.22
Story Telling	5599 (1.7)	7800 (2.37)	4.07
Drama	23162 (7)	27720 (8.43)	15.43
Pre-school magazine	4520 (1.38)	(2000 (0.60)	1.98
Magazine information	9914 (3.01)	3920 (1.2)	4.21
Information/News	–	3120 (0.95)	0.95
Magazine Entertainment	12260 (3.72)	7480 (2.27)	5.99
Quiz/Games	28033 (8.52)	4160 (1.26)	9.79
Pop music	8720 (2.66)	100 (0.03)	2.69
Religious	13360 (4.07)	0	4.07
Cultural/Traditional	4706 (1.42)	0	1.42
Others	51792 (15.75)	6240 (1.9)	17.65
Total	174278.66 (52.9)	154422.66 (46.97)	100

programme priorities none of them mentioned children's programmes. None of the networks has any specific policies to create awareness or to create programmes on children's rights. An obvious gap in children's television programming in India is the virtual absence of programmes specifically made for early teens.

In Indonesia[7] tight competition for advertising revenue has resulted in little attention being paid to children's programmes because such programmes are perceived as being less attractive to advertisers. The emergence of private television and lack of proper policies and guidelines about programming content has resulted in an uncontrolled and confused situation. In this situation it has become difficult to develop children's television. Of 15 programmes most preferred by children seven were programmes for adults. Station managers had little or no knowledge about UN Convention on the Rights of the Child.

In Japan[8] NHK, has taken a leading role in the production of children's programmes. Its productions are enjoyable and has educational value. Children's programmes are broadcast in three out of four NHK channels. A project called YUMEDIA uses a traveling caravan to bring hands on broadcast experience to grade school children. In contrast to NHK, which is a public broadcast organization, the commercial stations in Japan do not have separate children's

7. Mr. Bob Gantarto, Researcher at Indonesion Child Welfare Foundation in Jakarta, was the lead researcher for the study in Indonesia.

8. Ms. Sachiko Kodaira, Senior Researcher at NHK Broadcasting Culture Research Institute, Tokyo, was the lead researcher for the study in Japan.

programmes. Children's programmes are included in programmes for family viewing. In commercial TV stations animation and metamorphosis drama are the main kinds of children's programmes. All top rated children's programmes in Japan are produced in Japan. Producers in NHK are well aware of the UN Convention on the Rights of the Child. Publicity for children's rights are given through information and educational programmes.

In Malaysia[9] the government broadcasting station, RTM, is making a serious effort to produce children's television programmes. The commercial stations, TV3 and Metrovision, have not shown similar enthusiasm. This neglect is due to the perception that children's programmes do not have much appeal to the advertisers. RTM producers are quite aware of the UN Convention on Children's Rights. They have gained this knowledge through international conferences in which they had participated. Private broadcasters on the other hand are unaware or vaguely aware of UN-CRC.

In Nepal[10] severe financial constraints have hampered the production of children's television programmes. Children's programmes hold low priority due to the perceived lack of advertising/market support. This is made worse by lack of adequate training in the production of children's programmes and lack of creativity. Nepalese television producers have heard of the UN Convention on the Rights of the Child but are not familiar with its detailed provisions.

In Philippines[11] there has been an increase interest in children's television programmes in recent years. However this still remains a neglected area. Lack of profit in children's programmes is the main reason for its neglect. Furthermore many children's issues have become politicized. Sometimes the way television handle these issues are not in the best interests of the children. For instance child victims of sex and violence are made to relate gruesome details for the benefit of TV cameras. Several bills have been field in the Philippines Congress to improve television programming for children. These include the introduction of a rating system and regulating television advertising.

In Singapore[12] there has been some revival of children's television programmes after corporatization of television in 1994. Locally produced children's TV programmes target a wide age range: from 4 to 12 years. Children within this

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9. Prof. R. Karthigesu and Dr. Shanti Balraj of the School of Communication, University Sains Malayasia in Penang, were joint lead researchers for the study in Malaysia.

10. Ms. Josefina Dhungana of DECORE Consultancy Group in Katmandu was the lead researcher for the study in Nepal.

11. Dr. Theresa H. Stuart, Social Mobilization Officer in UNICEF, Manila was the lead researcher for the study in the Philippines.

12. Ms. Lin Ai Leen of the School of Communication Studies at Nanyang Technological University, Singapore, was the lead researcher for the study in Singapore.

age range have a wide variation of cognitive abilities. Television programmes targeting such a wide age range are generally ineffective in appealing to such a group. Television stations also broadcast a large number of programmes for pre-schoolers. Older children's needs are not sufficiently met. Consequently older children consume a large proportion of adult programmes. No special training has been provided for children's programme producers. The programmes reflect Singapore's political and cultural climate. Stress is on maintaining racial and religious harmony and political stability. The priority given to children's programmes are low. This is because of the belief among managers that the audience ratings of these programmes do not justify high expenditure. Only few producers were aware of the UN Convention on the Rights of the Child.

In Vietnam[13] every year the government sets targets for producing children's programmes. These programmes are directed at children or are aimed to educate adults regarding the needs of the children. Financial limitations are a major factor which inhibits production of children's television programmes. There are very few programmes catering to children over ten years of age. Producers are aware of the UN Convention on the Rights of the Child and related state policies.

Overall children's programmes produced in many Asian countries do not appeal to the children for whom they are meant. Consequently only a small percentage of what is made available are actually watched by children. According to Mira Aghi, (1996) Indian media researcher, around 75 percent of her sample of children mentioned programmes made for adults as the ones they liked. Crime, thrillers, comedies and family serials form the core of the programmes liked by her respondents. Sri Lankan researcher Dharmadasa (1994) observes that locally produced children's programmes are often not up to the level with regard to quality and content that most children demand. According to a survey carried out by Survey Research Malaysia (1994) of 100 most viewed programmes in Malaysian television by children between the ages 6-14, only three are children's programmes. These are all foreign productions. Their rank is given in brackets. Cyber Cop (39); Uetraman Trio (63); Alamria Disney (80).

Of the countries surveyed three have followed policies conducive to the development of television programmes for children. These are China, Vietnam and Japan. In China and Vietnam support received from the government was crucial. In Japan public broadcasting policy of NHK was behind the success of children's television. However in many other countries children's television programmes had to complete in the marketplace. In this it could not succeed. The advertisers and marketers saw little profit to be made form children's

13. Prof. Chung A, Director, Centre for Sociology at Ho Chi Minh National Political Academy was the lead researcher for the study in Vietnam.

television. AMIC survey shows clearly the need to develop children's television in many countries in Asia. It also shows that market forces will not do this. A concerted effort by concerned groups is needed to mobilize support for children's television in Asia. Resources of government, civil society, educational institutions and commercial organizations need to be mobilized. At the Asian Summit of Child Rights and the Media[14] AMIC proposed the creation of an Asian Children's Communication Fund for the production and marketing of quality children's programme for television, radio and press. We believe that this is a practical way of addressing issues concerning children and media in Asia.

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14. The Summit was held in Manila, Philippines, during 2-5 July 1996. It was the first Children's Summit organized for the print, broadcasting, film and advertising media. It was supported by Asian Broadcasting Union (ABU), Asian Media Information and Communication Centre (AMIC), Philippines Children's Television Foundation (PCTVF), United Nations Children's Fund (UNICEF) and the Government of the Philippines.

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VIRTUAL REALITY IN A CHILDREN'S HOSPITAL

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Abstract: We used virtual reality technology to improve the quality of life and amenity of in-patients in a children's hospital. Children in the hospital could enjoy a zoo, amusement park, and aquarium, in virtual. They played soccer, skiing and horse riding in virtual. They could communicate with persons who were out of the hospital and attend the school which they had gone to before entering hospital. They played music with children who had been admitted to other children's hospitals. By using this virtual technology, the quality of life of children who sufferd from psychological and physiological stress in the hospital greatly improved. It is not only useful for their QOL but also for the healing of illness. However, these methods are very rare. Our systemic in our children's hospital is the first to be reported in Japan both software and hardware of virtual reality technology to increase the QOL of sick children need further development.

In recent years, the forms of diseases have greatly altered due to the advances in diagnostic technology and therapeutic techniques, and the percentage of chronic diseases, so-called intractable diseases, has increased while that of acute diseases has decreased. Diseases called intractable usually require long-term treatment, because their etiologies have remained unclear, or because there are no established therapeutic regimens, even if the etiologies have been clarified. Children with intractable diseases have to stay in hospital for a long time for diagnosis and treatment, and their activities in daily life are markedly restricted. In other words, their quality of life (QOL) is greatly impaired. Needless to say, diagnosis and treatment should have priority, but it is also important for treatment that the associated mental and physical stresses are reduced as much as possible, and that the QOL is maintained.

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7. Children's Media Committee (CMH), Japan.

1. Impairment of QOL by Hospitalization

(1) Communication Deficiency

Children are isolated from families and friends and also from society when they have to stay in a hospital over a long period of time for examination or treatment, resulting in marked scarcity of communication with out-of-hospital people and collection of information. Communication and information collection are essential nutrients to life and are also very important for the mental and social development of children. Telephones installed in a hospital and interviews with a few people are usually the only means of communication with the outside. Lack of information and communication results in the impairment of patients' QOL.

(2) Deficiencies in Exercise

Moving of the body is not only good for the body itself, but also for the elimination of mental stress. However, hospitalized children are deficient in exercise, because they live in a closed space, such as a bed, ward, or hospital. Hospitals are places where available space for exercise is limited, and such space is a poor environment for exercise, giving the children no encouragement.

(3) Deficiencies in Education and Learning

Since humans have the instinct of learning, mental stress is imposed on children when they are isolated from the learning environment, as they are in a hospital. Learning and education are essential, particularly to children, who spend most of their time studying and learning. However, there are only limited facilities and opportunities for learning within a hospital. Thus children gradually lose their will to study and also then creativity when they stay in hospital for a long period.

(4) Insufficient Opportunities for Actual Experience

Long-term hospitalization takes away from pediatric patients the opportunity to have common experiences that healthy children routinely have, such as walking in a town, travelling by train, or going to a zoo, amusement park, or concert. Since children develop mentally and acquire social roles through various experiences, such deficiencies not only impose mental stress on the children, but may also induce unbalanced development.

(5) Deficiencies in Pleasure

The inside of a hospital is a place with a marked scarcity of entertainment. Hospitals have very few facilities for entertaining or relaxing patients, which at most consist only of televisions or a videocorder (Fig. 1).

In addition to these environmental factors, children often have to undergo invasive tests or treatment during hospitalization, because current medicine often requires large-scale intervention, which is often painful and agonizing. Thus children have mental stress and fear such examination and treatment as well as side-effects, which impair their QOL.

Fig. 1: 15-year-old boy with muscle dystrophy who has lain in bed for a long time. There are only a TV set and tapecorder around his bed for his amenity. His quality of life in hospital is poor.

2. Application of VR Technology to the Improvement of Children's QOL

Although various attempts have been made to improve inpatients' QOL, they cannot always provide a satisfactory outcome. Communication technology has recently advanced tremendously, giving simultaneous mutual communication with many distant places, which virtual reality technology produces a feeling of reality, a high vision technology provides very clear images. Thus these technologies are thought to be suitable for children who need communication, experience, exercise, learning, and pleasure within a hospital. At our National Children's Hospital, we have attempted to improve children's QOL using such latest VR technology since 1993. We herein report our attempts, together with the future potential of VR.

Many of the attempts described below were conducted by the Children's Media Study Group.

(1) "Let's Go to a Zoo!"

A system, called "Let's go to a zoo!", by which one can freely walk in a zoo by means of 3-dimensional images, was installed in 1993 at the National Children's Hospital. This system was the first VR-related technology used in a hospital in Japan, offering a chance of improvement of patients' QOL by VR

technology applied to medical practice (Fig. 2). Since this system provided stereoscopic images and gave every child a free walk at will through a zoo, different from videotapes, the children had a real feeling that differed from the one-way presentation of a hour through a zoo on a conventional videotape. This system provided children with pleasures and experiences which they could not have in a hospital. After that, different version, such as "Let's go to a park", in which children could walk in a park, ride a roller coaster, and so on, were prepared. Children rather preferred scenes that healthy children see in everyday lives to exciting stories, such as wars, racing cars and complicated games. This was because hospitalized children are deficient in the activities of everyday life.

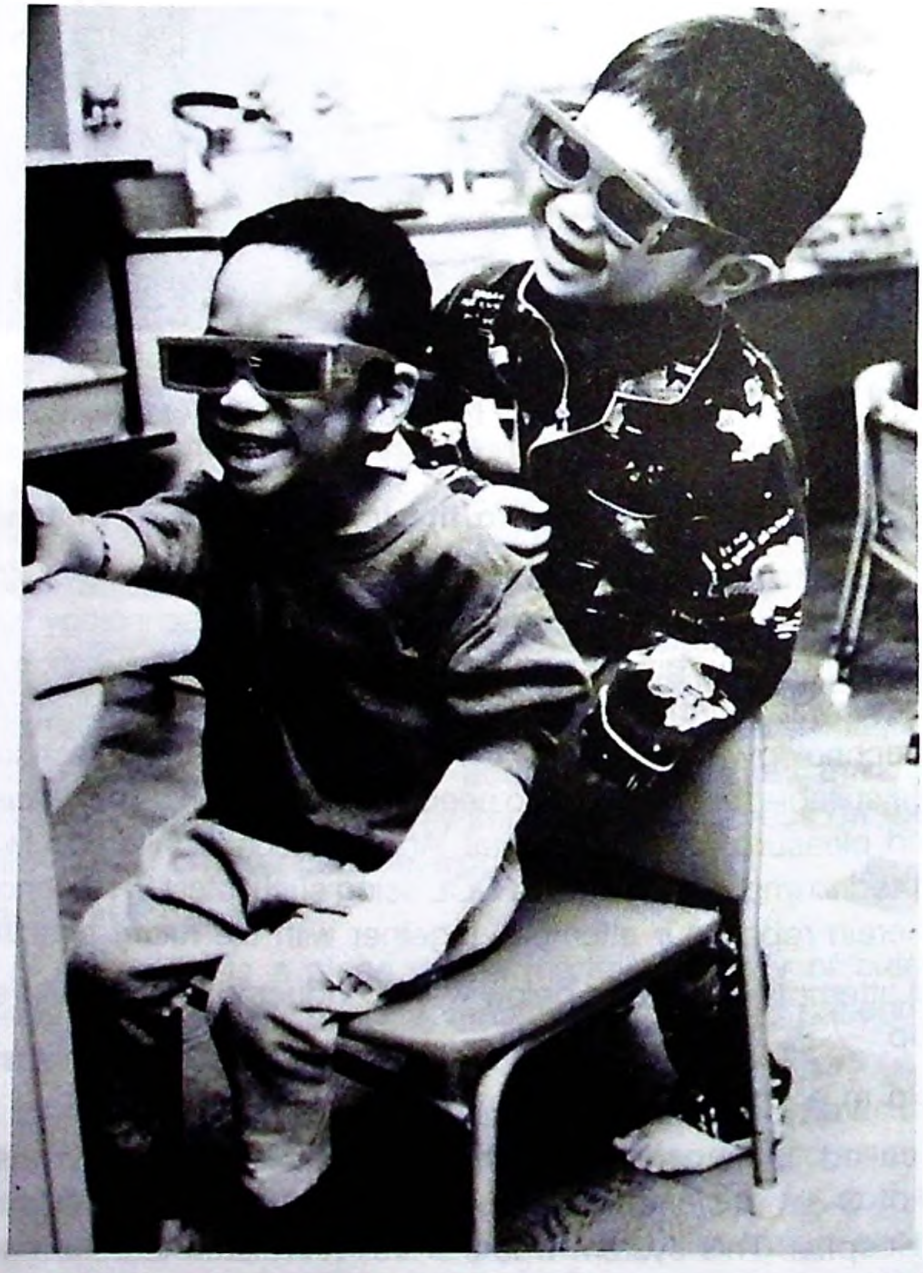

Fig. 2: Children play and enjoy a virtual zoo, called "Let's go to a Zoo!".

(2) VR Aquarium

Clear images on a large screen can give a real feeling, although they are not stereoscopic or bidirectional. A high-vision aquarium on a large screen which we attempted simply provided images of tropical fishes swimming freely, but greatly relaxed patients. This program was preferred to many other VR programs. Although it is ideal that a real aquarium should be built up in a hospital, this is difficult because of questions of economy and safety. This VR aquarium had such a role. Many hospitalized patients are in a physically and mentally negative condition, and they often prefer just watching images to doing something. We also attempted to give natural sights, such as mountains and rivers, as well as sights in a town. These images were also found to be effective.

(3) VR Skiing

We installed a VR skiing system in our hospital. Each child, who actually wore skiing shoes and held stocks, skied on a slope projected on a large screen while balancing with the legs and changing direction. This system gained the greatest reputation during the testing period, and many children used it (Fig. 3). Children who were thought to be unable to go to a skiing ground and those who could not go out of the hospital due to ongoing treatment for such conditions as leukemia could enjoy virtual skiing. This system also provided useful experience and was a form of rehabilitation. Although it was a large-scale system, it definitely merited installation in a hospital.

Fig. 3: 10-year-old boy with leukemia plays virtual skiing.

Other than this system, a VR horse riding system was also prepared for the same purpose. Although horse riding is considered to be effective as physical and mental rehabilitation because movements to keep a 3-dimensional body in balance, and certain up-and-down rhythms, stimulate the brain and body, it is impossible to bring a real horse into a hospital. VR horse riding, however, can serve as useful rehabilitation. A virtual driving system with 3-dimensional high-vision images is useful for children who have lain in bed (Fig. 4).

Fig. 4: 15-year-old boy with muscle dystrophy enjoys a virtual driving system with 3-dimensional high vision image.

Such VR sporting systems effectively provide patients with exercise, experience, and pleasure, and are expected to be further developed.

(4) VR Interviews

Isolation from out-of-hospital communication is a serious problem. Interviews made at the present time within wards cannot be said to be sufficient because of many limitations, such as the number of people attending an interview and restrictions of space and time. Through interviews on images, it is possible to see people who cannot come to the hospital frequently due to time restriction or long distance. When we arranged VR interviews between children in wards and their relatives or friends in distant places through images, they were found

to be of sufficient significance as interviews (Fig. 5). In another case, we made an attempt to improve the QOL of both a mother with leukemia and her child with muscular dystrophy under the aid of artificial ventilation, who stayed in different hospitals far from each other, by connecting their bedsides with images to see and communicate with each other at any time they wanted (Fig. 6).

Fig. 5: Children in hospital communicate with their families through a large screen.

Fig. 6: Boy with muscle dystrophy communicates with his mother who entered other hospital for treatment of leukemia.

Further, we also arranged communication between patients in children's hospitals distant from each other through a concert, a Christmas party, dancing, and playing ping-pong by connecting our hospital to others using a communication channel.

(5) VR Classes

Although opportunities to learn and study are impaired in a hospital, it is possible to have classes through pictures. We attempted to let children have classes in a distant hospital school or through VR with their classmates in the school which the children had attended until hospitalization. Because education is essential to children's lives, it is ideal to have classes while staying in hospital.

(6) VR Soccer

VR soccer was not performed in the hospital, but on the shores of Yamanaka Lake, to which we brought children with intractable diseases for a summer camp. Children played soccer (PK game) as follows: while the campground was connected with a soccer ground in Yokohama through a satellite telecommunications system, the strength and direction of a soccer ball kicked by a child in the Yamanaka Lake campground near Mt. Fuji were sensed, and the ball was transported into the Yokohama soccer ground through images and caught by a keeper.

As our next plan, we are attempting to hold a VR World Cup through VR soccer games between children hospitalized in Japan and in other countries.

The main VR systems that we attempted to use during the 4-year period have been shown. These systems were thought to be effective for the release of hospitalized children from mental and physical stress, even to a small extent.

VR technology should be used to break the wall of a closed space, a hospital, and to make everyday lives of hospitalized children as close as possible to those of healthy children. Thus both software and hardware should be further studied and developed.

3. Future Development

(1) VR as Rehabilitation

Rehabilitation can be achieved by the use of VR by patients. When used for rehabilitation, there are physical and mental approaches. For physical rehabilitation, training can be performed in a pleasant virtual space, although it is normally done in a rehabilitation room at the present time. Programs such as VR golf and VR horse riding are also thought to be useful for rehabilitation. These programs are expected to be prepared in the future.

We developed a VR miniature garden therapy and applied it to clinical cases. Many others plans have been made to apply VR technology to the rehabilitation of claustrophobia, anthrophobia, etc. We expect to see the establishment of these programs.

(2) Application to Informed Consent

Many patients cannot form images of their post-treatment state of future pathological condition although doctors explain them as precisely as possible. If such patients have previously experienced their future states through VR, they can have realistic images, facilitating their understanding. Moreover, if patients are experienced in VR conditions close to the advanced states of their diseases, they can mentally prepare themselves for such conditions and will not be in a panic when they read this state.

(3) Support of Parents' Groups

Parents having children with intractable diseases desire to collect accurate medical information, to exchange information with other parents, and to receive medical care for their children from specialized doctors. Because of this, such parents have organized parents' circles as well as patients' circles, and the parents and patients have meetings to exchange information and receive treatment. We are now planning to provide communication between parents, medical consultations with doctors, medical information, and lectures by doctors in VR space.

(4) Application to the Nursing of the Elderly

Although our attempts have been made for children, mainly in our children's hospital, they can also be applied to the nursing of the elderly if viewed from different points. Problems for the elderly include deficiencies in experience, communication, exercises, learning, and pleasure which are generally considered as problems for hospitalized patients. With aging, people have less chance to have such opportunities and are also given less opportunities from those around them, and these deficiencies further aggravate aging. Development of VR systems for the elderly is thought to be useful for the nursing them and making them more active.

4. Current Difficulties in the Use of VR in Hospitals

(1) Difficulty in Development of Software

The current tendency of VR software development is directed to the development of software used in so-called game centers; namely, more exciting or game-playing VR software, but not such as in suitable for hospitals, patients, or the elderly. This is probably because programmers cannot understand the needs of hospitals or patients, and software for minorities has low economic value due to small market demand. Moreover, it is not clearly understood what physical and mental side-effects VR has no humans, resulting in limitations or its use in hospitals. We strongly hope that both software and hardware suitable for patients and the elderly will be developed to improve their amenity.

(2) People Who Can Understand Both Children and VR

Needless to say, human-to-human heartfelt communication is most important to maintain the amenity of patients and the elderly, and VR is a mere tool to help such communication. When VR is used in such cases, it rarely serves as useful tool if VR devices are just installed. They need the intervention of people who link the devices with humans, and such people have important roles. The reason for this deficiency is that no instructors have been allocated for VR. Because children staying in a hospital for a long time and aged persons requiring aids usually do not actively challenge themselves with new tools, VR cannot exert its effects if no instructors to guide children or the elderly are present. At the present time, it is difficult to recruit persons who can understand both children and VR technology.

(3) Economic Difficulty

Current medical expenditure is paid from health insurance only for examination and treatment, but not for mental care or improvement of patients' amenity. Further, equipment and human resources needed for the improvement of patients' amenity are often sacrificed to increase profits from medical care. Therefore we have no available budget to purchase such devices or to hire persons to operate such devices at the present time. We must clear away many such difficulties before VR technology can be routinely used in the hospital.

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VIRTUAL REALITY – CURRENT MULTIMEDIA – THE WORLD OF VIRTUAL REALITY FOR CHILDREN

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1. Introduction

About fifty years have passed since computers were first developed. If asked to name the most outstanding characteristic of this machine, it is the speed at which computers have developed which seems the most prominent. Recently, computer capacity has doubled each year. A simple calculation shows that over a period of ten years a thousand-fold increase in capacity will be produced, a figure almost beyond comprehension. Fig. 1 indicates the decrease in price of LSI memory per bit. Cost reduction in LSI memory by about several hundred times has occurred in one decade.

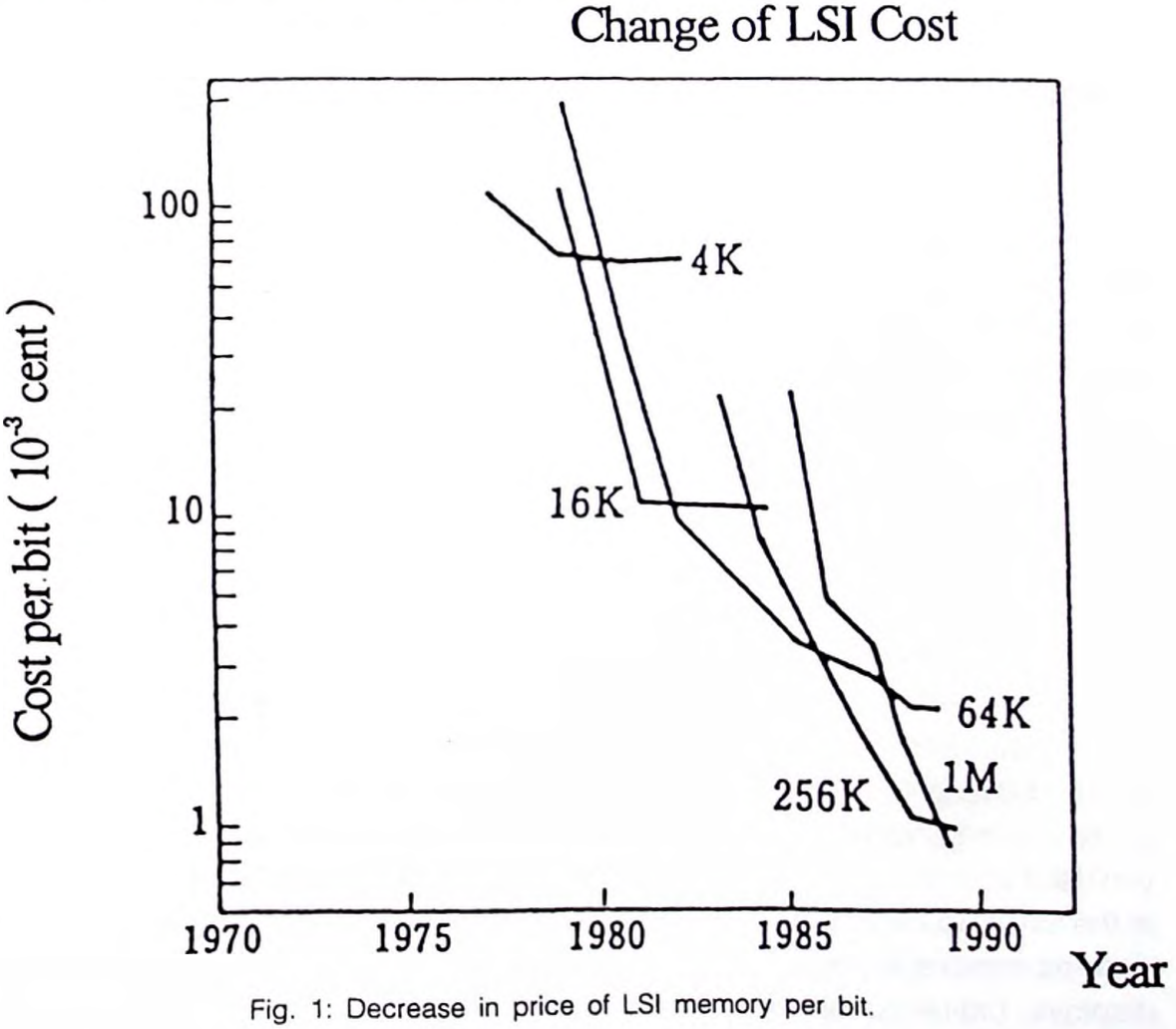

Fig. 1: Decrease in price of LSI memory per bit.

2. Progress of Computer Technology; From Kilo to Giga

The early eighties are considered to be the dawn of the personal computer age in Japan. At that time, the memory capacity of a computer was several kilobytes, and the data transmission speed was several kilo bps (bit/s); we can say the computers were in the "kilo era". In 1990, workstations made their appearance in laboratories and offices. The memory capacity of workstations is several megabytes, and network technology such as its ethernet whose transmission speed reaches several Mbps has become popular. Thus, computer capacity has become "mega" in scale and improved by more than one thousand times compared to its "kilo" capacity computers of the 1990s. Thus, as of 1998, we have entered the "mega era".

It is claimed that the "giga" unit will appear in the early 21st century; thus, the "giga era" is close at hand. This astounding quantitative expansion in capacity is bound to result in qualitative changes as well. The information that can be processed by one kilobyte almost equals one page of a Japanese writing pad (400 Japanese characters). One Japanese character equals 2 bytes so that 400 characters are equal to 800 bytes, which is 0.8 Kbytes. On the other hand, handling a photograph requires almost one megabyte. One-byte pixels are arranged as 1000 x 1000 meshes, which is 1 Mbyte. Furthermore, even higher gigabyte capacity will be required for processing moving images.

In the transition from the "kilo era" to the "giga era", we should note that the type of information processed by computers has changed remarkably. In the "kilo era", computers were capable of processing only text and numbers because of insufficient capacity. Backed by highly advanced technology, this recent expansion of multimedia diversifies data processing potential, ranging from moving images to letters in an interactive format.

3. Virtual Reality Technology and Simulated Experience

Among multimedia technologies, virtual reality technology is at the leading edge (Fig. 2), although this technology is relatively new and was introduced only in 1989. People are now able to perform various activities in a "virtual" space created by a computer, enabling them to broaden the world through direct experience. Glasses similar to ski goggles, which the woman is wearing the figure, are known as HMD (Head Mounted Display), and are used so that a person can observe a computer-generated 3D world. A pair of black gloves, called "data gloves", is a device used for grasping, throwing and handling virtual objects which appear in the virtual 3D world. In addition to these, various interesting interface devices such as immersive projection displays, force displays, 3D sound displays, tactile displays, bidirectional treadmills and a 3D mouse have now been developed.

Fig. 2: Virtual reality technology.

Fig. 3 shows an example of an immersive projection display. This system is known as "CABIN" (Computer-Augmented Booth for Image Navigation) and is installed at the University of Tokyo as one of the world's largest virtual reality systems, enabling us to experience various simulated world. Fig. 4 shows an example of a simulated world; the world of Einstein's theory of relativity. Various phenomena predicted by this theory such as space distortion, or color shift by this Doppler effect of light, can be simulated by a computer. By using this virtual environment, even children can experience the world of scientific theory, which can be difficult even for science students to understand.

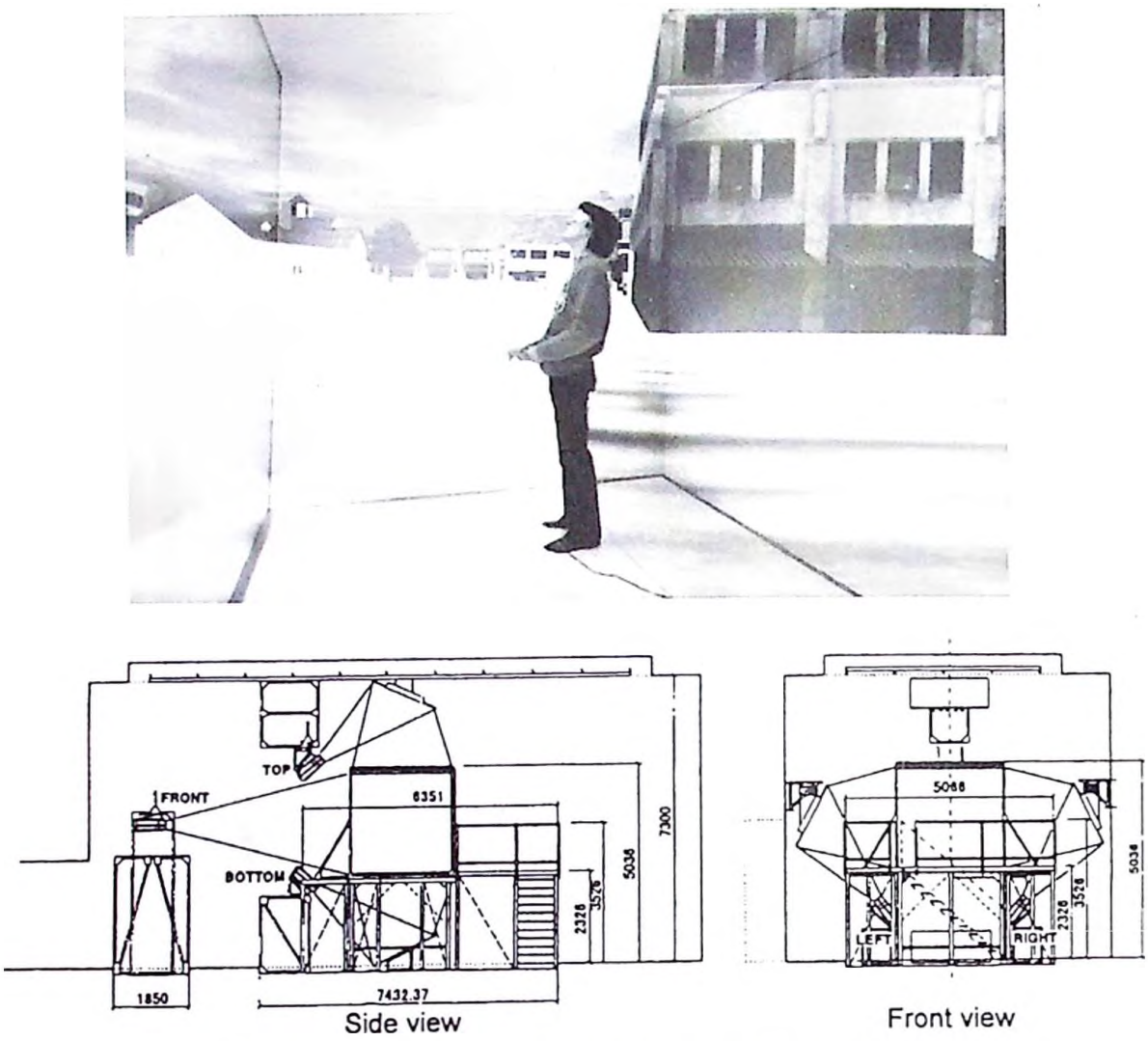

Fig. 3: An example of immersive projection display.

Fig. 4: An example of simulated world.

I do not believe that virtual reality technology will immediately mode a complete change in fundamental science education. However, there is no doubt that the technology provides an additional, attractive potential tool for teaching our children. In the past, only written logical knowledge could be transmitted systematically and efficiently by characters or script. Today we are fortunate to be able to introduce a new world to children by providing them with "experiences." Reality becomes meaningful when children incorporate their experiences into their frame of reference, by the process of watching and touching. The invention of microscopes and telescopes quickly led to the enhancement of scientific knowledge. Likewise, virtual reality technology will have a great influence on intellectual activity Fig. 5 shows the microscopic world of carbon atoms and oxygen molecules. Supercomputers can simulate such small-scale phenomena. Through this kind of experience, we, including children, should be able to understand scientific theory in greater depth.

Fig. 5: Microscopic world of carbon atoms and oxygen molecules.

4. New Image of Computers; Body Motion

One feature of virtual reality technology is that computers used in this technology have a rather different shape from conventional computers. Present-day computers are not necessarily only associated with a CRT display and a

keyboard, a stereotype presented in the past. The image of computers has changed drastically; virtual reality technology demonstrates this change.

Nowadays there are computers which can be interactively operated, using body motion with this assistance of a "motion capture" device. This system is one of the successors to the data glove, in that body motion can be directly transferred into computers by using this device; thus we have a channel which does not use symbolic information such as alphabets or numbers. This channel will result in a completely different concept of human-computer "interaction". Conversational metaphor will be inadequate to describe this type of interaction.

Using the "haptic display" shown in Fig. 6, one can touch a simulated image and fell its weight and movement[2]. Haptics is an interactive sense closely related to body motion. Touch sensation occurs only when body motion occurs. Current mobile computers or wearable computers are closely related to the mobility of human beings (Fig. 7). Many have raised the issue that computers deprive the individual of mobility. However, this preconception is rather old-fashioned, based on a imperfect image of computers. As for this future educational use it is obvious that children's contact with computers will no longer be limited to static classroom computers, but will also facilitate children's "real" experiences outside the classroom, proving to be an extremely powerful medium for providing then with various new experiences.

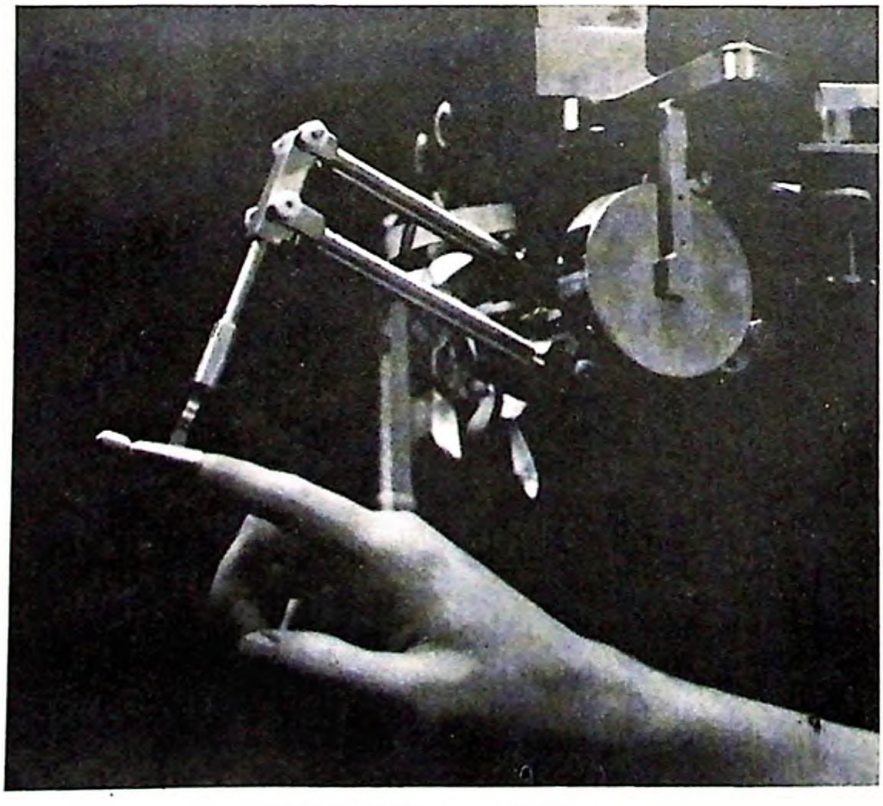

Fig. 6: Haptic display.

Fig. 7: Current mobile computers.

5. Summary

Some people go as far as to say that the invention of virtual technology is comparable to Columbus' discovery of the American continent. Nowadays, computers are regarded as essential tools for children to explore their new world. It will be interesting to observe and guide the growth of these children who have entered into such a world filled with many possibilities.

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DIGITAL KIDS OF THE HEISEI ERA: EXPERIMENT AT TOYONAKA BUNKA KINDERGARTEN

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Abstract: I wonder what most people think when they hear of small children playing on computers in kindergarten.

One can almost hear the responses: "Why should kindergarten children have to use computers?" Small children are using computers? It's much too early!" "At kindergarten children should be singing, playing games, and making mud pies!" A computer is the epitome of the artificial. If we really make a mess of things, humans will become slaves to computers. What can they be thinking, putting such things in kindergartens as a child's toy?

Many people who think in this way have never touched a computer, and it often seems the case that these "emotional opponents" are opposed to them only because of their own preconceptions. There is still a preconception that" a computer = a square machine like a TV with lots of difficult-looking keys". Computers are now in virtually all of the electronic appliances we use every day, refrigerators, washing machines, vacuums and televisions, and we think nothing of it. We live each day using computers, but only the "square" computer invites such contempt. Why is this the case?

On the other side, there are the "proactive endorsers", who think "Computers have spread thus far in society and schools, so we must let children become familiar with them from a very young age!" These people often seem to want to teach everyone everything. There is much to know about the image and use of computers. They seem to think that if adults don't teach them, children won't understand anything. On this point, they are at the same level as the "emotional opponents", in that they conceive of computers as being something out of the ordinary.

No one knows how the future will have unfolded for the digital kids of this era kids who freely operate computers when they come of age. Should we adults, then, with our narrow sense of the image and use of computers, and our meager experience, really be allowed to instill in them our one-sided views?

Among this same "endorser" group, there is the softened opinion of the "skeptical endorsers" which goes something like this: "Computers have only come into our lives in the last ten years or so at most, so there is no way we can tell yet if they are good or not". Thus, their opinion is that we should at least give them a try, Or else: "If they are bad, stop; if they are useful, keep using them". They would be happy if computers in kindergartens like the Freibel toys or the monolith that leads humanity in the movie 2001: A Space Odyssey. Set off by computers, children have their own adventures and expressions of pleasure, and share this information among themselves. Adults would do better simply sitting back and watching over them with the smile of affectionate parents.

At two years old, a child can play on a Macintosh, in kindergarten draw computer graphics, and then, in grade school, exchange electronic mail with friends from

around the world. For children born in the Heisei era (born in or after 1989), having computers in their environment is perfectly natural. It is only to be expected, then, that there will be a difference in the way people interact with people as well as this difference between those who first touched computers in adulthood and those who used them almost since the time they were born.

The practical research we have done so far was conducted from the position of a "skeptical endorser". For this presentation, I would like to report on this research focusing on the items below.

- Digital turtle (turtle graphics) and children.
- Digital drawing and children.
- Interactive picture books and children.
- Kindergartens and the Internet.
- Mothers' networks.

1. What is the Computer
   A. Image
      a) Mechanical, Cold, Individualistic
      b) In the realm of education
      c) Preconception, Preconceived stereotypes
   B. Background
      a) Nature and Artificial
      b) Papert
         (1) Mindstorms
         (2) LOGO (Computer term)
      c) Freibel toys
      d) Skeptical endorser
2. Computer use in the realm of pre-school education
   A. Computer as a toy
      a) Search and Expression
         (1) Digital turtle (Turtle graphics) and children
         (2) Digital drawing and children
         (3) Interactive picture books and children
   B. Computer as a tool
      a) Information sharing
         (1) Kindergartens and the internet
         (2) Mothers' networks
3. Themes for early childhood

A. Perceptions
B. Basic data
C. Environment

a) Interface
D. Individual notions of child rearing, education and values
a) However good the tool is...
b) Negative effect "real contact" with computers
(1) Affluent information = is it good?
c) Moral issues surrounding internet use

4. Prospect in the realm of children's education
A. Children's education is in idealistic environment?
B. "Skeptical endorser" of computers

Digital Kids

Contrary to what you might think, the expression "Diji-kame" does not refer to the digital cameras that have become so popular recently. Rather, it means "cyber-turtle", from the English word "digital" and the Japanese word kame, which means turtle.

The turtle is controlled with the programming language Logo. Unlike difficult, arcane languages, languages like BASIC and C, Logo developed for use by children. One of Logo's functions is Turtle Graphics. Its name suggests, the program uses a turtle to draw pictures. In the original version the turtle was a robot controlled by the computer, but in the version used today it is a pointer that the user moves across a screen. A pen is attached to the turtle, so, as it moves around it draws a line, just as if it were a snail leaving a trail behind it. At first, the turtle can follow only a few simple commands. If, for example, the user tells the turtle FORWARD 20 (move forward 20 pixels) and RIGHT 90 (turn right 90 degrees), it draws a line as it completes these commands. Although it is unable to instantly execute a complex series of moves like, "Move slightly forward, turn right, go forward again, turn left at such-and-such a corner", by putting the commands it already knows into a loop and naming it, the user can teach it new ones.

Teaching the computer new commands is programming. For example, by repeating the commands LEFT and RIGHT several times and giving the procedure a name such as TRIANGLE or SQUARE, the computer can be made to learn new command for drawing these shapes. Then, by combining these new commands, the user can teach the computer yet another new command, like combining TRIANGLE and SQUARE to make HOUSE.

How can children use the Diji-kame to play and learn? What is it like for children to have the experience of teaching, instead of being taught? Here is one case. A child starts off pressing keys randomly, which makes the turtle move randomly, resulting in a scribble. However, if a triangle or a square appears

somewhere in that scribble, she starts wanting to complete the task of drawing a triangle or a square on her own. This task is not something that is imposed upon the child by another person, and thus she does not see it as an unpleasant chore. It is at this point that she begins to want to figure out how to move the turtle to draw what she wishes.

The process works this way: The child writes a program, implements it, makes mistakes, corrects these mistakes, rewrites the program, implements it again, finds new mistakes, corrects these. Finally he is successful, he has a sense of accomplishment, becomes motivated, and seeks the next challenge all by himself. The focus is not on the result, but on the process itself. It is one of building up and breaking down, breaking down and building up again. Children's experience of programming is similar to that of playing with building blocks.

The Diji-kame has another interesting feature: it offers children the chance to examine their own thought processes. There are many ways to approach the problem of drawing a square. What sort of thoughts a child has, what sort of mistakes she makes, how she changes her way of thinking-all this becomes instantly clear. It is as if she can see inside her own head.

Logo is like an updated version of building blocks. How about taking another look inside your own head? Having the workings of one's own mind exposed can prove to be more embarrassing than nakedness.

Digital Pictures

When you hear that children are using a computer graphics program in kindergarten, do you think, "What? That early?" Many technophobic people suppose that "computer graphics" means that the computer itself does the drawing. But this is not the case. Thinking of a computer drawing its own pictures might make on imagine it wears a beret, smoking a pipe as it ruminates over where to make the next brushstroke... At the moment, though, the computer is nothing more than a tool, a device that allows human beings to create pictures. It is like brushes, paints, and canvas. The one who makes the picture is the human being who uses the tool.

How do computer graphics images differ from conventional pictures? The biggest difference is that a digital image is easily redrawn and easily edited. For example, one can change the color in one part of a computer graphics picture and then see how its overall balance is affected; or select an area, cut it, and paste it in somewhere else. How easy is it do this in a picture done in paint or crayon? Furthermore, even an adult would be daunted by the task of making one hundred or even two hundred squares, each colored differently. For a child, it would be

impossible. But this kind of thing can be accomplished in seconds when one uses a computer graphics program.

There was an exhibition of art created by children using computer graphics. An artist who specializes in oil paints looked at the children's work and said, "Did children really do these? You could show them at Nitten (Japan National Art Exhibition) and no one would know they were not done by adults. How extraordinary these young people are".

Computer graphics allows people to express things that they have always felt, but have been unable to do so because they lacked the right skills. This is a tremendous thing. And this potential is not limited just to children, but adults, older people, and the disabled can use it to express themselves as well. This the real advantage of this new tool.

Of course, computer graphics has a down side as well. It raises many tough questions, one of which is that of originality. "Digital" may mean "ease of editing", but it also means "ease of copying". We sometimes see the following sort of thing happening with children drawing pictures: The child starts by opening a file containing his friend's picture; He makes some slight change to it, and then saves it as his own. Children make copies with no awareness of the fact that they are copying. Whose work is it really, in such cases? Originality is a major issue among adults, too. To what extent should copying another's work be permitted? What becomes of copyright? In a age where questions of human rights extend even to genes, the problem of originality will grow bigger as our society becomes more and more digital. No doubt computers will revolutionize our way of thinking about the question.

As one child said, while gazing at a screen, moving mouse around on his desktop to draw a picture, "This is a magical desk". For him, the computer did not exist. How about putting aside your old notions and assumptions, and try making a digital drawing of your own? You may discover a new aspect of yourself, and don a digital artist's beret.

Interactive Pop-up "Books"

The phrase "outdoor activities by computer" no doubt makes many people wonder how things as diametrically opposed as analog and digital could be reconciled. But they can. One example is an interactive picture. When the user clicks on "hotspots" on the interactive picture, other elements such as pictures or information can be made to appear. Children can play and learn by searching through these pictures.

We have made interactive picture programs like this together with children. First, the children used a digital camera to take pictures of the landscape from several

vantage points along a familiar hiking trail, then transferred them into the computer. A digital camera is different from a conventional one in that it stores images in a digital format. For this reason, the image can be processed and edited easily by the computer. There is no need to load the camera with film or have the pictures developed.

We then linked together the images of the landscape, and created a program that enabled the user to have the experience of walking along the hiking trail. While this program was not quite 3D virtual reality, it allowed the user to point to the places on the screen that he or she wished to visit, move forward, backward, left and right-a kind of cybernetic picture-show. Then the children took pictures of animals and plants they had discovered during their hike, and transferred those into the computer as well. These new data were hidden on the screen in places analogous to the real places where the children had made their discoveries. When the user clicked on a hiding-place, the image would jump out, just as it would in a pop-up storybook. For example, if the user clicked on a clump of grass, the image of a grasshopper appeared, and when the user clicked on a tree-stump, mushrooms appeared.

It has become normal for children to play with interactive story "books" in nursery school. What sort of reaction do children who have had a real experience outdoors have to playing with interactive picture programs? Not only do most children enjoy searching through the images of the things they discovered themselves, but they are strongly interested in the pictures of their friends' discoveries. Some children have taken particular kinds of images and used them to make a game. One such example was a game that made use of pictures of animal droppings. The children called it "Poo Hunt".

Children who return to the hiking trail after having played with this interactive software often say things like, "There was a... here in our computer program!" "A... came out of there in the program, I'll bet there's something in there now!" The experience of using the interactive picture program stimulates the children's interest in animals and desire for discovery. A virtual experience inspires them to have the actual experience, and the actual experience makes them want to have a virtual experience. Virtual and actual experience form a cycle: the one leads children to seek out more of the other.

The number of digital images that children collect on hiking trips is increasing. Every time the children go on another journey of exploration the number grows, and we are steadily developing a fine collection. As this collection continues to get larger, in five or ten years it could well turn into a global database for education on nature and the environment. In the future it will be possible to add motion and sound to these still pictures and turn them into interactive multimedia.

Why not take your children hiking? Collecting insects with a digital camera is lots of fun.

Internet in the Kindergarten? Tools for Communication.

Until a few years ago, the internet was mainly text-oriented. But we have now entered the era of multimedia. Web pages complete with images and sound are coming out thick and fast. Even children who are too young to read can visit and enjoy these web pages. Just like the cartoon character Doraemon's "Door to Anywhere", the internet allows children to instantly visit museums and zoos all over the world from their own kindergartens or homes.

Being able to get information without knowing how to read is being able to communicate without words, using drawings or photographs, being able to send out messages that express one's own thoughts and ideas. Computer graphics and a digital camera make this easy. Up until now, communication in the nursery school classroom has mainly taken the form of newsletters children make for their teachers by hand. Very rarely, they may find their way into newspapers or magazines, or onto television. But the Internet allows children to share their thoughts with the world on an everyday basis. Their messages can be viewed again and again by other children and by grown-ups, by parents, grandparents, people in the neighborhood and around the world. Adults who do not know much about children may see these messages and revise their opinions, realizing how amazing and wonderful children are. People overseas who imagine that Japanese still wear kimono, carry swords, and shave their heads like samurai might also learn a thing or two.

We now help children design web-pages for their kindergartens. We held a live sports meet on the internet in Autumn 1997. In the future, we will enable parents to watch their children playing in kindergarten from the workplace computer, and Net nursery school visits are also being planned. Much still needs to be done, but we plan to keep making innovations. Please keep coming back to visit us at www.e-kids.org.

Today's children are without question Heisei Kids. (Note: Heisei refers to the reign of the present emperor, which began in 1989. The previous era was called Showa, 1927-1988). Not long ago, people used to talk about the changes that would take place "ten years from now" or "fifty years from now". But in the Heisei Era, we cannot foresee the changes that will take place in the next decade. Our way of thinking could well shift 180 degrees in a matter of a few years. These days, Showa Grown-ups have a difficult task ahead of them, thinking of the best way to educate Heisei Kids in a way of thinking that has existed for only a few short years.

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INTRODUCTION OF "SHİNKENZEMİ 84 NET" PROJECT

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This paper reports on the communication of junior high school students in a digital network community. As a part of Shinkenzemi's projects, an experiment with 7th graders was held in order to study their points of view on the media and the possibility of values offered through the network. (* 84 Net refers to the network of middle school students born in 1984.)

Shinkenzemi and the Media

Shinkenzemi is a correspondence education program for self study at home intended for children aged up to 18 and has 3,900,000 students at present. In the basic system, teaching materials such as lesson texts and exercise work sheets are delivered every month. The children study, using the texts, and hand in the exercises to be corrected. "Akapen (red pen) teachers" carefully correct each paper, pointing out mistakes and weaknesses and praising good work, before sending them back.

With the aim of improving children's grades, Shinkenzemi started as a home study program with reference books and exercise work sheets personally corrected by Akapen teachers. Over time, in answering the children's needs, its services have been expanded to support all areas of life. It offers information not only on studies but on extracurricular activities to help students enjoy school to the full, and to decide which school to attend in the future.

When Shinkenzemi had only educational materials, it was unable to enter the children's lives and communication. By including topics such as fads, sports, club activites, love and music in magazine-like media, communication was stimulated and friendship arose between members.

Also, in respect of studies, there are many areas where visual images with movement are much more efffective than long explanations with texts to enhance understanding, for example in explaining electric current and showing three-dimensional figures.

In the same way, in order to meet children's needs in studies and life, Shinkenzemi has continued to improve problem-solving by offering more values through the application of new media. These developments have led to an increase of members and expansion of services.

Changes in the Environment of Children

In order to further expand the values which are being provided, changes in the environment of children and their consciousness were studied. The uniform standards that were indispensable during the period of high economic growth have already collapsed, and children now intuitively understand that getting into a good school with good grades does not necessarily lead to happiness. Also, Japan's drive to achieve economic growth and catch up with the West, and the educational system producing a homogenous work force, can be considered to have had a destructive influence on local communities. Children no longer have the means to express themselves other than the "self at school" which is most appreciated both at home and school. In the context of these environmental changes, children will need to learn how to make their own life decisions. For this, it is necessary for more persons to pursue the Desire for Personal Realization set forth in Maslow's Five Stages of Desire, according to their individualities and values; and as persons with diverse values influence one another, they are able to develop greater self-awareness and fulfill their wishes and dreams. A society or a forum where this is possible must be created.

The Aim of Shinkenzemi and the Network Media

Shinkenzemi believes that they should attempt a shift from communication focused on producing outcome to communication that helps members discover together, learn together, exchange ideas together, and foster their own values. From this point of view, it sought to offer children a community, namely a forum and a process by child they are able to encounter diverse values, learn through them and create their own. For this, it deliberately avoids fixing or directing starting points and goals, but provides a forum, accompany it to the utmost at all times, and watches over the customers affectionately. To realize this objective, it is necessary to have a medium that allows users to make friends, that deepens mutual feelings, that discovers differences, that enables communication between many people and links those with information and those without. The network, therefore, is necessary.

84 Net Experiment

Children in their mental growth period, junior and senior high school students in particular, have extremely strong bonds with friends of their own age group with whom they grow up and have a sense of unconditional solidarity. It is important for them to communicate with these friends. How wonderful it would be if the members experiencing Shinkenzemi were able to communicate and become precious friends with each other! This cannot be accomplished on a

open network where people of different ages and positions are able to participate. To find out how much about the world of network junior high school students understand, and whether there will be an interaction of values, a communication experiment was done. Approximately 700 members who were born in 1984 and were in seventh grade in 1997 participated in this experiment, held for three months from June until August 1989.

Functions Prepared for the Experiment

Original communication software was developed so that students who were unfamiliar with computers could easily express their feeling. The basic function is a mailer. Expressiveness is strengthened: for example, users can write not only texts but also simple illustrations, choose the design of the writing pad, and press "feeling stamps" to express feelings and messages ("top news! come on, everybody!"). Besides that, a function was added for questioning Akapen teachers and reading the answers.

To make this software easier to understand, it is supposed that reading and writing e-mail is done in the user's own room on the desktop, and that the forms of communication, or the digital conference rooms, are at the school where everyone gathers, called "Challenge-ga-oka Junior High School" outside the window of the room.

Bulletin Board and Rooms

The following bulletin board and rooms were opened and operated at the school.

- Nandemo (anything) Bulletin Board: a board for classified ads, news. etc.
- Study Club: a forum for reducing insecurity by information-sharing and cooperating to solve problems.
- Sports Club: Serious team sports start from junior high school. A forum to share feelings about team sports and solve troubles.
- Comics Club: a forum for talking with people of the same generation.
- TV-lovers Club: a forum where anyone is welcome to talk.
- Game Club: a forum to talk about games. This room was set up during the period, because of the enthusiasm of the children.
- Boys' & Girls' Locker Rooms: a forum for chatting. Separate rooms were set in order to see the differences in gender.
- 84 Net Club: a forum to stage the ending of this time-limited experiment and talk about 84 Net and the future. This room was set up in the final period of the experiment.

The Operation of the Rooms

The rooms were operated by two system operators, set as the chief directors of each club.

The operation gave the most consideration to independence, self-advancement, influence from others, and feeling of belonging, and tried to ensure that the participants learnt to do the following:

- recognize the forum as a public space and have good manners
- have their own comments in feedback to others' comments
- have feelings of appreciation
- make proposals among themselves and act them out
- involve others

In order to keep the network healthy, all comments were checked. Those with problems were deleted, and the writer was contacted so that the reason of inadequacy was understood. Further consideration was given to sad matters on asking the chief directors to propose or set rules on the subject in order to keep the space comfortable for learning.

The Results of the Experiment

Since the program was designed so that the user had to make a comment in order to receive e-mail, there was concern about the case when nobody made any comments. However, the start went smoothly with comments on the bulletin board about self-introduction and classified ads for e-mail and friends.

While some students made friends quickly, others did not receive any e-mail. The difference in each student's communication ability and style had surfaced. In the end, there were children who were fully satisfied with the program as well as some who absolutely could not enter that world.

As the students are seventh graders, there is a great difference in their communication abilities. There were more than a few children who could not find their place in the network world, for example, those who had only standard topics to share with their new friends and lost their words after a while, or those who were unable to write the required replies and lost interest.

The numbers of users and comments in each room are as follows:

	no of users
1 Manga Club	112
2 Girls' Locker Room	106
3 Game Club	93
4 TV-lovers' Club	71
5 Study Club	69
6 Sports Club	68
7 84 Net Club	46
8 Boys' Locker Room	37

	no of comments
1 Manga Club	1229
2 Study Club	1013
3 Girls' Locker Room	956
4 TV-lovers' Club	591
5 Game Club	567
6 Sports Club	456
7 Boys' Locker Room	409
8 84 Net Club	262

70% of the students answered that they were satisfied with the rooms.

Examples of Comments and Their Effects

Example 1

Within the comments made at the Study Club, there were, signs of regional differences. This could be felt through the notes on final exams, information exchange on test problems, janken, dialects, length of summer vacation, etc. The club can be thought to have acted as a forum for problem solving.

#373 "To those who have already finished the finals"
"Sports test is going to be on the phys-ed exam" it says. "Someone tell me what that is!!"

#375 "Phys-ed: actual test question"
Q. How many exercises are there in Radio Exercise No. 2, including the deep breathing?
This is a hard one. I kept on going over the Radio Exercise in my head, over and over again...

#384 "To those who have already finished the finals" Reply.
At our school, we only had the physical strength test in the exam, but
"What is the width of side-steps?" and
"Which of the following is flexibility?" were on the test.

#789 "Let's compare dialects"
Let's make a chart comparing dialects from all over Japan. They say it's going to become the era of power decentralization, so I think we should do more research on provincial identity and characteristics. Standard language might be important for making points understood correctly, but I think it's good that there should be many kinds of expressions, and it's more fun.

#825 "Interesting dialects wanted"
Where I live, when we do "janken", after the standard "Goo, Jankenpon, Aikodesho", if it keeps on going even, we repeat, "Jisshinke" "Hitsukoine" "Jankenpon"!

I have no idea what "Jisshinke" means!
If anybody knows, please tell me!
Note: "Hitsukoi" is "Shitsukoi" (persistent) in Hiroshima.

#831 "Interesting dialects wanted"
I don't know if this is included in dialects...
At my elementary school (in Tokyo), we start with the normal "Janken, pon!" If it's a tie, it usually goes "Aikode, sho!", right, but we say "Ai, San, Chis!" at my school. Even now, some of my schoolmates still use that. I do too.

Example 2

At the Manga Club, they held popularity votes to comics characters with the system operator taking the lead at first. But as the members got used to the forum, they made proposals themselves, and in the end, they were able to report the questionnaire results.

#626 "What should we do?"
Umm... Let me see..
1. Popularity vote to characters in a comic. (or before)
2. Popularity vote to favorite comics. (my idea)
(Everyone makes votes like "vote for XXX. The Reason is...", and they find out the most popular comic.)
Is that about it?
Oh well, I guess no one will listen to me anyway.

#628 "What should we do?"
I'm for XX's idea number 2!!

#637 "What should we do?"
I want to do XX's idea number 2 too!

#849 "Favorite comic questionnaire, first report"
At present, number 1 is "Slayers" with 3 votes, second are "Children's Toys" "Rurou ni Kenshin" and "Magic Team GuruGuru" with 2 votes, and besides those there are "Doraemon", etc. We've got a bunched result. We need more votes, so everyone, please write.
End of first report.

Example 3

At the Girls' Locker Room, they moved from topic to topic, such as psychological tests, fashion, "my fragrance" such as shampoos, traditional girls talk (a, b, c), love, boyfriends, etc.

There were comments on bullying and worries, and some people started calling themselves counselors.

#??? "Hear this!"
Please listen! A while ago, I got this letter.
The sender doesn't name herself, but I think it's from an older student. It goes on about how the skirts are short, how the schoolbag has to be black, about the hairstyle, etc... Those things aren't written in the school rules though. It doesn't make you feel good at all to get that kind of a note, I mean, it feels really terrible. Besides me, several other people were also named. My skirt isn't short at all, and I have no idea why they tell me to quit being so arrogant. I was really shocked when I got this letter, but my friend cheered me up. If anyone had this kind of experience, please e-mail!

#??? "Hear this!" Reply.
Don't let that kind of thing get to you. White hairbands are forbidden at our school, but you know those elastic hairbands? An older student caught my friend with one on after school, and was told lots of mean stuff. You' re obeying school rules, so ignore it! Cheer up!

#234 "Trouble Advisory Board!"
I' ve got a proposal! It's...
"Trouble Advisory Board!! Corner"!!!!!!!!!!!!!!!
Yeah!! Worries about love, home, friends, school, etc....
Girls, let's discuss these kinds of troubles at 84 Net!!
Did you know that I'm called the "World's Youngest Counselor"?!
But because of that, I, in turn, have no one to consult with....
Anyone's welcome, confide your worries to us at the Girls' Locker Room!!

Example 4

At first, there were comments about teachers and classmates who were disliked, and it led easily to comments about figures we could identify. For the presentor of the forum, it is very important to keep in free from this kind of happening through everyday communication. For one example, we considered how a comment despising. Playstation would progress. This is a case where the children, by themselves, could state their own comments, discuss them at the conference room, and reach a constructive conclusion that they shouldn't say things that make others feel bad.

#305 "I despise Playstation!"
I hate Playstation!! Play 64! ROKUYON (64)! BIG!!!!!!!!!!!

#340 "I despise Playstation!" Reply.
Why do you hate Playstation? Isn't it fun?! But of course, 64 is fun too!!!

#353 "I despise Playstation!" Reply.
... Why do you hate Playstation so much? State your reasons!

#355 "I despise Playstation!" Reply.
Playstation and 64 each have their strong and weak points, so I like any kind of game players. 64 was a year late in coming out on the market, pricey, and the price of software was high too. That's why I chose Playstation, which we can buy to under 20,000 yen. Having only 32-bytes, it's slow, but the price was suitable. Of course, I'm still attracted to 64's great graphics-processing ability. Playstation's weak points are that the CD-ROM takes time to download, that we need to buy memory cassettes, etc., but its strong point is that it can handle a large load of data at a cheap price. For lengthy dramatic software needing a large memory, Playstation with its CD-ROM is suitable, and for speed action software. 64 with its 64-bytes is suitable, I think. There are one's likes and dislikes for specific software, but the hardware shouldn't matter. Well, I guess the design of the machine and the controller is cooler for 64 though.

#359 "I despise Playstation!" Reply.
I hate it too!!!!!!!! I hate 64 too!!!!!!!!!!!!! I hate S.S. (Sega Saturn) too!!!!!!!!!!
Use Super Famicon, "SuFami", or Gameboy, Gameboy.
(Why? Well... I don't have those game players, so I can't keep up with the talk.)
"It's selfish, isn't it?" (Everyone got this impression, right?)

#362 "I despise Playstation!" Reply.
I like 64, but I like Playstation too! For 64, I like "Mario Cart 64", and for Playstation, I like role-playing games. Of course, there aren't any role-playing games for 64 so far...

#365 "I despise Playstation!" Reply
At first, I was divided between PS or SS. At that time, "Virtual Fighter 2" was popular, and that's why I bought SS. Other reasons are that the loading is quick and not many people have them.

#368 "I despise Playstation!" Reply.
Hear ye! Hear ye!! Playstation is a good boy!! 64 is fun too! (traitor...)

#386 "I despise Playstation..." Reply.
Isn't it wrong to comment that you despise Playstation..?
I think lots of people who love Playstation will be really hurt if they see that comment.
Anyone will get mad if someone despises something that he or she likes.
Even if the person who made the comment did it lightly, there are others who would feel bad.
This is a public space used by many people, so I don't think we should make that kind of comment.

Of course, since this is a Game Club, we should discuss the bad points of game players and software. People's tastes are all different, so it's okay to feel that you don't like something, but don't you think that we shouldn't make comments that would make others feel bad..?

Example 5

During the last stage of the experiment, the topic of personality on the net came up from the members.
Children seem to understand the feeling of the media and the background (how people receive the media) and act naturally.

#0148 "Personality...."
I just thought of this, but I feel that everyone's personality changes when writing on the computer and when talking normally. How do you all feel about this?

#0155 "Personality...." Reply.
I think that my personality is a lot different when writing in the clubrooms or on the bulletin board and when writing e-mail. In my case, when talking normally and when writing e-mail, it's the same personality.
Wow! That's such a smart question, it's sooo hard to answer! But I guess I'm not the same at all. (but it might be the same if I'm meeting someone for the first time...) Within 84 Net, maybe I'm more care-free when writing to friends I often exchange e-mail with.

#0187 "Personality...." Reply.
Actually, I feel I'm more frank on 84 Net.
Things that I can't say at school because I would be looked down at on and be called weird, I feel I can say here. (Mind you, I'm not being bullied or anything!) For example, nobody besides the people who read my comment at the Girls' Locker Room knows that there's someone I like. I might be saving my character while off 84... I'm getting worried about myself! But hey, let's cheerfully!!! My heart feels a bit empty. <Twinkle>

#0203 "Personality...." Reply.
I get more quiet here. What? You call that quiet?! People who just thought this, you' re going to be amazed when you meet me in person. I talk in an awkward Kansai dialect even though I'm from Niigata, and I call myself "boku ['I' for boys]" (when I call myself "watashi [polite way of saying 'I', especially used by women]", I get sick), and I'm a bit of a Shinoler [people who act and dress like Tomoe Shinohara]...

#0220 "Personality... a doubt" Reply.
Why do you speak in Kansai dialect? But I'm a bit weird myself, too.
(That's not what you said before! by M!!!)

First of all, at school, I call myself "uchi", "oira", "watashi", "atashi", etc, etc. PLUS, I guess people who I exchange e-mail with know already, but I use "watashi" in e-mails and "oira" in the clubrooms. (Who in the world are you!?) So, you' II be amazed when you see me in person... probably. But, I really want to see you guys. Won't it be possible?

#0245 "Personality...."
Howdy! I cut my hair! Anyway.. I'm not the same at all at 84 Net and at school! I mean, I'm not the same at home (when I'm with my family) and at school. I'm from Osaka and I normally talk in Osaka dialect, but everyone at school so distressing... That's why I can't say what I want!
Oh, oh, oh! 84 is such a comfortable place. I can say straight-forwardly everything I want!

Conclusion

Re-connecting to Reality

Through the 84 Net experiment, one could feel the possibility of a changeover to communication where co-learning, caring for each other and exchanging discoveries are possible. This is a necessity for children in the future. It is hoped that they find this not as a place for escape from reality, but that they feel reality through the participants' presence and make communications with other people's values. It should be a world where people share vigor and wisdom from real life and prepare energy to live through the future; and where everyone is able to share and discuss ideas, feel the power to do one's best tomorrow, to find out what one wants to do, ... Let us make this an indispensable place for children. With the power that the children possess, this kind of a world will surely be created.

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MULTIMEDIA UNPLUGGED: A WORKSHOP ON LEARNING DESIGNS AT THE NEOMUSEUM, JAPAN

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Abstract: In Japan, we have a growing field called 'Information Education,' but people are paying too much attention to computers and the internet. That's why I am proposing unplugging the computer and thinking about the more essential aspects of learning and information design. 'Unplugged' means that technology and multimedia need not be limited to digital forms. Pencil-and-paper and traditional 'by hand' media also have important roles to play.

In the Multimedia Unplugged workshop, participants use different forms of expression and media, including paper and styrofoam cubes, freeform construction kits and a wide variety of everyday objects, like bamboo leaves and post-it papers. Through this workshop, participants can understand that each medium has its own constraints and opportunities, and have a change to rethink the roles of multimedia from new perspectives. They can then replug and thus be able to choose appropriate media-digital or physical or both-to express their ideas.

In this paper, I start with the chronological description of the two events of the multimedia unplugged workshop, and then move to focusing on the key concepts which are critical in designing learning environments.

neoMuseum

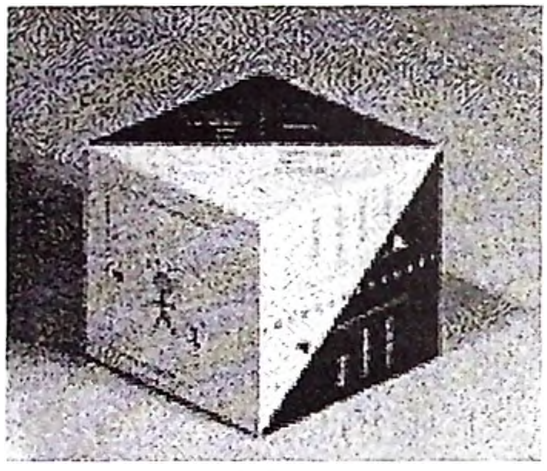
1 This paper was written with the collaboration of
Mark D. Gross - Planning & Design, University of Colorado
Annette Dula - Women Studies, University of Colorado

Multimedia Unplugged Workshop

The entire Multimedia Unplugged had two main events: design atelier/workshop and exhibition. On February 6th and 7th, 1998, the atelier/workshop was held at the neoMuseum in Yoshino, Nara, Japan.

At this first event, we asked participants to reflect and express by using various and diverse media–from clay to computers– how they interplay with concepts like Learning, Media, and Design. Specifically, we invited them to consider the special relationships that they–as designers–have with materials and these concepts.

For this workshop we chose a Cube as a representation metaphor, and we asked participants to use the cube as a way to think about and project their ideas.

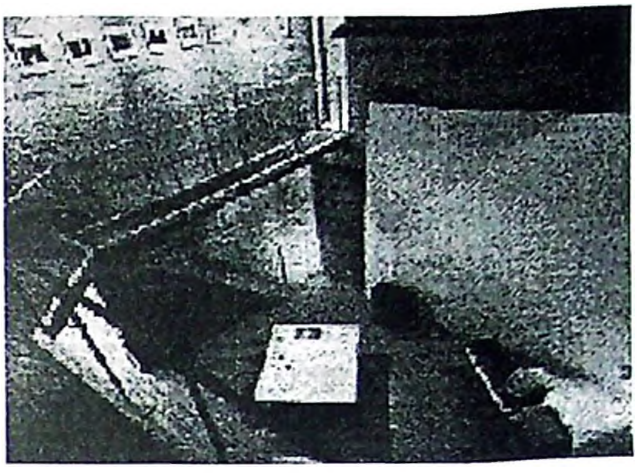


cube

At the second event–the exhibition–atelier participants displayed their work, presenting their cube construction projects to invited guests. They collaborated with and received feedback from an expanded community; and they reflected on what and how they had learned by participating in the atelier. The exhibition revealed the participants' understanding of 'learning by design'. It highlighted the opportunities and limitations of using the cube as a metaphor for learning, and it made transparent the role of the self in design.

Learning Meets Layered Space

The atelier/exhibit space at the neoMuseum serves as a 'technology of place,' a spatial metaphor for thinking and learning. The downstairs floor is the experience level–a busy place where activity happens. The upstairs balcony is the reflective level, a quieter zone for thinking and metacognition, or "thinking about thinking". As participants enter the atelier space, they are encouraged – by the design of the physical environment – to reflect on their own learning strategies and ways of thinking. The entire atelier/exhibit space is a 7m x 7m x 7m cube.



technology of place

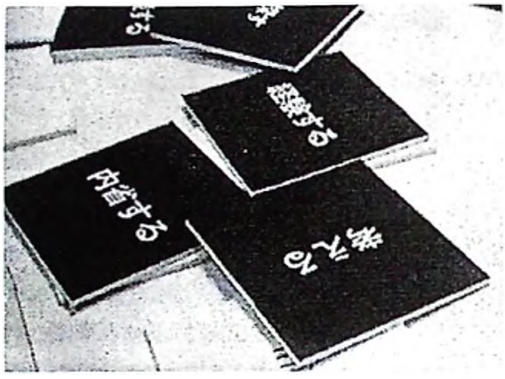
Learning Meets Tangible Media

"Unplugged" means that multimedia need not be limited to digital media. Pencil-and-paper and traditional 'by hand' media also have important roles to play in learning. In the multimedia unplugged workshop participants use different forms of expression and media, including paper and styrofoam cubes, the freeform construction kit 'Toobers and Zots,' and a wide variety of everyday objects, like bamboo leaves, post-it papers, and markers. Designers of future multimedia– understanding that each medium has its own constraints and opportunities–will be able to choose appropriate media– digital or physical or both– to express their message.

media unplugged

Learning Meets Inspirational Concepts

Previously prepared kits are used as opening ice-breakers. Each kit contains items of diverse media– objects to think with: oil paints, film, floppy disks, and 'key concept words'. Using the media kits, participants work together to begin their initial exploration of the relations of media, design, and learning. The media kits encourage dialogue, self-expression, community, and reflection. Participants manipulate the concepts and objects in the media kit to build a collage for display by the end of the workshop, and later at the exhibition.



playful words

Learning Meets Metaphorical Thinking

By the end of the ice-breaker, participants are aware of the opportunities as well as the constraints of the design object. They are now ready to begin their individual design project, using the cube as a representation metaphor.

The cube was selected as a simple and highly constrained representation for learning. In the experience level, atelier participants project ideas about the relations of Learning, Media, and Design onto the simple form of a cube. Then they use their cubes to explain and exchange ideas with other participants. Next they reconstruct their cubes, based on what they have learned by interacting with other members of the community.

Learning Meets Social Construction

People learn through experience – learning by doing. We use the cube and media kits to reinforce experiential learning which has been the cornerstone of our workshop at the neoMuseum. The multimedia unplugged workshop includes spaces for experiential learning. Three kinds of activity take place at the experience level: making and building, community discussion and feedback, and display of results. The atelier also provides three metaphors of space. In

cube reconstructed

the main atelier people make things; in the media café they discuss and get feedback regarding their cubes and their projects; and in the theater they present their ideas and projects after developing them.

Learning Meets Reflective Experience

Activity with thought can lead to meaningful experience. Throughout the workshop, participants reflect on what they have been doing. However, where is also a spatial metaphor for thinking about their ideas. The formal place for reflection is the upper level of the neoMuseum. Here participants can take an overview of the activities on the experience level, and reflect on their own work as well as on the work of others. Following Schön's theory of 'reflection in action', reflection takes place at times of breakdown in a complex cognitive process. When participants are at a loss for what to do, they can move both literally and metaphorically to the reflection level and consider their next move.

learning by doing

reflection in action

Learning Meets Convivial Community

A primary goal of the atelier/workshop is to bring together a community of learners around the theme 'learning, media, and design'. At the atelier event, they collaborate, communicate, learn, and reflect by being together. They combine the new concepts they have explored with their individual and collective knowledge, experience, and stories; they weave a tapestry from the colorful threads of their diverse backgrounds and interests. They engage their collective creative potential and their understanding of their environment.

Learning Meets Virtual Participation

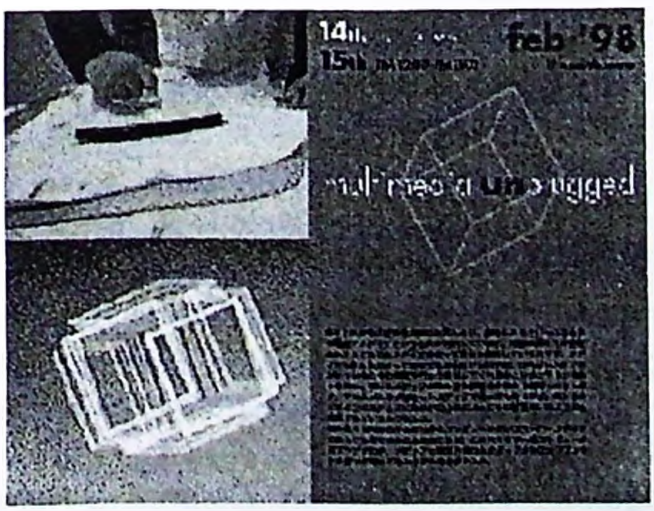
During the atelier/workshop a direct mail (DM) invitation is designed, and copies are printed and sent. Tee-shirt transfers are printed on a color printer, and participants iron the transfers onto tee-shirts. They wear the tee-shirts during the workshop. Some participants build the multimedia unplugged WWW website. Other atelier sites around the world can engage in virtual participation. They contribute their own multimedia images transmitted digitally to the neoMuseuem site, where they are reviewed, printed out and posted. Virtual participants also link to the multimedia unplugged website. These methods help people learn and understand, and enlarge and enrich the community of learners.

Learning Meets Virtual Studio

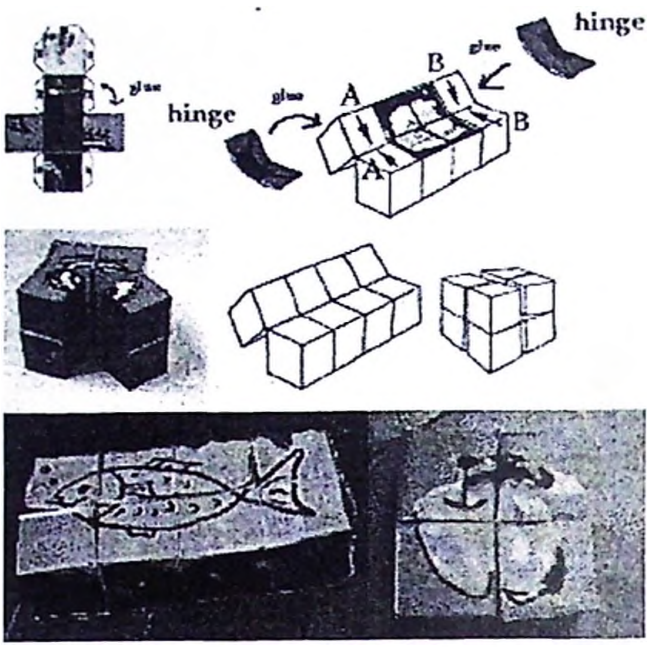
The World Wide Web offers the possibility for both extending the experience and the reflective levels to a wider community that collaborates through the

community of talk

internet. Designers at the Sundance Laboratory for Computing in Design and Planning at the University of Colorado responded to an invitation to participate in the atelier. They used the internet to send a 'folding and unfolding cube' that was printed out and assembled at the atelier, and they created a website for



inviting technology



folding and unfolding cube

their contribution that was linked to the main atelier website. The International Media Research Foundation in Tokyo contributed a digital sound responsive cube program (designed by Masahiko Furukata) called 'I wanna be a cube'. The virtual design studio concept offers the opportunity, not only to share design artifacts, but also to comment on projects and ideas.

Learning Meets Transformation

We believe in learning as a transformational process. Learning is not only a means to knowledge, but also to understanding one's individual, social, and cultural identity in the world, a way of gaining power and control over one's world. Very little attention is given to this in most learning environments today. However, participants in multimedia unplugged gained understanding of their own learning strategies by participating in their own design activities. By creating their own stories through these learning activities, all who took part were greatly empowered!

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folding and unfolding cube

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DESIGNING, CONSTRUCTING AND UTILIZING OF NEW LEARNING SPACES: SPACE AS A PLACE TO THINK WITH

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Our new Communication Center – a combination library, computer, theatre/ presentation area, playspace and museum facility – opened in August, 1997. Of the various phases of creating our final building, only one might be commonly called "The Construction Phase" but I would like to propose that all phases were in a very real sense "construction" because they gave us the opportunity to take our ideas out of our own personal mental space and present them in various forms to others, then reflect about them again to ourselves, and again present them to others, constantly building and rebuilding them.

The nine teachers, office staff, and administrators who comprised our "Construction Committee" and worked together with the architects were all involved in different kinds of activities. The ways we viewed ourselves as teachers and learners were very different. The marvelous thing was that the participatory and interactive nature of the early stages allowed each of us to bring our dreams, philosophies and experiences into the design process and try to turn them into something real.

A Lifetime of Designing

During the two years previous to the opening, our committee members had attended more than three hundred hours of meetings relating to the new buildings. Together and separately, we had visited libraries, computer centers and museums in Canada, U.S., England, France, Germany and Japan over the past decade. Books and magazines had been read, videos watched, conferences attended, mailing lists joined, friends and strangers consulted, and visions conjured up. Personally, when someone asks me how long we had worked on the design, I'm always tempted to answer, "A lifetime".

It was mostly in this first phase where enthusiastic constructing took place. All the ideas that ever danced in our heads were suddenly given the opportunity to fly out and take on shape. Which thoughts were worth animating? How could we know if we didn't give some effort to developing them? Knowing (or imagining that we knew) what to develop and what to let go was sometimes energizing and sometimes exhausting. When should we stop trying to help others envision our own dreams? What dreams were worth envisioning? I believe I could easily fill this paper with the dynamic questions each of us wrestled with. When I look

at the resulting buildings and think of some of the confusion I felt, I'm indeed amazed, not only that the results are what they are, but that anything was created out of the myriad mazes we explored.

Early Stages – Dreamy Designs

In the early stages of design, we avoided talking about costs totally. In fact we were instructed not to talk about money, but to envision our ideal learning facilities. For many years some of us had been trying to provide a computer for each member of our community. We also wanted each school space and dormitory to be wired. Some of us envisioned a huge high definition TV above the entrance to our school that would display school news and announcements before class and broadcast student performances and presentations at lunch and after school. Each classroom would have a projector so that anyone's computer screen could be shown to all the learners in the room. All spaces, both new and old, would be built or re-built in ways which would encourage group collaboration. These were some of our early dreamy designs.

Naturally, as we began to think about money, we were also forced to prioritize our goals and the equipment we thought was most necessary to achieve these goals. For example, we started by giving one computer to each of our full-time teachers. All other members of our community had to share about 150 computers – roughly 1 computer for each 10 people. However, we are still actively searching for ways to achieve our original goal. There's no huge high definition screen in our plaza; not even a small low definition screen there! That, too will have to wait for the future. Not all of our hi-tech dreams were easy to let go of! Learning to compromise with other members, each one giving up some of our favorite ideas, was a good lesson for us in group collaboration.

Throughout the process of construction, we constantly bumped into our own beliefs about learning. Every time we created a space or chose a shape or color, our thoughts about education were part of our design toolkit. No one said, "Well, I believe that by creating a collaborative atmosphere here, Piaget's ideas about students learning experientially would be able to come inton". But in fact, certain philosophical underpinnings came to be accepted by us all.

Active Communication Spaces

For example, it was clearly understood that all design aspects should support active communication (at least in any ways that we had awareness of). In talking about the color of tables or carpets, one of us might say, "The colors we have right now in this section are too bright and conflicting". So it was clear that person valued some calmness in the mental state of their students. Naturally, various personal and cultural tastes came into play in our choices. Conflicts arose leading

to marvelous compromises. Sometimes we hit on a theme that all of us were immediately attracted to: other times we listened and tried to give voice to a variety of ideas. Early on the theme of "mosaic" came up as a metaphor for our students and our philosophy. The architects took to this metaphor with such enthusiasm that we finally had to tell them – "Enough with the mosaic motif already"!

In reflection, it occurs to me that we developed this stage in a way that encouraged our own construction of a vision of ourselves as designers. We thus became aware of ourselves as actors on the educational stage, rather than simply passive receivers of someone else's ideas. As teachers we were used to walking into a room that had been designed by someone else. The size and color and style and placement of furniture were chosen by someone else. In many cases even the choice of lessons and styles of teaching were not seen as being in our control.

Relationship With Architects

We might have easily fallen into this pattern in our relationship with the architects. The same company had, in fact, designed our first buildings more than fifteen years ago. They were ready to tell us exactly what was going to be built. However, over the course of an uncomfortable first half year, we made it clear that the architects were there to give life to our visions of learning. This took some getting used to on their part, because, at least in Japan, it is usually the case that clients mostly accept the decisions of architects without question.

For us, we tried to present our visions at every step of the design stage, and even beyond into the construction stage, though of course, with varying rates of success. My favorite story about this is, after more than 300 hours together talking about our educational philosophy and what we really wanted to do, at the opening of our Communication Center, one of the chief architects came up to us and, looking around wide-eyed at the Center, said, "Now I see what you were trying to do"!

Builders of Our Own Environments

The point I'm trying to make here is for me the key point of this experience. Taking this position as constructors of our own environment was a very empowering activity for us. It had to change us as human beings and affect our relationship to the process of teaching and learning and to our students.

Sherry Terkle comments about the game SimAnt, that it "gave people something concrete to play with" (See endnote 1). In the same way, designing our new Communication Center gave us something concrete to think about (even before

the concrete started to flow). How deeply and in what ways each of us have been affected is something I choose not to generalize about here, but would rather let unfold with time, and perhaps someone else's research.

A few days before I was to give a talk about the Center, I was showing some new friends around. Afterwards, over a cup of tea, one asked, "So what do you hope to do here with all this great equipment" (See endnote 2). The other added that this was what Seymour Papert had envisioned back in the early 80's, a place where computers would be as accessible as pencils. But always the important question for him was, "What do you do with them?"

At this point, I'd like to discuss some of the educational underpinnings at the heart of our Center. One of the main goals of our new center is to bring all kinds of media into the educational process, and thus affect the learning process and the learners themselves. In order to understand this well, it is helpful to examine our history, our special facilities, and our educational philosophy and goals.

Doshisha International was founded in 1980 as part of the Doshisha family of schools. This means that both Christian principals and an international perspective underlie our educational system (See endnote 3). Our specific mission was to create an environment where "returnees" (Japanese children who had lived some significant portion of their lives outside of Japan) could re-enter the Japanese culture and have their unique experiences appreciated and developed. Approximately 2/3 of our students have lived and studied outside of Japan, and they bring an amazing range of experiences to our school.

Building a New Kind of Education

Some of the teachers and staff at our school have been believing (See Endnote 4) from the start of our school that helping the students build on their bi-cultural views and bi-lingual skills meant developing a new kind of education, and have been trying to do this at every possible chance. With the creation of our new Center this chance came. Naturally, when our school opened there was a library, but as our school grew (a junior high school was added in 1988), the library became much too small. The use of computers began in 1981, and we were pioneers in the use of Logo and in telecommunications. We started with a few computers in a tiny half-classroom space. Ten years later, and after we were chosen to be a part of the 100 School Project (a governmental initiative to encourage the use of technology in the classroom), we had 25 computers connected to the internet in a new Cooperative Design Center that was large enough to hold a full class and, in some ways, became a model for our Communication Center.

However, from the beginning it was our philosophy that computers and books were different forms of media that should be available to all learners. At the top

of the list of important "media" was human communication. This has always been an important factor in our educational and design thinking. Thus our library space and Cooperative Design Center were not seen as "quiet" places, but rather as lively areas where learning was a social activity.

From the beginning, wo chose laptop computers, rather than desktop computers so that the atmosphere of the room was not of a "computer lab", but as a space for people to communicate with each other, sometimes using computers and sometimes other media such as books and video, but most often just the media of their own faces and voices relating their ideas. Furthermore, we rejected the idea of "computer literacy" for the same reason that we didn't have classes in pencil literacy or paper literacy (See endnote 5). Rather we have encouraged our teachers to integrate computers and technology into their classes.

Over the past ten years and especially since 1994, we have been thinking about how to plan a new space for learning. The physical and mental shapes we have given and will be giving our spaces hopefully reflect our educational philosophies.

Respecting Learners

First, we want to give learners respect – respect for their unique experiences and unique way of viewing the world. Of course this applies to our returnees, but to our "general students" who are equally, filled with the energy and ideas of youth. Respecting our learners means that we have designed a center with them in mind, where they can freely express their ideas and will feel that their ideas will be seen and heard.

Secondly, we want to give our learners power – the power to think, the power to use the new media tools that they see all around them, the power to develop their own ideas and the power to present their ideas to others dynamically. Empowering our learners means that we have designed our Communication Center so that our spaces encourage particular kinds of activities. Because different teachers and students have different approaches and needs, we have tried to make all the spaces as flexible as possible.

Focus On Learning, Not Teaching

One constant is that discussion among learners is optimized. Most tables are rounded, encouraging face to face communication. These areas are not "teacher-centered", but very much "learner-centered". That is our focus is on learning, not teaching. Our Communication Center Staff and Teaching Staff become guides. The idea being that forcing one particular kind of information on students creates dependent and passive learners, but by guiding and supporting students' own learning activities, we empower them to be creative and independent learners.

Also, Because They Are Given

Respect, they also learn to respect each other and a wide range of ideas and cultural perspectives.

Major Activities of the Center

There are three major kinds of activities that we see taking place in the Center. These activities are not exclusive from each other, nor sequential, but they are all important in our educational philosophy.

1) Research Related Activities. These involve planning, thinking, writing, use of various media including memories of the learners' own experiences, and interactive discussion with learners from various cultures who hold various points of view. What in many classrooms and libraries is often a one-way activity of information moving from knowledgeable person (teacher) or knowledgeable text (book), now becomes an interactive process of gathering information, thinking, and evaluating such information.

2) Creative Activities. In some learning environments, activity stops when information is gathered. The important thing in such environments is to write down this information, memorize it and repeat it on a test. A traditional classroom with a teacher talking in front or a quiet library space might encourage this approach to learning. In our Communication Center, we want to encourage a more active approach.

Creative Research

For example, when doing research, we want our students to have their own ideas and not just to repeat the idea of others without thinking. Furthermore, we want our students to be able to express their knowledge in a variety of ways, first in ways that fit their own learning style, and gradually in ways that provide effective communication of their ideas.

3) This brings us to the idea of Presentation Activities. It is our belief that the usual kind of Japanese school examination, which basically depends on memorizing information, is only one way to have students express their knowledge. We want to give them the opportunity to take the ideas of others, examine them critically, combine them with their own experiences, and then externalize their new ideas in creative ways. Such ways of externalizing might be use of internet for homepage construction creating a video, writing a computer program story/puppet show, designing a museum exhibition, or publishing a report that will become a part of our Communication Center's own material.

Presentation of Ideas

Let's look a bit at what this does to a learner to have the power to seen his/her own ideas presented in a way that is respected. When our own book becomes a part of a library, it teaches us something about information and knowledge: for example, that everyone possesses knowledge that needs to be respected. Also that printed/published information needs to be examined critically and not swallowed whole. Having this intimate and personal experience in constructing knowledge, learners can understand that our knowledge is incomplete. These are ideas that are vital to learners in our new information age!

Another thing that happens to learners in this kind of environment is that they see the process of learning emphasized more than the results. Feedback and re-development, re-thinking and re-doing become important aspects of the learning process. Studying all night for a test and then forgetting everything one minute after the test becomes a shallow way of learning, one which is unfortunately too common in the Japanese educational system. We want our students using the Communication Center all the time, not just one week before examinations!

These are some of the ideas that we have had in developing this new Center. One important thing for those of us who were involved in creating this learning space is that we ourselves were exposed to these ideas and experiences through the process of construction of this space. We are hoping to give a similar empowering experience to our students through the way we design our experiences together. It should be noted however, that no matter how much and how carefully we designed our Center, the surprises we had and the opportunities for extending our ideas beyond what we were able to imagine at each stage, have constantly been presenting themselves. Construction, as learning, is an empowering, never-ending process.

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3. Both these terms "Christianity" and "internationalism", have as many different meanings as they do proponents. In the case of our school, it is enough to say here that there is no single interpretation forced on our community.
4. Sorry. I am believing that this verb needs to have a progressive tense!
5. As far as I know, this analog should be credited to Seymour Papert.

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NEW TOOLS FOR LEARNING

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The only thing I can say with a great deal of certainty... is that the evolution of human brain function has changed principally in response to the linkage between human beings and different tool systems. –Jerome Bruner

Abstract: In the last twenty-five years more has been learned about the human brain than in the past history of mankind. Through the use of new technologies such as PET and CAT scans and functional MRI's, it is now possible to see and learn much about the human brain while it is in the process of thinking. The research of neuroscientists, such as Marian Diamond, has demonstrated that the brain changes physiologically as a result of learning and experience —for better or worse — and that plasticity can continue throughout the lifespan. It appears that there are particular kinds of environments that are most conducive to the development of good mental equipment. They are positive, nurtiring, stimulating, and encourage action and interaction. Many of the most effective schools and training programs have created such high-challenge low-threat environments.

It is also very clear that intelligence is not a static structure, but an open, dynamic system that can continue to develop throughout life. This understanding is being utilized not only in school systems but in the workplace, where training programs show that even at the adult level people are able to develop their intelligence more fully. Corporations such as Motorola have implemented programs in which they are training their employees, managers, and executives to think, problem-solve and create more effectively using strategies developed by such educational innovators as Reuven Feurstein, J.P. Guilford, and Edward de Bono.

A most recent development is in the new kinds of technology that make it possible for people to take responsibility for their own learning as they access and process information through the internet, communicate with experts anywhere in the world, and use software that facilitates higher order thinking and problem-solving. Computers are in no way replacing teachers, but rather these new tools allow them to spend more time being facilitators, mentors, and guides. As a result, teachers and students are able more often to collaborate on creating new knowledge as well as mastering the basics.

As technology becomes more ubiquitous, there is growing recognition of the importance of the arts in humanizing the curriculum. "More high-tech, more need for high-touch" is becoming the by-word of many schools. They recognize that the arts are not only culturally important and civilizing influences, but they can facilitate the learning of almost any subject.

I believe that these four concepts — the plasticity of the brain, the modifiability of intelligence, the use of technology as a powerful new tool for learning, and the renaissance of the arts in education — have major implications specifically for educational systems and generally for the future of our world. In this time of rapid change, leading-edge educational systems are equipping people with the ability to learn, unlearn, and relearn continually. They are giving students meaningful opportunities to apply what they have learned in order to turn information into knowledge. And – of critical importance if any of this is to lead to a healthy future — they are helping students to learn to use knowledge responsibly, ethically, and with integrity. Furthermore, they are involving students in experiences that develop compassion and altruism in the process of their education. Our complex world urgently needs more people who have developed their fullest potential in mind, body, and spirit.

Tools That Form the Mind/Brain System

The human brain is the most complex and powerful technology on earth. It has become increasingly so over time largely as a result of need – and the tools we use to meet those needs. Thousands of years of walking (that freed the hands), making and using tools, and talking with other people catalyzed the physical growth and development of the human brain as well as great cognitive leaps of the mind. When people moved from pointing and grunting to using words, these verbal tools made it possible to communicate about things that were not in their immediate presence. They could talk about the past or the future; they could discuss abstractions; and they could tell stories that were much more complex than they could through the arts they had used such as painting, carving, dramatic, and dancing. It may be that story is one of the basic building blocks of intelligence with its roots in prehistoric times. Cognitive tools that facilitate story-making and story-telling and communicating may be among the most powerful ones in affecting the development of the human mind.

The development of additional symbol systems such as numbers, clocks, calendars, and musical notation created even more evolutionary possibilities for the brain/mind system. Another cognitive leap for humanity was facilitated when the printing press was invented. As growing numbers of people learned to read, they could learn about places they had never been from people they had never met. Their minds became increasingly able to deal with abstract thinking, and their ideas had new power as they were able to communicate with other people near and far.

In our own time, new tools in the form of electronic technology have been developed that may have even greater effects on human development. Not only can they facilitate the accessing of information on any conceivable subject from anywhere in the world, facilitate communication to people in nearly any country instantly, make possible the solving of complex problems, and be used to invent still more complex tools, but they are revolutionizing learning and cognition when used in ways that make full use of their power.

In no way do we suggest that the new technologies will rival or replace human interaction as an essential part of the learning process. Human learnings is by nature collaborative. Nor will these technologies replace a good teacher's empathy, nurture, and understanding and a good teacher's both conscious and intuitive ability to motivate, stimulate, and facilitate the learning of different student. These new tools will in fact free the teacher to be mentor, coach, and guide instead of a primary source of information and skills. It is good teachers who can best help students to understand and to turn information and skills into knowledge that they can apply in a number of contexts. The new research in

Distributed Cognition suggests that intelligence is not just in our heads. Part of it lies in our interaction with other people; part of it lies in the resources in our environment; and part of it lies in the tools we use. In order to discuss further the effects of new electronic technologies, let us consider some important information about the human brain, beginning with a simple analogy.

The Human Brain

A frequently used analogy is that of the human brain as computer. All too often in formal education the brain is limited to similar functions as primarily a storage/retrieval device. Unlike the computer, which is powered by electricity and programmed externally, the human brain is powered and transformed by multiple sources of energy, many of which are within. One source of energy is the blood supply which furnishes the brain with oxygen and glucose—so what we eat, drink, and breathe can energize or debilitate its function. Another source of energy is the sensory system which receives and processes visual, auditory, tactile, smell, and taste stimuli from the environment. The more aware we are the more alive we become. A third source of energy is an inner source, in the form of psychological drives such as interest, curiosity, motivation, and even passion. All these forms of energy are constantly working together to drive the human brain/mind system, and unlike the computer, with its hard drive, the human brain can continue to change, and develop, and improve as it is used in challenging ways.

The computer can store information without its affecting the inner workings of the machine, and that material can be accessed in the same form in which it went in. In many school systems, too often the human brain is required to store information and access it for use on standardized tests in exactly the same form in which it went in. This is a great way to test if information has been memorized (et least for a short period of time), but not sufficient to explore if the information can be applied in practical or even creative ways. Too often, it is not recognized that what the student takes in and how it is learned, can have a great effect on the brain/mind system. This computer–like approach to learning surely does not do justice to the complexity of the human mind at any perceived ability lever.

Dr. Marian Diamond, professor of Neuroanatomy at the University of California/Berkeley and recently director of the Lawrence Hall of Science, has been studying the human brain for several decades. Her work, along with that of numerous colleagues in the field, attests to the fact that the human brain can change physiologically as a result of learning and experience—for better or for worse. She points out that the brain is capable of making new neural connections (that we use to remember, think, problem-solve, and create) throughout life as long

as people are in environments that are positive, nurturing, stimulating, and that require activity and interactivity.

Not only is the brain capable of physiological transformation, but it is itself a transformer. It is in this capacity that it moves far beyond any other kind of technology. The human mind can transform abstract ideas into concrete reality, reality into abstract ideas, or one reality into another. For example, the human mind may think about thinking and transform that process into a statue of "The Thinker" as Rodin did. Or the human mind may take in the experiences of a lifetime and transform them into histories, tragedies, and comedies as Shakespeare did. Or the human mind can view an exhibit of paintings and transform them into music as Moussorgsky did when he composed "Pictures at an Exhibition". It can transform knowledge of science and technology into a new treatment for illness or transporting people to the moon. It can even create a kind of artificial intelligence from knowledge about the human brain/mind system!

Human Intelligence

Just as the human brain has been proved to have enormous plasticity, so apparently is human intelligence modifiable. The work of Dr. Reuven Feuerstein, Israeli psychologist and director of the Center for the Development of Learning Potential in Israel, demonstrates that intelligence is not a static structure but an open, dynamic system that can continue to develop throughout life. The strategies he has developed to teach the process of intelligence are now being used with remarkable success throughout the world with people of all ability levels from the profoundly retarded to the highly gifted, at all ages from infants to the elderly, and in a variety of settings from jungles to classrooms to board rooms. This system may soon appear in software form that will facilitate its use with people of all ages and ability levels.

J.P. Guilford's "Structure of Intellect" model, developed further by Drs. Robert and Mary Meeker, is also proving conclusively that there are more effective ways to identify and assess a greater range of intellectual abilities, and that there are now strategies to improve them. Key Technologies has translated the SOI model into a software program called "LearnSmart". Clearly I.Q. scores do not give a true picture of human intelligence, and it is now essential to change belief systems about what is possible for human beings to overcome, build on, and achieve.

Renee Fuller, psychologist who specializes in research on human intelligence, developed some years ago a highly successful, multisensory reading program for bright but dyslexic young children. The world she thought she knew as a professional psychologist came apart when she found that this program could

also teach retarded individuals with assessed I.Q's down to 20 to read with comprehension. The only people who did not learn were those with uncontrollable seizures that disrupted the sequence of their thinking so that they could neither understand nor retell stories. This finding led her to consider "story" as one of the basic building blocks of learning and intelligence. She went on the write an important little book called In Search of the I.Q. Correlation, in which she discusses the fact that she has not been able to find any correlation between assessed IQ and what people are able to learn. (Her program has not yet been translated into software.)

The educational implications of these findings about the human brain and intelligence are enormous. It is for this reason that some school systems are at last moving forward to implement programs which make it possible for all students to learn successfully. The same is true for training programs in large corporations. For example Motorola is testing both the Feuerstein and Guilford model in its training programs throughout the world. Feuerstein's strategies are being implemented in most of the major corporations in France, and are now moving through the European Economic Community.

Individual Differences

It would be an easier task if educational and training systems could apply the same strategies to help all students to learn successfully; however, the population of most countries is becoming increasingly diverse and people from different cultural, social, economic, and educational backgrounds have very different ways of learning, thinking, and behaving. It is essential to take these differences into account. Clearly, it is extremely difficult, especially in large classrooms, to individualize an educational program for each student, although multimedia technology and interactive computer programs are becoming more available and can be used some of the time for this purpose. It is possible, however, for teachers and instructors to become more aware of their own ways of learning in order to avoid teaching primarily in that way. Then they may expand their array of teaching strategies, so that at least part of the time their students have opportunities to learn through their strengths and learning preferences, and the rest of the time they have opportunities to stretch and grow as they use other methods. Equipping all teachers with a rich variety of strategies is one essential key to successful learning for all, and it surely makes learning much more interesting. Matthew Lippman once said, "When everyone thinks alike, no one thinks much".

There is a continually growing array of ways to assess individual differences and accompanying recommendations for meeting the learning needs of all

students. Following are some that have been found especially useful and are already influencing the development of software programs for use at all age levels and with many different subjects.

Perceptual differences are among the easiest to identify either by a number of readily available assessment devices or by direct observation. It is not difficult to identify the students who learn best by only listening. They are a small minority, although a large part of instruction is offered orally, and this method increases as students progress through school and higher education. A a result these students are usually successful learners. We can also identify those students who rely on accompanying visual materials in the form of illustrations, charts, diagrams, videos, and other graphics, And then there are those who must hold ideas in their hands in order to understand and learn. Cuisinaire rods, models, constructions, creative drama, and other physical activities and manipulatives are examples of successful for them. Many students who rely on kinesthetic learning experiences are understandably in special education and remedial classes, since these ways of learning are not available to them in many clasrooms. Prisons and juvenile detention centers are also full of people whose learning needs—often visual/spatial and kinesthetic—have not been met in classrooms where much of the instruction is offered abstractly.

Another kind of individual difference lies in "world view". There are those who look at one tree after another and come to the conclusion that they are seening a forest. Others see the whole forest before they pay attention to the individual trees. Herman Within calls these learners field independent or field dependent (or field sensitive). Field independent learners are more detail-oriented, less dependent on others, more analytical and sequential in their thinking; whereas, field sensitive learners tend to grasp ideas as a whole, are more affected by the emotional climate of the learning situation. It appears that field independent learners learn well in either situation, but the field dependent learner finds it very difficult to learn in contexts oriented to the field independent learner. Teachers who wish to reach all students will do well to offer "field sensitive instruction" in which the teacher is perceived as a "warm demander". This kind of instruction begins with an overview or global approach, establishes a warm relationship with students, works with a humanized curriculum, creates a highly supportive environment focusing on students' needs and feelings, ties learning into living, and encourages group achievement. Multimedia technology offers an important tool to present highly motivating and colorful overviews, and computer programs can offer positive feedback and support as students progress in their learning. They allow students to access information either in a linear, sequential way or more randomly, and they are invaluable tools for learning projects in which groups of students work collaboratively.

Multiple Intelligences

One of the most recent theories dealing with individual differences is The Theory of Multiple Intelligences, developed by Dr. Howard Gardner, Professor of Education and Psychology and co-director of Project Zero at Harvard University. He suggests that our culture and schools that reflect our culture teach, test, reinforce, and reward primarily two kinds of intelligence, i.e., verbal/linguistic and logical/mathematical. These are of course the foundation of the basic skills and important to functioning effectively in the world. He believes, however, that there are at least six other kinds of intelligence that are equally important. They are visual/spatial, bodily/kinesthetic, musical, naturalist, interpersonal, and intrapersonal intelligences. Altogether this constellation provides a broader view and a much more comprehensive way of describing human intelligence. These intelligences are tools for thinking, communicating, learning, and problem-solving, and they are languages that most people can speak, cutting through individual differences in ability, culture, and educational background. Gardner notes that "the ways in which intelligences combine and blend are as varied as the faces and the personalities of individuals".

As multimedia technology becomes more available to more students, we see how it can help teachers to provide both the important interactive and supportive environments that Diamond describes, as well as how it can be used to exercise and develop multiple intelligences. These tools are also useful in individualizing instruction, thereby meeting the needs of a growing diversity of students.

Electronic Technologies and Learning

As we consider different ways of learning and different ways of accommodating diverse learners, we may question whether the new electronic technologies really improve learning. The United States Advisory Council on the National Information Infrastructure has been asking this question nationwide, and following are some results of their investigation:

- A 1995 review of more than 130 recent academic studies found that using technology to support instruction improved student outcomes in language arts, math, social studies, and science. A congressionally mandated review of 47 comparisons of multimedia instruction with more conventional approaches to instruction found time savings of 30 percent.
- A review of New York City's Computer Pilot Program, which focused on remedial and low-achieving students, showed gains of 80 percent for reading and 90 percent for math when computers were used to assist in the learning process.
- A comparison of peer tutoring, adult tutoring, reducing class size, increasing the length of the school day, and computer-based instruction found computer-

based instruction to be the least expensive instructional approach for raising mathematical scores by a given amount.

- A 1993 survey of studies of the effectiveness of technology found that "courses for which computer-based networks were used increased students and student-teacher interaction, increased student-teacher interaction with lower-performing students, and did not decrease the traditional forms of communications used".
- Research on the costs of instruction delivered via distance learning, videotape, teleconferencing, and computer software indicates that savings are often achieved with no loss of effectiveness. Distance learning vastly broadens the learning environment, often providing teaching resources simply not available before. Technology-based methods have a positive impact on learner motivation and frequently save instructional time. Savings in training time produce benefits both by reducing training costs and by shortening the time required to become and remain productive in the workplace.
- A landmark study on the use of technology for children with disabilities showed that "almost three-quarters of school-age children were able to remain in a classroom, and 45 percent were able to reduce school-related services" when computer-assisted learning techniques were employed.

New Tools Open New Doors

The content of learning has always been based on where and how students access information. The more sophisticated the medium, the more complex the information that can be communicated. Today's students need some types of information to be available in formats that are more easily updated than the standard book format. A typical textbook takes years to produce and be adopted. We have only to consider the changes taking place in nations comprising the former Soviet Union during the past five years to see how all existing textbooks in history and geography must be inaccurate at best. Changes in the fields of science and technology are even more rapid and texts become obsolete even faster. Books will not disappear from classrooms. Students will continue to read anthologies, biographies, and historical documents, as well as novels and short stories from the printed page. Librarians and teachers are turning to new tools for learning, reporting that as more students use new technologies to get information, use of libraries and standard texts actually increases. Students in fact tend to read more, possibly because they are introduced to new ideas "surfing" the internet, and because new resources have expanded the average library's reference capabilities. Student reports become more complex and far-ranging as a result.

New Tools and the Future of Education

These kinds of projects utilize technology as powerful tools to bring together the real world and the world of classroom learning. And it is already bringing about a transformation in how students are educated. Technology now makes It possible for students to:

- break down barriers, Including physical, cognitive, geographical, cultural, and economic.
- learn in ways that accommodate their own learning styles and kinds of intelligence
- learn basic skills and all subjects more effectively
- access and manage information
- practice and improve communication skills
- communicate with peers and experts anywhere
- move beyond memorization to deeper understanding
- practice working both independently and collaboratively
- assume greater responsibility as a learner
- explore and expand intelligence
- continue learning throughout life.

In his Testimony to the U.S. Congress, House of Representatives In October, 1995, Dr. Chris Dede, professor of Education at George Mason University said: "Many people are still reeling from the first impact of high performance computing and communications: shifting from the challenge of not getting enough information to the new challenge of surviving too much information. In a few years, the core skill for American workplaces will not be foraging for data, but filtering and synthesizing a plethora of incoming information. The new type of literacy students must master will require diving into a sea of information, immersing oneself In data to harvest patterns of knowledge just as fish extract oxygen from water via their gills. Understanding how to structure learning experiences to make such immersion possible will be the core of the new rhetoric. Expanding traditional definitions of literacy and rhetoric into immersion-centered experiences of interacting with information will be central in schools preparing K-12 students for full participating in the 21st century society".

Such new kinds of skills are now essential in order to function effectively, intelligently, and productively in an increasingly complex world filled with challenges no one can fully anticipate. To prepare students for such a world demands that educational systems make the best possible use of all the knowledge, wisdom, and technologies currently available.

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IMPLICATIONS FOR THE FUTURE

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Well this is delightful job and a scary job I'd like to start by sharing with you my personal solution for a certain problem that I suspect a lot of you have. And this is a problem that's plagued me since the beginning of - I've been in this business for more than 30 years-and always have this dilemma that almost makes me feel schizophrenic.

Because when I think about the future, there are two kinds of pull on me. One of them is about what will happen one day. Whereas, I can think twenty years ahead or thirty years, I don't know, I know sometime, in the not very distant future, things are going to be so different. We're not gonna worry about how to teach the fourth grade curriculum of mathematics. I am quite sure there won't be such a thing as the fourth grade. I am quite sure we won't have separate mathematics and - resembling anything like our present curriculum. That's someday. But meantime, as teachers like to say, "what about Monday?" Monday I am gonna be there, in my school or wherever it is, with my business, I've got things to do right now, and I have to fit into the present structure of the world as it is. So, how do you deal with these two things? I think you've got to be schizophrenic. You've got to be spend some of your time, on one day, and some of your time on Monday. And I think you've got to do that, because although you can't predict what will happen; if you don't make yourself a theory of what's gonna happen, you are like a boat without a rudder and you're not going anywhere. It's better to go somewhere and be wrong about your goal than to drift around randomly. I think so, I'd like to say some remarks about how to think about the someday and some of the issues that we should think about. And I think most of all, I'd like to talk about a responsibility of the community of people to participate in forming in the evolution of public opinion, in the kind of image that the rest of the world has. On the school thing for example, I believe that, unless... you know, I know, that next year or in two or three years' time school is not gonna change very, very much. It's gonna be incremental change. But, I also feel the responsibility to prepare the public as much as I can for the fact that one day it's gonna change very radically. That this whole idea of having children in grades segregated by ages is because of a kind of production line of putting out knowledge that we were forced to adopt in the past. It's not about whether it's good or bad. It was the inevitable consequence of the knowledge technology that we had until now, and its inevitable consequence of the new knowledge technology that thing doesn't make any sense. And what

doesn't make any sense survives for five or ten or twenty years, but eventually goes away. So, we've got to be working on the public. And I'd like to touch on a few issues. One that I'd like to touch on very slightly is about our visions of the technology itself. Somebody said a little while ago he likes paper better than (point to computer) he'll never give up paper. Careful, how do you mean you will never give up paper? Really? In our lab, at the Media Lab at MIT, we've got a research group that's making digital paper. Now, that's to say, as stuff; it will feel like paper, it will bend like paper; if you like, it will smell like paper. But it will be a digital medium. And on it will appear writing in the typography that you want. But also in color, in movie, you will be able to surf the world. So, why would anybody then prefer to have static paper when you could have dynamic paper? So, this is a kind of question we've got to keep in mind that it's only, you just think how fast the whole idea of the computer has changed. What you thought a computer was thirty years ago, twenty years ago, ten years ago, today; the change is so dramatic that, well, if you predict into the future, we must not assume the computer is like the ones we've known. In, on my way back, I'm often off to Russia; on the way to Russia I'm gonna stop off and say hello to my friends at the Lego company, who are announcing the production of a little object. That's a sort of a computer; but it's a computer you can hold in your hand; that a kid can put inside a Lego model. That's a computer that doesn't look the slightest bit like this hybrid between a television set and a typewriter that we keep on our desks. And all the questions people ask about how much do you want your children to sit in front of a computer. Children won't sit in front of that computer, it goes in the pocket. And it does all together different things: the child can make a robot, the child can make a model with intelligence in it, and do something radically different? And that's just, you know, this is going to be there in a few months' time. So, in a few years' time it's gonna be even more radically different. The aspect that I'd like to emphasize, though, is that we; there's another way in which we must not be passive. The education community on the whole has accepted the right of the computer industry has decided for example, a certain price point. That people will pay, sort of like a thousand or two dollars at the low end, and four or five or six at the high end, and they've translated technological advance into maybe more power, but at the same price level. They have not found it valuable, profitable, to put research and effort into making a two hundred dollar computer. But why? And that brings me to a question that came up about the rest of the world.

There are one billion children in the world, at what we would consider to be elementary school age; one billion. Maybe ten percent of those children live in countries like Japan or the United States where, although right now they might not have access to computers and the internet, you see a process at work which is going to bring them that in the future. The other ninety percent, most of them,

live in countries where there is no such process at work. I think this is an extremely dangerous situation for the world. And this isn't just a question of humanitarian. Although that's there; it's unfair that those children should be deprived. But worse than that, it's a threat to the existence of all of us, of the planet. It's a threat to creating a global economy, because as long as there are the rich countries and the poor countries, there's tension and danger on the planet. And moreover, if one percent of what has been said in the last two days about how these new media can improve learning, if just one percent of that is a little bit true, it follows that the countries that already have the lead are going to increase that lead.

So, we've got to look, we're in a part of a process which is leading towards the rich becoming richer, and the poor becoming poorer. The "digital haves" are becoming more so, and the "digital have nots" becoming "have nots" in everything else, as well. We've got to; that really is hard fact. And it is our responsibility to make sure that our politicians, and our public and our friends and our aunts and everybody we can talk to has to face that fact. Cause they don't want to. They want to be ostriches. They want to put their heads in the sand. So they say, well, what can you do about it? It's too expensive, I think even somebody here sort of said, well, we can't give every child in the world a laptop. Why not? Why not? It's too expensive Really? Let's do some arithmetic.

Not quite if you've got to buy the computers that you can get in the stores, although even with that you can get pretty close. But if you invested a few of the first five or six billion of this in research and development making a computer that is suitable at price, you could make a computer, that for probably much less than a hundred billion dollars, we could give every child in the world access to the computer.

Now, I don't say that I know exactly how to do that. But I'm saying that it is ridiculous to say that the world cannot afford it; the world has to afford it and can afford it, and the world does afford to deal with other kinds of crises that don't cost any more than this.

As a personel step, I've been involved with Nicholas Negroponte and a few others, in creating an organization that we call the 2-B-1 Foundation Numeral two, letter B, numeral one. And I'm sorry that it has an English pun, but it seems to go across with young people of many languages 'to be one'. The world can be one, but only if the key to the future, the children, are given the opportunity to be one, if we can get rid of those gaps.

And the 2-B-1 Foundation which was launched, which had a conference last July in which we pulled together people, activists from the field, who are bringing computers to children in eighty developing countries. And we have a really seriously thought-out plan to create, within the next year, thousand of what we

call digital outposts in remote and poor parts of the world. And we think in terms of ten, twenty thousand in the next five years. Well we don't, that's not getting to a billion yet, but we hope that we can at least show that we're doing and our bit, and set an example to precipitate other action by other people. But what I'm saying is not necessarily... not only to say the existing organization...it has...it has unfortunately not a very good, yet, web page '2B1.org', but I promise you in the next month it's gonna look a lot better and more lively.

But this is a direction. I'm just pointing to, that I think, the challenge for the future is to recognize that we've got to think big, that we have a huge responsibility, that is not just a matter of improving our schools or getting better grades or doing a better demonstration here and there; we are talking about the fate of humanity and the fate of this planet and we're talking about world peace. Or world strife. And we have to rise to the level of facing the problems that come from that perspective. And these problems are, we must not be passive about the way the research goes.

We must not be passive about, in the face of people who say, "it's too expensive to do anything about it" or "it's not our business, it's somebody else's business". It is our business. And I think particularly we must not allow people to get away with tokenism. Like the United Nations Organization is sponsoring computer labs in a few hundred schools in African countries. Well, great, we ought to applaud that. It's good for those schools. But this is not an action on a scale that is relevant to the planetary problem and the billion children.

Thing big. Thing big and be active and don't let other people push you around. We should be saying what kind of computers we want to see developed, we should be saying what kind we want, we should get out of the mode of debating is all the educators do about whether this model of Windows computer is better than that one, or Apple is better than IBM. This is, we're putting ourselves in the position of playing their game. We should be playing our game. Now, think that everything that's happened in the last two days, all these wonderful demonstrations, there's incredible technology, it's inspiring, and it's wonderful and gives us a sense that we've got a real power in our hands. And so let's not be intimidated. And I think that's not all I wanted to say but all... enough. And thank you very much for letting me take this platform, for letting me meet you, hear you, have many, many great conversations. And I hope we'll all stay in contact in cyberspace, if not in real space, and maybe we will even get to the point where we don't make that distinction any more and just let the boundary disappear.

So, what else can I say? Thank you Mr. Fukutake, and the Benesse Corporation and everybody who's contributed to organizing this wonderful conference.

And, thank you.

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AWARENESS OF THE EARTH AND POSSIBILITIES FOR NEW SCIENCE EDUCATION IN THE INTERNET AGE

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Abstract: The internet as "the nervous system of global size" and multimedia technology have changed our global experience radically and suggests possibilities of entirely new approaches to the conventional education of sciences and the environment.

They are not merely the changes where printed text books are converted into dynamic things with vivid appeal to our senses and information about the world's museums and art galleries, digitalized and shared by all.

If the seismic activities occurring every day in various parts of the world can be seen in real form directly through the internet by all the people of the world, how will children's views of the earth change and how will their scientific understanding improved?

If there was a system whereby one could monitor, in real time, how one member or others of the world net surf the global home pages, and if one could follow the "moving" process on the internet, children would certainly appreciate the presence of the internet as a global network of information.

The web site "Sensorium" (http://www.sensorium.org) was created by us in an effort to put these live experiences of the internet into design.

Sensorium is not a site merely to digitalize and list the existing knowledge and data. It is an experiment for the Digital Museum as a new "forum" where we may experience and share a moment. It is also an attempt to create tools for science and environment education which are only available on the network.

I would like to introduce works using the internet and to share my attempts to encourage children to understand the internet through experiencing in with their bodily senses at a children's workshop jointly given NTT (including an experiment to create a structure simulating the internet by use of paper-box-and-thread telephones). In addition, I would like to present my proposals for use of the Internet/Multimedia for education.

The following three points are of particular importance:

1. The substance of world experience in the age of the internet; possibility of integrating "Intelligence" and "Sensibility".
2. Taking out media from the Black Box (understanding not only "the result" but also "the process").
3. Bridging/combining "Real space" with "Cyberspace".

Awareness of the earth in the age of the internet

In a deep blue space spreading on a computer screen, a vibrating silver globe is drifting. On a closer look, one sees that bubbles are being generated

incessantly at various places as if the entire earth was breathing in and out. It is a part of our Web site, "Sensorium", which was named "Breathing Earth" (http://www.sensorium.org/breathing earth).

Recent images of inner movements of the globe (to be more precise, movements in the two weeks preceding the moment when one watches the home page) obtained by monitoring the seismic movements occurring daily all over the world, were compressed into a CG animation of less than 20 seconds.

The important thing is that this is not a mere fictional image, but is the self-portrait of the "real" earth based on the observation data recorded by seismometers of the world and collected daily through the internet.

Seismometers scattered all over the world are none other than sensors which sense what may be called the fetal movements of the earth at every moment. Data of minute crustal reformations at these sites are successively collected through the information network based on the internet (WWW) and make up a realistic seismic database of global size which is updated daily. Similar real-time data sensing and its accumulation in a database are being performed from various sides such as the temperature of the air, the sea level, wind directions and sea currents, and they enable understanding of world-wide climatic changes such as "El Nino" and the earth's crustal deformations which had before been impossible to comprehend.

In this context, we human beings are now acquiring "a nervous system of global size" which monitors total changes of the "physical" and "emotional" condition of this alive and breathing planet.

Unfortunately, such information resources remain as mere lists of dull numerical data used only by a handful of specialists such as seismologists, and most people do not even know that they exist. Most of the humans on this earth neither feel the presence of this "nervous system of global size" in their daily life nor sense the throbbing pulse of the living body called the earth.

We were thus prompted to create a program based on the seismic database, which is public information property, to convert numerical data, which are meaningful only to specialists, into visible and dynamic expressions which the general public and children can intuitively understand.

This may be described as "building a platform for global sensibility" and an attempt to open a window in each of the individual terminals (PCs) in order to actually feel that each and every one of us potentially has "a nervous system of global size".

We thus understand that the earth is constantly breathing as a "whole", that earthquakes are by no means abnormal phenomena that occur only occasionally

but are "normal" for a healthy earth as they occur every day all over the world, and that earthquakes which we experience in Japan are not isolated or abnormal but are parts of "the incidents on the network of the earth" and linked to other earthquake in Indonesia or the Philippines.

Designing New Experience — The "Hows" and "Whats" of Media

Although what I have described is only a part of the primary experimental stage of the Sensorium project, it is already possible to glimpse the signs of new global awareness and the possibilities for science education brought about by the internet and multimedia.

Our aim was, above all, to search for new world experience brought about by the internet which is something that can only be done by a new media structure called WWW (World Wide Web).

It does not mean merely converting the conventional media contents such as textbooks and TV images into electronic media, and transplanting the collections of museums and art galleries into cyberspace by simple digititalization. It is possible to use the inherent structure of such Web environments to realize platform where one's experiences are holistic.

Further good examples of unique experience in the Web environment are two contents of Sensorium, "Cell Meter" and "Star Place". The former graphically shows how many percent of the body cells of a person accessing the page have been replaced since the last access. (Our body cells are said to be replaced at a rate of several hundred billions a day). The latter is a live system which imparts the sensation of speed with which the earth (on which one exists) constantly moves at an astonishing speed in the space of the solar system by showing how rapidly the number on the counter increases from the moment the page is opened. (Several thousand km in a minute, since the speed is 30 km/second.)

Both designs offer experiences unique to the Web environment which achieves "live" and "updated" recognition that our presence, mistaken as constant and immobile, actually continues dynamic movements and changes, visualized by the unique characteristics of this interaction (mass customizing), which is validated only by individuals actively accessing the pages at different times.

Education through the Internet/Multimedia is not a mere issue of introducing computers and networks as tools. It should be perceived in the sense of how new experiences (WHAT) can be created in children by extending the concept of skillful use of digital technology as a means (HOW) for more effectively conveying existing knowledge.

Only then, does integration of "intelligence" and "sensibility" in its true sense become possible.

"Jigsaw Puzzle" Type Media Structure

In this context, "Breathing Earth" aims at visualizing "earthquakes" and "living earth", but also aims to bring out the substance of the internet simultaneously (indirectly), and to focus on the holistic "sensibility" of living in the new information environment as a latent theme.

It has become possible only through the Net to realize this "daring" attempt to accumulate the data of seismometers from all over the world or nearly every moment in real time and visualize them on a screen which is accessible to all. This is indeed astonishing, and we wished to share with many people our sense of astonishment and gratification or the possibility of such experience. (The site name "Sensorium" expresses our wish to share such a new experimental environment and also to share the "common sense" for the time and situation we are placed in).

The structure of this global experience may be captured by an image which is just the opposite to the one described by Russell Schweicart, an astronaut. He says that his experience of seeing the earth as a whole from outside played a decisive role in creating a new relationship between humans and the earth. This is symbolically expressed by the metaphor of a jumping flea. A flea sitting on top of an elephant does not think that the elephant is a living thing because it is too big, but sees it as a part of the earth which extends almost endlessly. However, if it jumps high in the air and looks down, the flea realizes for the first time that the elephant is not a part of boundless earth but is a limited and fragile living creature like himself. This certainly expresses the situation currently surrounding us where a new phase began for the humans of the 20th century who have gained a privileged viewpoint of looking down at the earth from space — capturing the earth as Gaia, and considering the limits of resources and preservation of the environment in earnest.

Our attempt to monitor the vital movement of the earth through the internet, however, points to another approach to recognizing the elephant called the earth as a whole.

If the view seen by a jumping flea was a whole image seen from the top down, this global sensing of earthquakes may be described as a whole seen from the bottom up by accumulation and editing of the perception of innumerable fleas feeling minute shakes of the earth which clinging to the various parts of a giant's surface.

Recognition of the earth by each local clinging flea is like a fragment (as each piece of a jigsaw puzzle); the fleas are like a group of blind men touching an elephant, as the Japanese proverb goes. But when they are connected by the

network and begin to share their data of "feel", the whole elephant appears as in a completed jigsaw puzzle. It is an image of the world as sensed by a networking group of blind people.

This is a form of recognition inherent to the age of the internet and heralds the birth of a new mode of experiencing the world. It is neither a one-dimensional bird's eye view nor a discrete and localized insects' eye view. It is not a personal structure like telephones or letters nor is it a mass structure like TV and publishing, even though it started from recognition by individual sensors. It enables creating and sharing of the whole image, which is distinct from conventional images, and re-arranges the relation between the individual and the whole in an entirely new way.

Opening Up the Black Box of the Media

This is naturally the reflection of the structural characteristics of the internet.

Often described as "the network of networks", the internet has grown into a complex network of global size from multi-dimensional small local networks as they reached out and joined hands. The hardware structure of the internet has the history of a kind of voluntary "jigsaw puzzle".

The structure of information carried thereon inevitably creates a whole in various areas as small diverse pieces are chained and come together voluntarily as in a jigsaw puzzle.

An easy-to-understand example is the contents of art galleries and museums. Many art galleries and museums of the world currently maintain home pages to show their collections in digital form. As one browses through the world's art spaces by going through the list of page addresses, one fantasizes that one is walking through "a museum of global size". As museum collections are connected on the internet, users are presented with a cyber-museum housing a collection of global size without anybody having designed it.

Even a museum with an enormous collection is merely a small piece among the collections of the world. Instead of the collections being monopolized and concealed in the enclosed spaces of individual museums and art galleries, they are publicly shown in an electronic "Commons" called the internet and shared as a resource, making up a magnificent art collection as in a jigsaw puzzle. The image of the whole "elephant", artistic resources owned by humans, thus surfaces unexpectedly.

This does not stop at a quantitative explosion of vistas of cultural properties and works of art of the world, but is a qualitative leap in information experience. While these contents are the material information of real space (such as paper

and fabric) transferred into cyberspace, they are beginning to be endowed with characteristics unique to the age of the internet in its synergistic mode of experience.

Children, however, will find it difficult to intuitively understand this bottom-up formation of the net sphere.

When looking at home pages, for example, one feels like turning the pages of a book and hardly feels the reality of going through various servers of the world or realizes that the contents of the world are being connected as in a jigsaw puzzle. For them, it is not much different in substance from looking at picture reference books or CD-ROMs.

In addition, as current media education tends to evaluate its effectiveness only in terms of the volume of knowledge acquired and emphasizes skill in the use of the computer as a tool too much, it appears too preoccupied by the result of media technology such as transmission of e-mails and use of home pages and data bases to notice the mechanism or process which enables such results (as in other media). The internet tends to remain a Black Box for many. We have therefore designed an experimental scheme to attract children's attention to the structural substance of the internet and its fun by using two contrasting methods.

Integrating "Cyberspace" and "Real space"

One is an application of "Web Hopper", a content of "Sensorium", which was constructed in the Electronic Arts Museum (Ars Electronika Zentrum) in Linz, Austria (Where most of the visitors are children).

"Web Hopper" was originally designed to show in real time on a world atlas on the web (Sensorium) the loci of trips made by people as they go net-surfing through the home pages of the world. Supposing a person watches home pages from a gateway on the net, we can obtain the IP address data of the servers at his starting point and the destination from the information packet flowing there, through using a tool called TCPdump. When this is converted to geographical information and shown in real time on the atlas, the net-surfing process or the movement of each person is dynamically shown, e.g. from Tokyo to London, and then to New York.

Based on this system, we installed many internet terminals with different color screens and a monitor showing a huge world atlas in a room at Linz Museum. When children browse through Tokyo or London pages from a red terminal, their "red" trace is instantly drawn on the atlas (for instance, from Linz to Tokyo to London). Children can intuitively understand how they are traveling the world by using the network.

With their global travel, the "green" and "blue" traces of their friends who are also net-surfing on the green or blue terminals next to them are visualized on the same monitor. As they share one cyberspace with many others, they can appreciate in real time the sense that accumulation of their information exchange is making up the substance of the internet.

Another experimental attempt which we carried out in a multimedia workshop for children and their parents, given jointly with NTT, used a contrasting analog method to make them understand the internet through their bodily senses.

A simulation experiment was participated in by children who created an internet in the classroom will paper-box-and-thread-telephones in order to understand the bottom-up network structure in a visible, tangible form, and achieved unexpected success.

They experienced the process of creating a local network by dividing themselves into groups of 10, connected to each other by the thread phone, and designating the groups as America, Japan, etc., and then connecting the local networks into a global networks as in a jigsaw puzzle. The analogy will the characteristics of the thread telephone which does not carry voices well unless the thread is given adequate and uniform tension helped them to understand the bottom-up type network which is supported mutually by small pieces.

As they experienced in real form the successful transmission of a message by another circuit when one circuit was cut, they understood the strength and interesting character of the bottom-up, loose-structure network at a far more intuitive level than that the logic of adults, which was born out of the necessity for distributing risks in the age of nuclear wars.

By going through such realistic creative experiences, visualizing such a net-surfing as "Web Hopper" is understood in more concrete terms.

What is Transparency of Media?

To sum up, such attempts are supported by the awareness of two important issues which have a complementary relation with live designs of world experiences such as "Breathing Earth", which I discussed in the beginning.

The first is to emphasize intuitive insight and understanding of the substance of the global information environment called the internet by focusing on the "Black Box" of the media. Additionally, information exchanges or movements should be focused upon nurturing a holistic sensibility of living in that new environment.

Contemporary media such as television, e-mail and home pages are generally like Black Boxes and it is hard to actually visualize their mechanisms and processes. Given only the technical result, one cannot say that the users' sensibility toward the media is being totally nurtured.

"Transparent" media which are merely easy to use become, in a sense, increasingly "clouded" for users.

Secondly, the experience in real space and the challenge of bridging with cyberspace the thread telephone, the internet and "Web Hopper" were all attempts to introduce tangible bodily senses and feeling of distance into abstract media (the process of practice and information exchange).

This viewpoints is the basic concept for the entire "Sensorium" built by us. As the first example of "Breathing Earth" showed that the earthquake experienced earlier in the morning can be seen by re-positioning it on the net, the bi-directional dynamism of the most physical experience is expanded by mediating it in electronic space. There are many people who have become sensitive to the actual shaking of the earth and climatic phenomena since they started looking at these contents.

"Net Sound", the audio content of Sensorium, which is heard by applying a kind of "stethoscope" to the internet and listening to the sounds obtained by converting the packet movements on the network, was created as a mechanism to feel the presence and practice of others who are active in cyberspace or in the real space beyond. When one applies the stethoscope system to the Linz Electronic Art Museum, it is noisy at the time when many children are there using terminals and quiet during the night. It is a system of sensing that one is connected to others who are strangers and that there are certainly real people on the other side of the cyber-network. Could this be another public standard for thinking about the transparency of network media?

At any rate, the concept of not completing our (especially our children's) media experience in cyberspace seems to gain the most importance not merely from the view immersion into electronic space as dangerous but also in fermenting the feeling for more total media and truly expanding the possibilities of the internet and Multimedia.

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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.