宮城教育大学　環境教育研究紀要　第5巻　2号　サプリメント

MIYAGI UNIVERSITY OF EDUCATION

ANNUAL REPORTS OF ENVIRONMENTAL EDUCATION 2003

Vol.5 No.2 Supplement

Proceedings of the International Symposium on Environmental Education 2002

ENVIRONMENTAL EDUCATION CENTER
MIYAGI UNIVERSITY OF EDUCATION

宮城教育大学環境教育実践研究センター

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Opening Address
Miyagi University of Education

Kaoru Yokosuka*

Distinguished guests, ladies and gentlemen, Good morning. Mr. Masayuki Inoue, the Deputy Director General of the Science and Technology Academic Policy Bureau of the Ministry of Education, Culture, Sports, Science and Technology, and Mr. Nobutaka Watanabe, the Chair of the Board of Education of Miyagi Prefecture and Mr. Yoshikichi Abe, the President of the Sendai City Board of Education and distinguished panelists and speakers and participants from all over the world and distinguished guests, ladies and gentlemen, thank you very much for joining us for the symposium despite your busy schedule in December and end of the year. I would like to say some words of gratitude to all of you for joining us today. On behalf of the organizers, teaching staff, faculty, graduate school, students and undergraduate students and the infants and children in the schools attached to our university, I welcome you all. In the area of environmental education, this is actually the first experience to hold an international symposium organized by our university with sponsorship from Ministry of Education, Culture, Sports, Science and Technology. This symposium certainly will mark the first page of a very significant opportunity to lead to a new way for environmental education, and I really would like to say words of thanks to the ministry for selecting this symposium as one sponsored by the ministry. This symposium has the theme of Support for School Environmental Education, by exchanging the research findings and information of all the people engaged in the field of environmental education. This symposium attempts to make some contribution to the enhancement of environmental education in the future. Now, on a global base, environmental issues have attracted much of the attention and also to the education of children in educational arena. This symposium, I believe, holds great significance. The course of study in Japan has been revised. A new course of study was enacted in April this year, and the new comprehensive learning class which dealt with crosscutting issues beyond the various disciplines has started. Therefore, how we raise the awareness toward environmental problems in the minds of children and students and to enhance the improvement of environment and conservation of environment constitute very important themes for all of us. Our university established the Environmental Education Center in 1997, to grapple with environmental issues and education. We exchanged a memorandum in March this year among the universities and Miyagi Prefecture Board of Education and Sendai City Board of Education to enhance the quality of education and to improve the quality of teaching staff in environmental education. This symposium is being held within the wide range of activities toward this end. I hope that we would like to turn our ears to the voices from the fields of environmental education to emphasize the community approach. The various communities grappling with environmental education thereby facilitate participation in the global activities. I hope the symposium will not only activate environmental education efforts in Japan but in the world and with a major contribution made by the Environmental Education Center of the university, we would like to further accumulate the findings of our research on today's symposium to expand the field of research in the

* President of Miyagi University of Education, JAPAN

future. Taking this opportunity, I would like to solicit the support and guidance of every individual with your understanding and cooperation so that our wish and aspiration could be realized in the future. Thus, in holding today's symposium, we are indebted to the efforts of many people, to mention a few, the faculty of the center, the teaching staff of the university, and also people from outside the university, and as you are fully aware the students of our university have been making great efforts in holding this symposium. The teaching staff, students, and people of the university's affiliated schools were involved in the process of teaching material development. Taking this opportunity, I would like to say a word of appreciation to all of you. Let us repeat again, how appreciative we feel for your cooperation, and I really hope that the symposium starting today will be a productive one to all of you. Thank you very much.

Message from the Ministry of Education, Culture, Sports, Science and Technology, Japan

Masayuki Inoue*

Thank you very much for the introduction. Miyagi University of Education is organizing this meeting and Miyagi Education Board and Sendai City Education Board are also co-organizing this International Symposium on Environment Education. I was given this opportunity to speak few words and would like to thank you all very much for inviting me as well. I would like to express my sincere congratulations to you on this occasion. We have distinguished foreign participants as well this time. Let me take this opportunity to say few words on this. Japan is trying to become a nation based upon science and technology, and we would like to emphasize both education and science & technology. Especially, with regard to science & technology, we are now promoting the second phase of the Science & Technology Basic Plan. Amid these plans, we have different priority areas of science & technology to be promoted as "system innovation" is being promoted. What are the priority areas? Life science is one of the areas; nanotechnology, material science as well as information, but the environment, of course, is one of those priority areas that we emphasize. With regard to system innovation, for example, the science & technology budget has been doubled, but one of the initiatives is to enhance the understanding of science & technology among the youth. We would like to make great efforts. That's one of the important pillars of our system reform. Japanese science & technology as well as the academic level need to be improved and heightened, and we have different measures to achieve this goal, and holding international symposia at university level is one of those important measures. This symposium is part of a program to support school education for the sake of environmental education because the environment is a global issue and challenge, and this is an international symposium to deal with education within the context of school education. I believe this is a unique symposium, and therefore we decided to assist in hosting this symposium. That is the backdrop for us assisting this program. I said that one of our priorities is the environment, and the environment is a major challenge globally. The World Summit on Sustainable Development (WSSD) was held in Johannesburg just in August this year, and in 2005 the United Nations will start the Decade of Environmental Education for Sustainable Development at the United Nations level. Thus, there is a globally-heightened interest and expectation toward environmental education. As President Yokosuka mentioned earlier, in Japan as well under the implementation of the new course of study by the Japanese government, there are new hours dedicated for comprehensive studies. So, environmental education is now being promoted, but I understand they are facing many challenges and difficulties and there is still room for improvement and issues to be solved. Sendai City of Miyagi Prefecture is a local government which is very actively engaged in initiatives related to the environment as a Prefecture and as a City. I understand that the schools are actively promoting environmental education and different activities as well. I hope that through this type of symposium, you could really have the opportunity to convey your messages

* Senior Deputy Director-General,
Science and Technology Policy Bureau, Ministry of Education,Culture, Sports, Science and Technology (MEXT), JAPAN

to Japan and the rest of the world. In other words, we can reconfirm environmental issues globally and how we can use such information for school education. We Japanese people seem to be bit discouraged–we lost confidence. However in the last three years, we can say that four Japanese nationals became the Nobel laureates. One of those people actually studied at Tohoku University here in Sendai. Mr. Tanaka is the new Nobel Prize Laureate. It is a hundred years since the foundation of this Nobel Prize. In Stockholm, there is the Nobel Museum for the prize, and if you visit this museum, you can see the "culture of creativity" that is their slogan depicted there. Creativity is the challenge for the 21st century for Japan and for the century of this knowledge, but the keyword "creativity" was written there. There are different keywords. Let me quote in English for example "meeting", "communication", "contact", "networking", "combination", "diversity" and "slump". It's very interesting that the word "slump" is included and "chaos" is also included. That being said, to enhance such creativity, this symposium today is held under the auspices of Miyagi University of Education. I hope that you could serve as the center for networking and center of excellence for these people who are enthusiastic about environmental education promotion. I hope this is not the end of it. I hope this will be the starting point to create the networking of that sort, and I hope that this will become a triggering event for that. With these wishes expressed, I would like to conclude my opening speech. Thank you.

Opening Remarks Miyagi Pref. Board of Education

Nobutaka Watanabe*

Good morning, ladies and gentlemen. On behalf of the Miyagi Prefectural Board of Education, I would like to say a few words of greeting. I appreciate that this international symposium is being held here. We thank Mr. Masayuki Inoue, the Director General of the Science and Technology Policy Bureau from the Ministry of Education, Culture, Sports and Science & Technology, and also distinguished guests and participants who have come all the way to Sendai despite their busy schedules. Since last March, the Miyagi Prefectural Board of Education and the Miyagi University of Education have planned multiple projects together, and this symposium is one of those projects. We think this marks a new page for our relationship in the 21st century. As Mr. Inoue mentioned earlier, in April 2002, the new course of the study was implemented at elementary and junior high schools. In providing such education, environmental issues cannot be overlooked. There are various environmental issues on the global scale, and there are various proposals regarding environmental issues, and there are many problems to be solved regarding environment education. We think it's very important for students to heighten their interests in environmental issues of waste and in environmental concepts based on global issues that are very close to themselves.

During this symposium, through the lecture presentations and discussion, I hope that a specific direction for environmental education or environmental education support can be determined. I would like to conclude my speech by expressing my respect to all of you here this attending this symposium, and also to those who conducted research in education. I hope this symposium will be very fruitful for all the participants. Thank you very much.

* Deputy Superintendent, Miyagi Pref. Board of Education, JAPAN

Opening Remarks
Sendai City Board of Education

Yoshikichi Abe*

Good morning. My name is Yoshikichi Abe, the Superintendent of the Sendai City Board of Education. Today I would like to offer my respect and encouragement to everyone involved in this symposium. I am anticipating a great success, and I am sincerely grateful to have the opportunity to be here today.

Well, how do you like Sendai? The residents of Sendai are proud of the beautiful zelkova trees that line our streets, and dramatically follow the cycle of changing seasons. We are comforted by the vivid, bright green of the new growth in the spring. In the summer, the rich, vibrant green of the dense foliage fills the air with life and vitality. As fall approaches, we marvel at the intensifying display of orange, yellow, and red, as the leaves meet with the cold winter air. The majestic Mount Zao, and other mountains tower over the west of the city, while to the east, the vast Pacific Ocean extends to the distant horizon. We are blessed with delicious water and bountiful harvests from the natural environment around us. I enjoy fishing, and from personal experience, I can tell you where to go to catch various types of flatfish that make a perfect side dish for rice wine.

I am proud to call Miyagi Prefecture and Sendai City my home, and I hope to preserve this area's beautiful natural treasures for all future generations.

For this reason, we must work to raise environmental awareness on the local and international level. On the local level, the city of Sendai has been certified with ISO 14001, and beginning with mayor of the city, we are all working towards protection and conservation of natural resources. The board of education also is working for this cause, and during summer vacation, about ninety thousand people have the opportunity to learn about environmental issues through "Eco-schools." Tomorrow we will hold the "Children's Practical Environmental Forum." I hope that this event, along with other efforts will help to promote our students' environmental awareness. On the international level, I know that people from various countries recognize that the natural environment transcends national boundaries. We share our wisdom and combine our efforts to work towards environmental protection and conservation on a local and international level, and lovingly care for the irreplaceable nature that benefits us all.

Starting today, the "International Environmental Education Symposium" will be held for three days based around the theme of finding the light that will illuminate the path towards saving the natural world. I wish to express my deep respect and gratitude to all of you who will participate in the search for this essential light.

Also, tomorrow's "Children's Practical Environmental Forum" held by the Sendai City Board of Education has been made possible through the cooperation and efforts of many people. I would like to thank all of you, and particularly, I would like to express my gratitude to Ms. Andrea Deri who will present the opening lecture. Because of everyone's efforts, the students of Sendai can gain a heightened environmental awareness

* Superintendent, Sendai City Board of Education, JAPAN

and a broadened from of reference which will enable them to take practical steps towards environmental preservation.

In conclusion, many thanks to all of you who have traveled great distances to join this symposium. As you have heard, I am very proud of this city and its beautiful natural surroundings. I would be honored if all of you enjoy your stay here in Sendai. Thank you very much.

Aims of the Symposium

Kazuyuki Mikami*

I would like to express my warmest welcome to all participants from overseas and Japan on behalf of the Symposium Administration Committee. I would also like to extend my sincere thanks to Mr. Masayuki Inoue from MEXT (Japan's Ministry of Education, Culture, Sports, Science and Technology), Mr. deputy superintendent, Nobutaka Watanabe from Miyagi Education Board and Mr. superintendent, Yoshikichi Abe from Sendai City Board Education for their kind and stirring remarks.

This symposium entitled "Supports for School EE" is one of the subsidized projects of MEXT, being held as an International Symposium in 2002 adopted by the Ministry. Now, I would like to explain about the aims of the symposium and how it came about. The Environmental Education Center was founded in Miyagi University of Education in 1997. The center aims to cultivate people of abilities to gaze with deep interest and anxiety, to have a high sensitivity and a strong sense of responsibility about environmental problems; to be aware of the importance of prevention against environmental pollution and the destruction of nature and to act for the environment. Especially, we are asked to contribute to the environmental education at school.

Five years have passed since the foundation of the center, so we wanted to evaluate our achievement and then decided to hold an international symposium as a new step.

We believe that environmental education is based on a high sensitivity to nature and affection for humans. In this symposium, we want to know about the good practices of school environmental education in foreign countries in collaboration with educational institutions on environmental education, and want to discuss about how environmental education should be at school.

Now in schools in Japan, environmental education is carried out in some subjects such as social studies and science or in the class of "integrated learning".

"The integrated learning" started recently, but has already some problems. To the persons who wonder if environmental education might be a kind of fashion, it is no more a main subject of the integrated learning. Global education however has become the main, because parents expect that their children learn English as an activity of global education in school. But people should notice that environmental education and global education are one. Environmental education was based on a variety of wisdom and on real information.

I wonder if it is sometimes difficult for schoolteachers to acquire the variety of wisdom and the real information. If there is a system to support activities of school EE, it must be helpful for schoolteachers. Then, they can get a lot of information anytime they need. To build up the system, we have to discuss the contents of a supporting system; how the system should be and what institutions such as universities can do for them. For such reasons, we planned this symposium.

Now, I would like to explain about the contents of this symposium. After this opening session, Dr. Jack T. Moyer will give us a special lecture on the ability of nature on environmental education. Then, Dr. Paul H. Williams will also give us a special lecture on how the results of environmental science are reflected in

* Chair of the Symposium Administration Committee, Director of Environmental Education Center, JAPAN

environmental education at school.

The first session of the symposium was entitled by "Challenges from Supporters' Viewpoint". In the session which will be held this afternoon and tomorrow morning, some case studies on practicing environmental education will be reported on from Australia, Thailand, Germany, China, USA and Japan.

On the second day, the meeting place will be shifted from here to Izumity 21. In the session entitled "Expectations and Requests from Schools", some remarks or comments will expressed by Miyagi Prefecture Board of Education, Sendai City Board of Education and Kesen-numa City Board of Education.

In the afternoon of the second day, Sendai city will organize "Children's Forum for Environment" that is co-organized by Miyagi University of Education. At the beginning of the Forum, Ms. Andrea Deri will give us a special lecture entitled "School, Community, Environment". She sent questionnaires to all elementary and high schools by internet and obtained quite interesting results, I heard. We will have a good opportunity to notice some characteristics of children.

After the special lecture, children will present their environmental activities at each school. All attendants may have a chance to know about the present activities of children for the environment in Japan.

On the last day of the symposium, the meeting place will come back to this International Center. We will have talks on "For the Future of EE". This year, the World Summit on Sustainable Development was held in Johannesburg. According to the paper, NASA published a simulation of the melting of polar ice. In such a way, it is the important time now for environmental education. At this symposium, we would like to ask you to discuss what universities and research institutes can do to support school EE. Based on the results obtained, we want to expand the scope of our activities and contribute to school education.

Nowadays, we are living in the midst of intricate information networks. Some information is useful but most others are unnecessary or incorrect. In the crowdedness of hasty urban life, we sometimes have an illusion as if we are in a honeycomb. To think about our environment, we have to get back a sense of wonder of nature, life and the whole environment around us. The difference of DNA sequences between a human and a chimpanzee is said to be only 3% or so. Nevertheless, their life styles are very different from each other. I wonder if we lost something on the way in the development of civilization.

The attendants here from foreign countries might see yellowish-brown fruits, called "kaki" in Japanese, on the branches of persimmon trees. I heard that in the Sendai district, people leave some fruits on the top for birds and give some on the low level to travelers, and eat the remaining of the middle level. Since old times, we Japanese have had good customs to live with other people and also with other forms of life, though some customs are exceptional. We have to remember it.

We have to have a lot of discussion during the symposium but the time for it is limited. I would like to ask you for substantial discussions. I am sure that this symposium will be very fruitful for exchanging information and creating new ideas to support school EE. In addition, I hope this symposium will bring all participants into a deeper understanding through good discussions for children, and into warm friendship with each other.

In closing, we thank Miyagi Education Board and Sendai City Education Board for their joint auspices, and also Kesen-numa City Education Board, IGES, the Japanese Society of Environmental Education, the Ecosystem Conservation Society Japan, FMM and UNU for their special cooperation. We also appreciate the support of Miyagi Prefecture, Sendai City and all communications including newspapers and television stations. Thank you for your attention.

Nature and Human Life

Jack T. Moyer*

The rapid deterioration of our natural environment, coupled with the unfortunate worldwide swing away from environmental problem solving (*e.g.,*the Kyoto Protocol, etc.) toward old-fashioned nationalism and preparations for war, only makes it more obvious than ever that environmentally-focused educational programs are badly needed. And, in fact, in Japan there has been a major increase in environmental education in the schools, especially at the elementary school level. Sadly, though, most such programs are mainly classroom-centered, often taught by teachers with little or no actual first-hand knowledge of wild nature.

Among the educational programs that actually take place in natural settings, many, if not most, focus on collecting specimens and, if the program is ocean oriented, cooking and eating things taken from the natural environment. Such old-fashioned approaches to nature education are out-of-touch with the realities of dwindling biological diversity in the 21st Century.

Students learning in the classroom about the rapid pace of species extinctions develop no personal identity with nature. It is too commonly imagined that people are somehow unique and different from nature. Actual “low-impact” studies in the natural environment are badly needed. Because our planet is made up of roughly 70% oceans, ocean education is especially urgent. However, the media-created image that the oceans are dangerous continues to hinder development of actual in-the-ocean education. Fortunately, this is changing.

For 16 years I have been conducting in-the-ocean environmental schools for children from grades 5 through high school. Minimal environmental impact is stressed, no specimens are taken nor even touched, as students make three important discoveries: (1) the oceans are fun, (2) the oceans are spectacularly interesting and (3) the oceans are of immense value. Of course, staff members are well-trained in rescue, and safety is the top priority.

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* Naturalist, The President of Miyakejima Ocean Family, Adviser to the Miyakejima Nature Center, JAPAN

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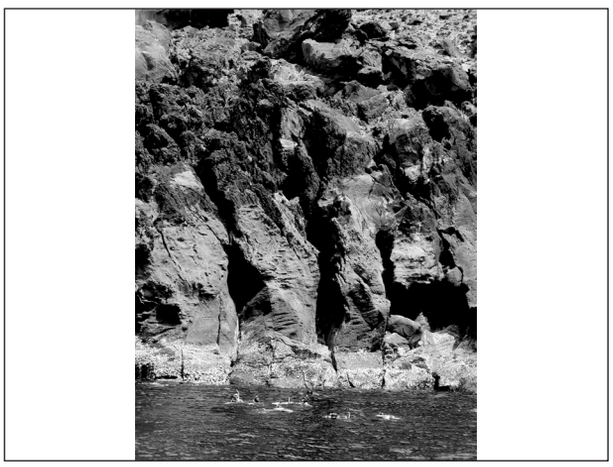

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Photograph : offered by Ocean Family Club

Environmental Education: Accessible to All

Paul H. Williams*

As articulated in the U.S. National Science Education Standards, there is a great need for teachers to understand the nature of science and to learn how to engage their students in authentic science activities both in and out of the classroom. The Wisconsin Fast Plants and Bottle Biology programs, www.fastplants.org, are both derivatives of my research and teaching at the University of Wisconsin which have come to be valued and widely adopted in science and environmental educational curricula across the United States.

Fast Plants, *Brassica rapa,* are small rapidly growing plants that I have bred to have a 40-day seed-to-seed cycle and are closely related to many Japanese and Asian brassica vegetable and oil seeds. Fast Plants can be easily grown in classrooms using accessible lowcost materials. Fast Plants are ideal: 1) for exploring all aspects of plant life cycles growth, development and reproduction; 2) for investigating how plants respond to the environment; and 3) for understanding the relationships among variation, adaptation, reproduction and inheritance. They are also widely used in research on genomics, plant physiology, ecology and evolutionary biology. A recent addition to Fast Plants is instructional materials for investigating many aspects of the life history of the cabbage white butterfly, *Pieris rapae,* a natural pest of brassicas.

Bottle Biology is an educational technology in which recycled packaging containers such as plastic bottles, food containers, film canisters, etc., are constructed as equipment for environmental and biological explorations in the field, at home or in the classroom. Bottle Biology fosters self-reliance and student ownership.

Accessible, low-cost Fast Plants and Bottle Biology materials centering on investigations of organisms and their environments provide a strong basis for a growing understanding of the natural world by teachers, students and their families.

* Lecturer in Center for Biology Education, University of Wisconsin-Madison, U.S.A

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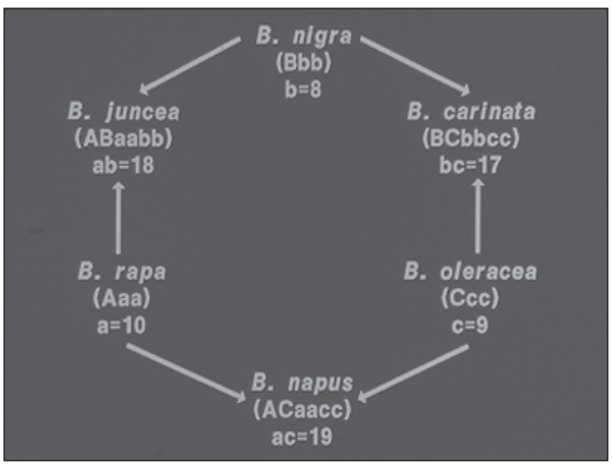

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SPECIES BASE POPULATIONS

CGC#	Species	Days to flower	Days for cycle	Cycles per yr.
1.	*B. rapa*	16	36	10
2.	*B. nigra*	18	38	9
3.	*B. oleracea*	29	59	6
4.	*B. juncea*	20	40	9
5.	*B. carinata*	28	58	6
6.	*B. napus*	26	56	6
7.	*R. sativus*	19	49	7

CGC = Crucifer Genetics Cooperative

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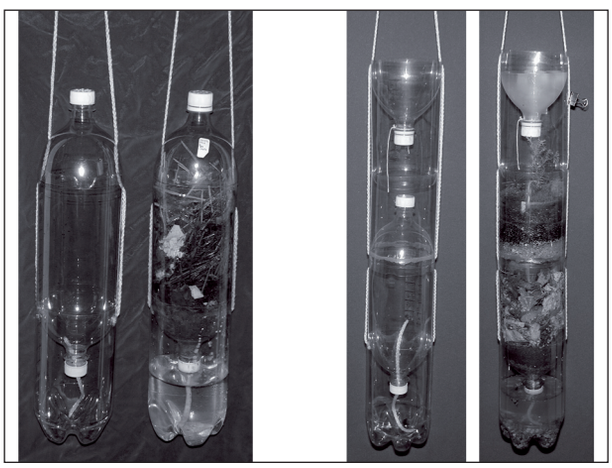

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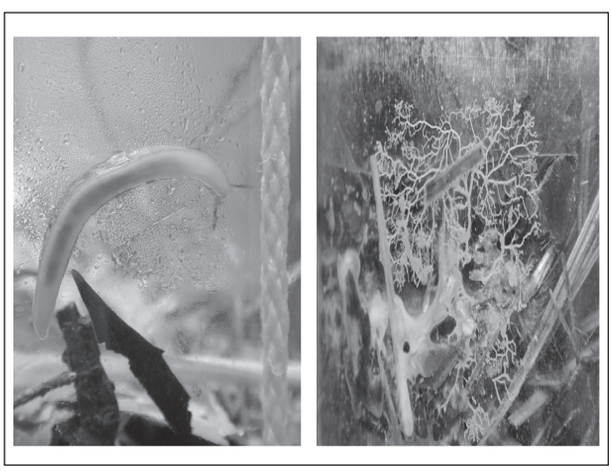

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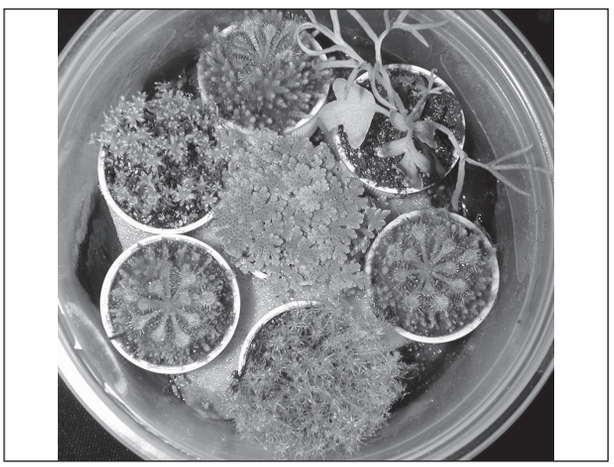

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Environmental Education in Australia: Towards Sustainable Schools

Vicki Keliher*

Introduction

When the Australian Academy of Science convened the first national environmental education conference -*Education and the Environmental Crisis* ― in 1970 (Evans and Boyden 1970), Australia became one of the first countries to engage with the newly emerging form of environmental education. Despite the early promise, the impetus to introduce environmental education into the formal curriculum in Australia often seems to stagnate. It is hoped that the release of the *Environmental Education for a Sustainable Future: National Action Plan* (NAP) in July 2000 will underpin a resurgence of environmental education throughout Australia, particularly in the formal education sector. With the support of the initiatives and strategies that arise from the NAP, Sustainable Schools Projects in the formal sector in all states may now be able to provide broad-based and effective environmental education.

Hence, this paper begins by providing a brief overview of the development of environmental education in Australia so that the place of the National Action Plan (NAP) may be better understood. The second section outlines the initiatives and strategies of the NAP. These strategies may provide both the impetus and a viable framework to enhance the development of environmental education policy in all Australian States and Territories. Support provided through the NAP should enhance the establishment of Sustainable schools projects in most states. Sustainable Schools should be able to implement environmental education programs that provide information, enhance understanding, challenge and review values, alter attitudes and promote changes in behaviour that lead to a more sustainable lifestyle. While significant levels of non-government support for sustainable schools projects exist in many states, only New South Wales has introduced an *Environmental Education Policy for Schools*. Support documents for this policy offer some guidelines for delivering environmental education programs through a school environmental management process. Therefore, with the New South Wales curriculum support document *(Implementing the Environmental Education Policy in your school (2001))* as a guide this paper concludes with an overview of the strategies and key elements fundamental to success of Sustainable schools.

Environmental Education in Australia ― A Brief History

The field of environmental education, as we currently understand it, grew out of increasing awareness of environmental degradation and the concerns being voiced by scientists and others in the 1960s. Of course, environmental education has been with us, in one form or another, for much longer than the last thirty years. Indeed those writers who look to the 1970s as the 'beginning of environmental education' may have overlooked the indigenous perspectives in environmental education. The Aboriginal people who first settled this land

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40 000 years ago established a human ecology that was in harmony with the natural ecology. Australian Aborigines have elaborate systems for codifying their knowledge of the land, its cycles, the need to respect it, and the management practices that allowed them to use the land and its resources in a sustainable way.

However, the field now known as environmental education has its beginnings in studies such as nature study, outdoor education and conservation education (Stapp 1974, Gough 1997). Australia was one of the first countries to engage with environmental education when in April 1970 the first Australian national conference on environmental education was convened under the auspices of the Australian Academy of Science (Evans and Boyden 1970). Australian representatives were also present at the Belgrade workshops in 1975 (Fensham 1976). However, by the time of the Tbilisi conference (UNESCO 1978) two years later the impetus appeared to have been lost (Fensham 1978).

From the mid-1970s, environmental education became an educational and political priority for the national Curriculum Development Centre (CDC). With the support of CDC the Australian Association of Environmental Education (AAEE) was founded in 1979 (Gough 2001). AAEE has provided support for many initiatives in environmental education and assisted in keeping environmental education on the political agenda in Australia over the last twenty years. However, since the abolition of the CDC in 1981, environmental education has not been afforded the priority nationally that it was given previously. Environmental education has to compete, often unsuccessfully, with other adjectival educations (*e.g.* social education, Aboriginal education, gender education) for space in the curriculum.

While the Tbilisi Declaration on the role, goals and objectives and characteristics of environmental education remain as a guiding influence in Australia and internationally, several other major national and international publications and conferences have been instrumental in guiding the development of environmental education in Australia. In the early 1980s the National Conservation Strategy for Australia noted the need to educate the community about sustainable development and conservation and to strengthen and develop school environmental education programs (Gough 2001). In 1988 a National Curriculum was developed in cooperation with the states. As a partial response to *Our Common Future* (World Commission on Environment and Development), the new curriculum targeted environmental education and encouraged the development of environmental education policy in all states and territories. As a result of this *Hobart Declaration,* most states developed environmental education policy documents. While these policy documents provide useful support for environmental education in schools their implementation is not mandatory. Although these policy documents received some support from teachers, this support was patchy, restricted to primary schools and the secondary Geography and Science, and tended to focus on the natural and physical environment (Smith 2001). In many cases these policy documents have not been reviewed for over ten years.

The United Nations Conference on Environment and Development (UNCED) held in Rio in 1992, prepared a framework for international known as Agenda 21. Chapter 36 of Agenda 21 calls for the integration of environmental education throughout all levels and sectors of society. Australia was slow to respond in any coordinated way to this call (although some states produced new or revised environmental

education policy documents). The Thessaloniki Declaration (UNESCO 1997) sought to further clarify the concept of environmental education or education for sustainable development. This Declaration presented sustainability as an imperative to which education should devote itself. At the same time individuals and groups within Australia began to focus more clearly on environmental education. It was at this time that work commenced in earnest on a review of the national needs for environmental education.

The Federal Government discussion paper, *Today Shapes Tomorrow* was released in 1999. This paper noted that students should develop an understanding of and concern for the natural environment and develop knowledge and skills that allow them to contribute to ecologically sustainable development. As a result of responses to the discussion paper Environment Australia (a Federal Government Department) published *Environmental Education for a Sustainable Future: National Action Plan.* It is hoped that the strategies suggested by the National Action Plan will provide the impetus and a viable framework to enhance the development of environmental education policy in all Australian States and Territories. Support provided through the NAP can also enhance the establishment of Sustainable Schools projects in most states.

The National Action Plan.

Information received in response to the 1999 discussion paper *Today Shapes Tomorrow* provided valuable insight into environmental education requirements in Australia. Comments received from stakeholders were used in the development of the document, *Environmental Education for a Sustainable Future: A National Action, Plan* that was launched by the then Minister fro the Environment and Heritage, Senator Robert hill in July 2000. The NAP is designed to foster greater coordination and effectiveness in environmental education across Australia. To achieve this the NAP recognises three key areas for action. The NAP aims to address the current needs in environmental education in Australia; enhance leadership for different sectors in environmental education; and act as a starting point to enhance national efforts in ecologically sustainable development.

The NAP aims to deliver a national environmental education strategy that can assist all Australians in moving 'beyond environmental awareness to informed action' (Environment Australia 2002a). The NAP begins by providing a broad definition of environmental education. That is environmental education should:

> . . . encompass raising awareness, acquiring new perspectives, values, knowledge and skills and informal processes leading to changed behaviour in support of an ecologically sustainable environment. (NAP 2000, p. 3)

Furthermore, the NAP (2000) outlines several principles for the conduct of environmental education. It suggests that environmental education should:

- involve everyone;
- be lifelong;
- be holistic and about connections;

- be practical; and
- be in harmony with social and economic goals and be accorded equal priority.

Through the community consultative process associated with *Today Shapes Tomorrow* a large number of proposals for future action were received. From these proposals the NAP (2000 p. 5) identifies several recurring themes and presents these as the key areas for action. These areas include:

- Development of a national framework for environmental education;
- Raising the profile of environmental education in Australia;
- Better coordination of environmental education;
- Greater access to quality materials;
- More professional development for teachers in formal education;
- More integration of environmental education principles into mainstream education;
- Better resourcing of community organisations.

The intention of the NAP is to provide a framework for environmental education in Australia and to advance the objectives of environmental education nationally. In order to address the action areas the NAP (2002a pp. 5-10) then goes on to identify nine strategies that it is hoped will increase the profile of environmental education, provide more resources for environmental education and encourage the integration of environmental education into mainstream education. These nine strategies are:

1. National Action Plan
2. Establish National Environmental Education Council (NEEC)
3. Establish Australian Environmental Education Foundation
4. Communicate importance of environmental education
5. Update Australian environmental education web site
6. Establish a national environmental education network (NEEN)
7. Environment Australia environmental education working group
8. Environment Australia grants
9. National training program

Not all of these strategies have been fully implemented. The National Action Plan has been released and adopted. The NEEC meets several times each year and has already initiated a number of activities aimed at raising the profile of environmental education. Activities of NEEC have helped raise the profile of environmental education and promoted better coordination of activities. NEEN was established in 2001 and is still developing its working arrangements. However, it has already been instrumental in providing funding to support the Sustainable Schools project (Woods 2002).

The NAP is starting point in the move from emphasising awareness of environmental issues to developing the knowledge, skills and values that are essential in promoting sustainability. While it is not meant to

replace the work done by state and territory departments and community groups involved in environmental education, it does provide strategies and funding opportunities for advancing the importance of ecologically sustainable development. In particular, the Federal Government has provided a funding package to enable a pilot programme for Sustainable schools to be extended in Victoria and New South Wales. Sustainable schools aim to develop a holistic environmental education program that can be used as a model for the development of similar programs in other states.

Towards Sustainable Schools

Environmental education seeks to enable all students to contribute to the achievement of a sustainable society. Environmental education encourages students to acquire the knowledge, skills and attitudes that assist them in embracing sustainable lifestyles. Environmental education is not just another subject area vying for a place in an already overcrowded curriculum. Environmental education should be seen as a way of teaching. The integration of the principles of environmental education and sustainability across the whole curriculum is one way to promote the transition to a sustainable society.

'The defining feature of the Sustainable schools program is the integration of existing and fragmented approaches to environmental education into a holistic education program' (Environment Australia 2002b). The move towards a comprehensive and successful Sustainable schools program requires reform in three areas:

1. Reform of Curriculum
2. Reform of School Management
3. Reform of Teacher Education

The first two of these areas combine to produce Sustainable schools and it is these areas that are clearly addressed in the Sustainable schools project. The area of reform to teacher education is being addressed through professional development projects and in-service support. However, at this stage there appears to be very little reform planned in the pre-service teaching area, although initiatives of the NEEC tertiary education sub-committee may begin to address this issue.

Sustainable schools have the potential to realise the transition to a sustainable society. Although Sustainable schools projects exist in several states, it is only in New South Wales that environmental education is mandated. This means that from 2001 the environmental education curriculum statement became policy with clearly enunciated minimum requirements. The curriculum support document, *Implementing the Environmental Education Policy in your School* (NSW Department of Education and Training 2001) clearly links environmental education objectives with the outcomes of syllabuses and emphasises integration of environmental education principles and objectives across the curriculum (Smith 2001). The Sustainable schools project in New South Wales as an example of what can be achieved in environmental education.

The New South Wales environmental education policy requires schools to develop a school environmental management plan that focuses on three areas. These areas are:

- ❖ Curriculum — a move from content to process, from single subject to cross curricular, from knowledge about the environment to knowledge about issues of sustainability and from activities in the environment to environmental action;
- ❖ School Resources Management — realising that institutions teach us by what they do, being aware that students need to live in a society that demonstrates a sustainable lifestyle, monitoring water, energy and waste, and ensuring sustainable and democratic management practices; and
- ❖ School Grounds Management — ecologically sustainable management of the built and natural environments.

Obviously, the development of a truly sustainable school does not happen overnight. The curriculum support document in New South Wales recognises this and provides guidelines for a step-by-step process towards becoming an 'environmentally active school'. This framework provides a tool for evaluating and monitoring the implementation of environmental education within a school. The expected final outcome of this process is a sustainable school that exhibits the characteristics outlined in Table 1 below.

The curriculum support documents also state (NSW Department of Education and Training 2001, p.19) that the 'most successful environmental management plans are those where the process of change' is:

- participative: involving students, all staff, parents, local groups;
- holistic: employing an integrated approach to environmental management of the site, the school community and the curriculum; and
- sustainable: ongoing with a commitment to continuous improvement.

Table 1: Characteristics of a sustainable school (from Smith 2001, p.9)

Whole School Planning	**Curriculum**	**Resource Management**	**School Grounds Management**
• Whole school commitment to environmental management plan. • Logical and holistic plan is evident. • Effective action plans in place and regularly reviewed. • Objectives in all focus areas are met. • Progress reported in school's annual report.	• Effective environmental education is integrated into all Key Learning Areas. • Opportunities for environmental education are maximised. • Demonstrated implementation of programs that address all environmental education curriculum objectives. • Programs are based on environmental citizenship and personal action.	• All resource management objectives are met. • Purchasing, resource use and waste management integrated across whole school. • "Best Practice" employed. • Learning opportunities incorporated. • Progress visible and reported.	• Management is consistent with principles of ecologically sustainable development. • Grounds developed to enhance environmental education. • Progress reported. • School community demonstrates commitment to grounds. • A diverse learning environment with positive impacts on the local environment.

There is a vast range of environmental projects that can be initiated through the sustainable schools model. Successful programs can provide information, foster understanding challenge values, alter attitudes and change behaviour towards a more sustainable lifestyle for all the community. The New South Wales model provides clear guidelines that underline the importance of involving the whole school community. This model also encourages the incorporation of external programs and environmental organisations in the school environmental education programs. However, one aspect of a holistic environmental program that is only briefly addressed in the New South Wales model is the linkage of the school community to the wider community.

Environmental education must be relevant for students so it is important to provide them with the opportunity to take action that links them to the real world. Students need to be able to see that they can make a difference and that the 'Think globally, Act locally' adage has currency. Educators must be able to set up links to the wider community and other outside agencies in order to make environmental education relevant and meaningful.

Coady (2001, p.1) suggests that there are fundamental strategies for developing a successful program that moves the school community towards becoming an exemplary sustainable school and forges links with the wider community. These strategies include:

- Fostering shared vision and leadership with staff, students, parents and the community)
- Appointment of focus people
- Open communication structure
- Utilisation of experts within and outside school community
- Release time for people to manage projects
- Preparation of proposals to resource projects
- Engaging partners and maintaining partnerships

Several key elements that contribute to the ongoing success of environmental education programs in Sustainable schools are also outlined by Coady (2001, p.1). First, a successful program needs to be inclusive and collaborative with clear actions, time lines and responsibilities. An environmental education committee with representatives form staff; students and parents can be effective in encouraging the adoption of new processes and practices (Coady 2001, NSW Department of Education and Training 2001).

Second, there is always a need for funding to support time release and resources for staff to develop and implement programs. Schools must be able to identify funding opportunities outside the education system. This is one area where the National Action Plan can be of assistance. 'To date 111 schools have been funded under the Natural heritage Trust and 2300 schools have been involved in the Trust-funded Waterwatch program' (Woods 2002, p. 6).

Third, there must be an ongoing monitoring process. Such a process can ensure that time lines are met

and can measure progress against the sustainable schools framework. Fourth, review and evaluation can determine the effectiveness of the environmental education program. Review and evaluation can establish the extent to which the environmental education program is raising awareness and understanding of environmental issues, promoting the development of sustainable solutions among students and the community and providing opportunities for action.

Finally, and perhaps most importantly, there must be celebration. Celebration is essential to maintain motivation and counteract the paralysing effect that often results from concentrating on the complexity and magnitude of environmental problems. It is important for the whole community to be aware that we are not facing an ecological doomsday. Celebration of the positives can be empowering for all.

Conclusion

Since the first conference to highlight environmental education took place in 1970, environmental education in Australia *has* moved forward. Despite the perception that the introduction of environmental education into the formal curriculum has often seemed to stagnate, this review of the state of environmental education in Australia shows that much has been achieved in the last thirty years. The release of the *Environmental Education for a Sustainable Future: National Action Plan* (NAP) in July 2000 has injected new hope and prompted a resurgence of environmental education throughout Australia, particularly in the formal education sector. With the support of the initiatives and strategies that arise from the NAP, Sustainable schools pilot projects in the formal sector in Victoria and New South Wales are set to provide an exemplary model for environmental education that can be introduced in all states. Sustainable schools will implement environmental education programs that provide information, enhance understanding, challenge and review values, alter attitudes and promote changes in behaviour that lead to a more sustainable lifestyle. Sustainable schools can encourage students and the wider community to achieve a level of understanding, competence and citizenship that enables them to contribute to the achievement of a sustainable society. We should all celebrate the successes and encourage an ongoing process that will result in all schools being sustainable.

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Environmental Education: A Case of Thailand

Alisara Chuchat*

Thailand is one of the front line countries that value Environmental Education in its education system and school curriculum. Over 40 years, the school curriculum has been contained either the content or knowledge concerning environment in various form and subjects, from the elementary up to secondary education. If one divided the development and progress of environmental education, it could divide into 3 periods. The first period, from the early sixty to mid seventy, environmental education was established as one subject called **"nature study"** and it was offered at the elementary education. This very name might familiar with many countries. At this time, the status of environmental education hardly observed at the secondary education. In 1975, Thailand had changed new education system and launched a new school curriculum from grade 1-12. At the beginning of this change, environmental education was part of other subjects such as part of life experience subject at the elementary education and one unit on ecology as in science subject both at the lower and upper secondary education.

Until 1990's after the world summit at Rio de Janeiro, the environmental education was named as a subject and established in the school curriculum. However it was categorized in the field of social studies and was offered at the lower secondary education or junior high school as an elective course. At other levels of education, the environmental education was integrated in subject such as life experience in the elementary education and partially touched upon environmental education such as ecology in the science subject at the secondary education. In 1998, it was the first time that science education committee took an active role in educating our children about environmental education by developing a new subject called **"environmental science"** and assigned it as a compulsory course for every students to study at the upper secondary education. Despised the named environmental science, the objectives and content was focused on educating our children of the next generation to understand sustainable development and care for our environment. At the very same time, the King of Thailand has motivated and encouraged the Thai people to conduct their life on sufficient economic which very much carries the environmental value in it. Thus, the Thai people as well as Thai education and school curriculum accept His profound thought and put into practice as part of the main theme of environmental education and sustainable development.

In the year 2001, the government of Thailand announced the education reform and launched the new curriculum framework. At this time, there's a policy for all school curriculum to integrate environmental education in all subjects particularly science, social studies and health education.

One uniqueness of working on environmental education in school in Thailand is that environmental education is not only concerned by the Ministry of Education, but there're also other agencies and

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organizations such as NGO's and other government organizations. These organizations have been working closely and collaboratively among each other and with the schools in order to reach the success of environmental education that is to inculcate our children to love and care for our environment. The case that can be observed, the Ministry of Science, Technology and Environment has produced supplementary readings, teacher handbooks, audio visual, poster and printing materials for the use of teaching environmental education. National Energy Policy Organization (NEPO) is another semi government authority has funded one of mea-project for integrating environmental education in the school from elementary up to secondary education. At this moment, environmental education could be observed in almost every school in Thailand.

DEVELOPMENT OF EE. IN THAILAND

- **1960 – 1975**
  Nature Study at the Elementary Education (grade 1-7)
- **1975-2000**
- **(Change of Ed.System and Implement New Curriculum)**
- **Integrate Environment Knowledge ie. Ecology**
- **In: Life-experience Subject in Elementary Ed.**

1

- Science Subject at the Lower Secondary education

1990's:
* Environmental Education as elective course at the Lower Secondary Education
* Environmental Science as compulsory course at the Upper Secondary Education

2

- 2001 Education Reform

Environmental Education must be integrated in all subjects at all levels
Especially in Science, Social Science and Health Education

3

Environmental Education

- Ministry of Education
- Government Organization & Semi-autonomous Organizations
- NGO's

4

Selected Project/Work

1. NGO

- The Chao Phraya Barge Programme

2. Individual

- Community Forest (Research Project)
- Learning from the Rice Field (Local School Curriculum)

3. Network Project/Work

- The Dawn Project
  (The Integration of Energy and Environmental Conservation at the Elementary and Secondary Education)

5

Corporation among 3 agencies

- Ministry of Education

- National Energy Policy Office
- Thailand Environment Institute

6

CONCEPT

- **PARTICIPATION** * HOME- SCHOOL -COMMUNITY
  * IN SCHOOL
  SCHOOL PRINCIPAL-TEACHERS-STUDENT
- **LEARNING** * ACTIVE LEARNING APPROACH
  * MEANINGFUL LEARNING
  * PROJECT APPROACH
  * LIFE-LONG LEARNING
- **INTEGRATION** * IN ALL SUBJECTS
  * AT ALL LEVELS
  * BY EVERY TEACHERS

7

OBJECTIVES

1. TO RAISE AWARENESS OF ALL THAI PEOPLE REGARDING: THE ENVIRONMENT PROBLEMS AND ISSUES IN THAILAND AT LOCAL, REGIONAL, COUNTRY AND GLOB

2. TO RAISE CONSCIOUSNESS OF INDIVIDUAL REGARDING HIS/HER ROLE IN ENVIRONMENTAL PROTECTION AND CONSERVATION

8

3. TO BUILD IN MORAL COURAGE IN TAKING ACTION ON ENVIRONMENTAL PRACTICE

4. TO DEVELOP HABIT OF ENVIRONMENTAL AWARENESS

5. TO TAKE ACTION ON ENVIRONMENTAL ACTION WITH UNDERSTANDING

9

PHASES OF PROJECT

- **PREPARATION STAGE**
  - MENTORS PREPARATION
    * NATIONAL LEVEL
    * REGIONAL LEVEL
    * PROVINCIAL LEVEL

10

PREPARATION

- ► Participatory and Empowerment Approach
- ► 3 Phases:

phase I

* Awareness in EE
* Teamwork

11

phase II

* Introduce approaches and methods in teaching EE
* planning for implementation

phase III

* Sharing expereinces

12

TARGET

- • 600 SCHOOLS
- • 300,000 STUDENTS
- • 23,400 TEACHERS
- • 2,400 COMMUNITY LEADERS
- * 300 SUPERVISORS

13

RESULT

* **ENERGY COMSUMPTION REDUCED BY 10 %**
* **80 % OF TEACHERS & STUDENTS HAVE IMPROVED COMSUMING BEHAVIOR**
* **COUNTRY WIDE NETWORK**

14

STRENGTH

- **CLOSELY CORPORATION AMONG ED. INSTITUTES AND MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT**
- **DEPARTMENT OF ENV. QUALITY PROMOTION ACTS ACTIVELY AND CONTINUOUSLY**
- **NETWORK AMONG TEACHERS, EDUCATORS AND OTHER CONCERNED GROUPS (INFORMALLY)**

15

SUPPORT FROM DEPARTMENT OF ENVIRONMENATL QUALITY PROMOTION

1. SUPPROT INFORMATION
2. SUPPROT FUNDING
3. SUPPORT IN INCREASING ABILITY AND CAPACITY OF TEACHER IN WORKING ON E.E.
4. SUPPORT THE TEACHING/LEARNING MATERIALS AND SUPPLEMATARY READINGS

16

NEEDS

- Teacher preparation for E.E.
  * limited in number
  * occasionally rather than regularly
  * no formal preparation for pre-service teacher
  * should focus on helping to understand the inter-relationship among nature, nature and human being and their way of living

17

- There're positions for teachers in different subjects except EE.
- Understanding and competencies of all subjects teachers to master the integration of EE in the curriculum and teaching without preparation

18

- SCHOOL PREPARATION

  * ADMINSTRATOR/ COMMUNITY/ CORE TEACHERS

- IMPLEMENTATION PHASES

  * TEACHERS PREPARATION

  * TEACHING
    *INTEGRATION
    *PROJECT
    * EXTRA CURRICULUM

19

- Support from all level from the Ministry of Education and School Administrators
- Easily Access Information

20

Environmental Education in Germany : Towards Sustainable Schools

Heiko Crost*

Biophysically, it is not the best time to have a lecture. In Southern Europe, you have the habit to make a “siesta”, but today that is not possible and so I will use the method of very famous Austrian － British composer, perhaps you all know him, it is Haydn. He used in its symphonies when he had the feeling, that the audience fells asleep a big drum. Unfortunately today there is not a symphony and I have no drum.

First of all, I have to thank very much to the Miyagi University of Education for the perfect organization and even a person with a big jetlag feels comfortable and has therefore to thank Prof./Dr. Mikami, Kazu, thank you very much!

Just a bit about my person: For what I get my money for today, it is to direct the “teacher in-service training institute” in Frankfurt. We are making courses in environmental education, but I am also responsible for courses in mathematics even in literature and so on. And only a small part of our courses are in environmental education, but my passion, my brain and my heart is just till of my students days in environmental education. So I became engaged in the “Deutsche Gesellschaft für Umwelterziehung” that means “German association for environmental education” and I am working there in the executive board.

Europe is compared to the United States or Australia, divided in a lot of countries, very small countries and so we have an umbrella organization for environmental education, and so I am talking today (even if my home country is Germany) as representative of the “Foundation of Environmental Education” this umbrella organization in Europe.

We heard today several times the well known slogan think global, act local and so my lecture today is about global aspects and how to organize it locally. Let it say so: we are working not only in Europe meanwhile also in other countries of the world. I am talking about the every day practice in eco-schools. That is my main topic. I will give you the background of our international dimension, and how it works. This is very similar in all partner countries FEE is an umbrella organization as I already explained. I will tell you something about the NGO organization and his structures about his members and the four programs. This foundation is running also other school-projects like “Young reporters”, “Learning about Forest” and the very important program of “Eco-schools”. In the year eighty-one, four European countries decided to make environmental education together, to run programs together. If someone in Germany puts all his rubbish in the Rhine River the neighbour countries of France, Belgium or the Netherlands will have the result of a polluted river, so you have to make environmental education programs across the borders. Today we have

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nearly no borders in Europe. You can travel from Finland to Sicily without any passport. So we are making efforts to come closer not only in environmental education. For FEE as an umbrella organization with in the moment 29 member countries it is very important that there is no governmental dependency. Governments are changing at least every four years, perhaps even quicker. So we have the chance in FEE, that we can have discussions and decisions without being connected to political parties. The central topic of FEE is the environment.

At my first power-point-page I tell you something about twenty-six countries engaged in our program of eco-schools, but twenty-nine countries are members of our organization, but they don't run all the program of eco-schools. They run other programs of FEE. In the last year, we gave up the third E from FEEE (it was the E standing for Europe) because we went globally. South Africa, Marocco, Russia, Chile and the Caribbean islands want to join us. Today we have as first full member, South Africa outside Europe and now more countries are applying to for membership in this umbrella organization. The idea is, not coming from Europe with a type of new imperialism and saying "Oh, we have a good idea. Join us and you have to do it in the way we are doing it." No, that is wrong. We just want to network together and bring the fruitful ideas of all countries together. You have not to invent the wheel every time new again and again. So as I heard the lecture from Vicki, I noticed a lot of ideas they are comparable to ours. Perhaps linking together with Australia must be very good. Our organization is a very democratic organization. The FEE General Assembly is held once a year and every member country sends one representative to this General Assembly. This year we had the General Assembly in Istanbul, and next year it is in Germany. All delegates are voting for the executive board. I am a member of the executive board and the treasurer. I can tell you this is not a very good job to be treasurer in this time.

We have four programs running, "Eco-schools" is one. We have in every country a national program director of eco-schools and one international coordinator. You can see it is a real border crossing organization. The international secretariat is today adopted by the "Tidy Britain Group" it is sitting in the United Kingdom near Manchester. The blue flag campaign, I tell you on another page something more about the blue flag, is for marinas, and beaches with good bathing water qualities. The international coordination of "Eco-schools" is sitting in Lisbon, "Blue flag" in Copenhagen, "Young reporters" in France and "Learning about Forest" is till the end year sitting also in Copenhagen and then changing to Germany.

The "Blue flag" campaign, run by FEE, is also an environmental education program. I would say for communities, beach management and for tourists. So, we are giving them an eco-label and this is for beaches and marinas they fulfill specific criteria. This campaign is every year at every beach with seminars for the users of the beaches, for the community and also for the owners of sailing boats and motorboats. It is the environmental management of the coastal areas, what is important for us. We are measuring the water quality, the facilities for handicapped and of course safety criteria are very important. The success you can see here, we have an amount of beaches because the communities are very interested to get the "Blue flag". If they have the flag at the beach, tourists will pay attention and say "Oh, here it must be good. It must be clean. I'm making my holidays at that beach." So tourism is very interested in this award. Last year we got

an ecological price from a big European tourism company so we are happy to run this program.

Another project is for young people: "Young reporters", it is for students at a higher level. It is a research work in the internet, writing little articles in newspapers about environmental problems. Doing the research with internet and communicating it in the internet. It is for the secondary schools. Another program is "Learning about Forest" (Leaf). The countries we are working within the northern part of Europe, in Scandinavia, have a lot of forests and the problems are very different from those in Spain. In Spain perhaps students have to learn how to handle the fire problem in the woods, or having no water in the woods, so this program is based on twenty-five years experience in Scandinavia "to learn in the forest with the forest" and to have school lessons outdoors.

Now, to our most important program: **"The Eco-schools program".** It is how we have also heard from other lectures, it has to have an impact on the whole school and it is a certification program. Every school gets after one year and only for one year this symbol. The school is allowed to have it on the letter heads and even gets a flag. We call it "Green flag", this eco-school flag. About the necessity to involve the whole community according to the local agenda twenty-one it is not only having lectures or lessons about environmental education, no (!) you have to work together with the community with parents and other students. I told you FEE is an international organization and you see most of the European countries are now members. It is not exactly updated we have three countries more now in the middle of this picture we have South Africa but I must confess I couldn't manage it to bring an other flags in this presentation. Of course we are linking and informing with a website here you find the address: www. fee-international.org! It is like all the other projects I mentioned. Blue flag, Young reporters, Leaf and so on. What is the use for being in FEE for the countries, because the countries have to pay a certain sum for being organized in this umbrella organization? They get back every third month an online newsletter, there are meetings at least twice a year of all national coordinators in a host country in Europe (in future perhaps world wide) and we supply all the schools with a logos, resources, leaflet and papers for lessons. I like just to mention here the eco-schools "seven steps process". This is really indeed the cornerstone of the program. It is as I mentioned the approach for getting involved. Every one has to take part on the community level. It is an action in the sense of a local agenda. In nineteen hundred ninety-four the project was financed through the support from the European commission, from Brussels we got money today, the financial situation is not the best so we are running the program without financial help of the European commission, but we are today supported from UNEP (United Nations Environmental Program) with his head office in Nairobi. We have also sponsors they give us a bit of money to run the program. On the national level or the local level, it is a bit easier to get money. A lot of countries get money from communities. On the scientific and pedagogical range we are working with universities together. You see here on the right side of the picture, the name of the word eco-schools. That differs from language to language. Sometimes it is called "gron flag" like in Sweden or in Denmark. The name differs but the idea is in every country the same. The eco-schools history is, as you can see, a big success. We have of course differences between participating schools and awarded schools. Here in these first years we had no symbol for an award then we created this green flag and then we needed certain efforts to have the flag. Till today in 2002, we have a lot of participating schools but give not every school which is participating the award. It

is not enough to plan in a concrete school environment two or three roses in a school garden. That is not enough for our idea of environmental education as you all know. If you look of our internet page of eco-schools you find all these flags, and if you click just the country perhaps you find the link of the national situation of eco-schools behind that, how many schools took part in special events and special problems and so on. This page is perhaps most important for the sense of our eco-schools program. I will just explain it very short because of the time I will not explain it too long. The situation is the following in this idea:

1) You start with an **environmental review.** That can be in the school. It can be outside in the school in the community, you go out with students and look at your nearest environment and then you list all damages and the dirt and you make a review about the local environment.

2) Then you sit together in the so called **"Eco-schools comity":** teacher, parents, students, and you discuss together the problems you have seen.

3) You have reviewed, and then you decide to make an **action plan** for the solution of the whole situation.

4) Then when you have made an action plan you will go to **working groups** with students for solving the problems. And if you can't solve it, you work at this problem.

5) The next step is to make an **evaluation** of the working and the decisions what is the best way to solve the problems.

6) Last but not least you have to inform the other students, they have not worked with you, you have to inform all the parents, the community and all who are involved, and then as a result you make an **eco-code** for your whole school about the behavior, about the action, and the result you want to have.

Here you see photos from practical examples: here is just an eco-school committee it is perhaps a bit too big, but sometimes it is a whole class sometimes it is only a group of five or ten persons. If you have very active students they want to take part all, because they feel important.

This is an example just for a review. You are going with your students just across your school and just in a corner or outside you find rubbish and you say "How can it be solved?" Perhaps this is easy, take it and bring it away. But how can you bring the rubbish away where have you to put it, what is the reason that you have found that dirty corner. The action plan as I told you is not only to clean the dirty corner. That is not enough. To think it over what is perhaps the reason for it and how you could prevent it in the future.

You have found for instance a water tap in students toilet is dripping. What can we do and what is a reason for saving water or going by bicycle to school.

Of course we have scientific research possibilities. As you have all said it is necessary to do research in

all the subjects. Here you can see a picture of a science lesson.

What is very important, to celebrate, if you have won this green flag you have to make a celebration or a party because the whole school has to identify the aims of the "green-flag". Look, it is a very different. Sometimes it is only a small group getting that for the whole school. Sometimes it is a very big group, so don't forget celebrating.

One of the ideas of my lecture is to invite you all to work with us together. If you want to become a member of FEE don't hesitate. It is very good and interesting to work together. It is just the possibility to build up an international network. You give your students the possibility to have another school as a partner, fill out this application for linking. Ask other eco-schools what they are working in environmental affairs, and as a result you get an answer from another school, so you have the chance to work together with schools from Iceland to Morocco from the Caribbean to South Africa on the same program. It is best education, and a work for understanding each other not only in Europe but for different parts of the world.

Thank you.

Support for Promotion of Environmental Education in Japanese School

Toshihiko Higuchi*

Objective of this report

The objective of this report is to explore how to support the environmental education to Japanese formal education. Since the books on environmental education guideline by the Japanese Ministry of Education, Culture, Sport and Science were issued in 1991 and 1992, there had been any developments in school environmental education of 1990's, in comparison with that of 1980's. However, we still have any issues for success story of environmental education, although we got some good results in formal education. One of the issues is the support to environmental education in formal education.

Contents in this report

1) Why support to school should be promoted in environmental education?

Firstly, we discuss the reason why the support to school on environmental education should be promoted.

2) What ways of support for environmental education are necessary in formal education?

In this section, we explore the ways of support for promotion of environmental education.

3) Partnership on professional development or teacher training related environmental education among organizations.

Examining examples of teacher training workshops, we discuss the fruit and issue in professional development and teacher training, and examine the support by NGO's, environmental authorities and universities.

4) Interaction between school education and local environmental behavior.

Finally, I would like to show that the support to school in environmental education has the good effects for local environmental behavior.

1) Why support to school should be promoted in environmental education?

The reasons why support by outside of school should be promoted in environmental education are as follows.

* Environmental education is new theme in formal education.
* It has interdisciplinary feature.
* It has learning activities with real world related to local nature, culture and society.
* The change of the Course of Study from this year has the new period, "the Period of Integrated Study" that has the educational object to bring up ability of problem resolution.

2) What ways of support for environmental education are necessary in formal education?

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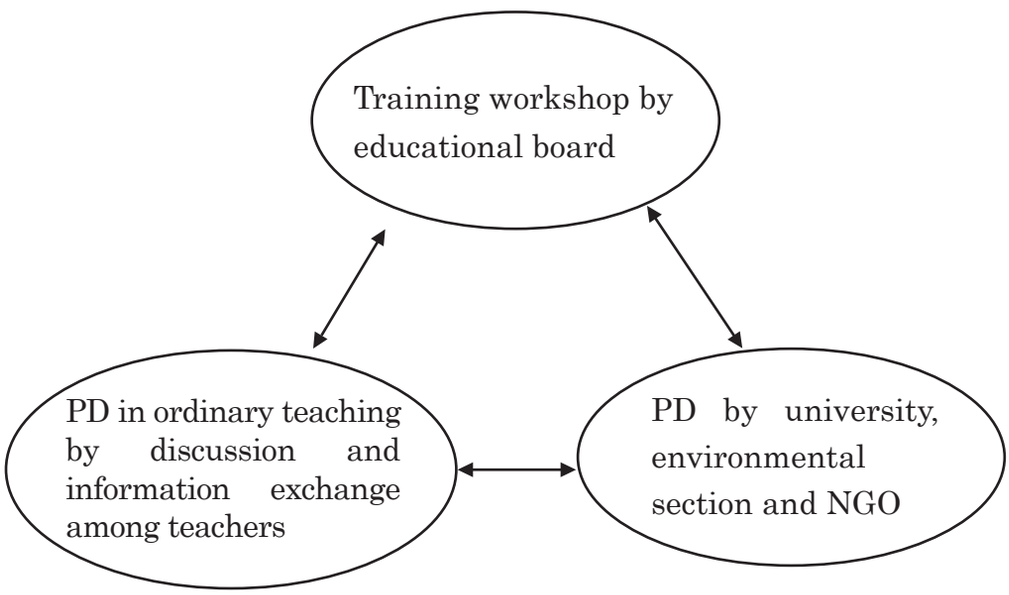
* Educational support by the able organization and people of local society in practice of environmental education.
* Support on development and information dissemination on leaning activities focusing on local environment.
* Establishment of resource system supporting educational exploration by students during inquiry process or problem based leaning in the Period of Integrated Study.
* Support by local community when creating environmental friendly schoolyard and school building.
* Environmental learning center with professional interpreter, environmental information and educational materials.
* Support on professional development through teacher training workshops.
* Emotional effect to school by making the Action Plan for Environment as Local Agenda 21 with civic involvement.
* Support by promotion of national or international project for environment with common theme.

3) Partnership on professional development or teacher training related environmental education

As an example of support systems, an idea of partnership on professional development is discussed. When the ways of support described in the above are examined for implementation of professional development, we have to offer the system with good relationship among the educational board, environmental board, NGO, teacher organizations as union and subject research association, and university.



Partnership on professional development among organizations

4)　Interaction between school education and local environmental behavior

Finally, I would like to show that the support to school in environmental education has the good effects for local environmental behavior. The effects are as follows.

* Use of school facility by community.

* Confidence on environmental action in people who participate to support the educational activities in school.

Learning in Nature: Perspective from Behavioral Biology

Chiemi Saito*

Summary:

Children can enjoy and get adapted to harsh environment much more easily than adults. Then, through the experience, they learn how to deal with nature, and then would in turn really understand the power of the nature. Thus, to develop the attachment to the nature in children's mind, what we need to give children is not knowledge, but real experience in the nature.

This is the biggest goal of environmental education for school age children.

In this lecture, I would like to emphasize only a fact that "we are a part of the evolution system". Everybody is a part of a species named *Homo sapiens*, which is a mammalian species that evolved from more primitive living creatures taking billions of years. It is important to be conscious about it when we think of the development of children. Just imagine a man who has been grown up in a green house, under some moderate temperature and humidity for 24 hours a day. Suppose that he has been fed the same food everyday, which is very soft, tasty, and made of perfect nutrients he needs. Suppose that he has been spoiled as much possible, having no objection from others in any case. This man won't be able to survive in the real life: he may not be able to handle with social problems, he may get flue very easily, may complain all the time about the climate. If not, at least he will suffer pyorrhea. This example sounds extreme, but we have known many examples in which children under extreme environment show abnormal behaviors or health problems when they get grown up. Many diseases like bad teeth, diabetes, high blood pressure, fatness, lack of vitamin-C, constipation, or other psychological problems are partly derived from the diet of developed countries, which is very much different from the food to which the body of human being is adapted. Even if we can enjoy highly technological life without moving a finger, the fact that you are still an animal, that need particular environment for your survival and reproduction, will never change.

As Human being, we need clean air, variety of plant and animal food, sunshine, water, proper temperature, other people who can cooperate with us, and so on. In other words, we need particular environment for our lives. But the environment in nature is never stable. To adapt to the dynamics of our environment, e have abilities to be adaptable to different environmental factors, and that ability is acquired by the complicate interaction of genetic elements and developmental process. We should not neglect the necessity of proper development in proper environment for our healthy and sound lives.

Then, what is the proper environment we are supposed to be in? The only answer is "the life like people before agriculture", which is about ten thousands years ago. Remember that we human being evolved taking more than four million years, but most of the time-until the beginning of the agriculture-our lives were rather

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stable. We were living in the nature, coordinating with the nature perfectly. Our body and brain had been designed for the life in the nature, and we still have the same design.

We feel comfortable in the forest when it is very hot, or we feel safe when we are with family or friends.

This is the real environmental problem for children. In the developed countries, or even in developing countries in many cases, children are deprived of many opportunities to learn from nature. It if not essential at all to teach children how human being are stupid to pollute and overexploited natural resources. This is something anybody can learn anytime of one's life. What we need it not to stop the children to experience as much possible in the nature, so that children, who have the mechanism to learn and develop their skill much effective than adult people, can have their chances to be wiser than us.

I have not dicussed about sustainable development so far. If children can have sound body and brain, does it have nothing to do with the sustainable development of the earth? Yes, it has. If we need sustainable world, we must solve many problems, and also we know instinctively that we need deep respect and love for nature that we have lost.

People tend to feel uncomfortable when it is too hot or too cold, when there are insects surrounding them, when it is dark, or when the sunshine is too strong. People tend to feel comfortable when they do not need energy to move to different places. People prefer soft and highly nutritional foods than fibrous food. The preference is mostly made up through the developmental course. We have to admit that it is easier to spoil children than to put them into the environment that is severe for grownups. But children can get adapted to harsh environment much more easily than adults. Then, through the experience, they learn how to deal with nature, and then would in turn really understand the power of the nature. Thus, to develop the attachment to the nature in children's mind, what we need to give children is not knowledge, but real experience in the nature.

This is the biggest goal of environmental education for school age children.

We staffs of the Environmental Education Center, Miyagi University of Education, have launched the "friendship project" since 1996. In the project, we train university students in the natural field, and after enough experience, we let them to lead children in wild. We do not plan detailed schedules, as we believe that children should not have the idea that they have to do something there. We just release them in the nature to help them learn by themselves. At the beginning, it is very hard to teach university students not to say "No!" or "Don't do it!" to children, as they are the easiest way to control children's behavior. The almost only thing leader should do is to do something that can inspire children's voluntary experience. When children start make questions, leaders must be able to answer properly, but leaders should not force children to ask questions. It may not sound like school education, but we believe that children need to feel more in nature and interact with each other in wild. They need to love the experience in nature much more, so that they will think about nature and grow interest in natural systems.

The Development of Environmental Education of Elementary School and Junior High Schools in China

Zongmin Wang*

This year is the thirtieth anniversary between China and Japan in their normalization of diplomatic relations. In the days of commemorating this important historical event, China and Japan's specialists in education got together and talked about the environmental matters of interest to both sides. This is of great importance.

We all hope that the 21-century will be a new century that can keep peace in the world, protect the environment, and preserve men on a regular developed way. As China and Japan are very close neighbors, who are just separated by only a narrow strait of water, in order to make this ideal come true, I think these two nations must keep friendly relations.

From the point of view of environmental ecology and geography, as it were, China and Japan are an environmental community that is difficult to separate. Therefore, it's extremely important for people in these two countries to use for reference and environmental education. Now we're facing the crisis of water resources, decrease of forest area, desertification of land, extinction of species, acid rain, greenhouse effect, ozone layer depletion, life garbage, air pollution etc. If we don't pay close attention to environmental education, don't protect the environment and bring it under control, the earth will gradually lose the ability to offer human being's life. The point of environmental issue is education. Education is expected to be put into operation from kindergarten, elementary school and junior school. Next, I'm going to do some brief introduction about the problems of environmental education in China's elementary school and junior school.

1. Environmental Education's Rise in Elementary School and Junior High School

Since China carried out reforms and an open policy, in the course of economic construction and development of society, we're always confronted with the problem of two relations. One is the relation between environment and development. Choosing the way "Construction ~ Environment Destruction~ Administer again", or choose the way "At the Same Time", which means doing the construction while protecting the environment and doing the development. Most people approve the way, which goes together with environment and construction and also coordinates growth. The second is the relation between human beings and nature. Choosing antagonism and destruction, or making a harmonious atmosphere? Instructive experiences tell us when human beings make good relations with nature, both of them make a profit, and then they developed. On the contrary, if human beings and nature just have antagonism and destruction between each other, there is no doubt that they will be destroyed. Human beings and nature should cross a river in the same boat and help each other develop. Anyway, we have to receive this kind of education first of all when we try to establish this kind of consciousness, to form this kind of ability.

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(1) Mentioned at "Basic National Policy"

The Chinese government in 1983 held a national environmental protection meeting. It was definitely mentioned, "environmental protection is a basic national policy". It also expounded that environmental education plays an important role in the environmental protection cause. The National People's Congress held in 1989 adopted "Environmental Protection Law", then went a step further to authorize the environment protection's position as a basic national policy. For the first time a national environmental education meeting was held in 1992. The theme of this meeting was "Protect Environment on the basis of education". Environmental protection, in fact, the key to environmental protection is education. Environmental education is a national policy while it is also a national condition.

(2) Stress Environmental Education from Moppet

According to the guidance of "Protect Environment on the Basis of Education", at the meeting of national environmental education that was held in 1992, we emphasized the need to strengthen environmental education from four aspects. One of the important aspects is "Through environmental education in elementary school, junior high school and kindergarten, try to train and improve children and young people's consciousness of the environment." There's a necessity to stress environmental educational for children. Environmental education has been included in our nine-year's compulsory education, and it has also been brought into elementary and junior high school's education program and teaching planning. A group of middle school students wrote a letter to Premier Zhu Rongji in 1999. They mentioned that we have to stress environmental education for children, compile teaching material for environmental education, attaching importance to forestation and so on. Premier Zhu Rongji made comments and said: "Junior high school 2 year students concern themselves so much with environmental education, which made us elders ashamed." Some departments concerned were asked to adopt their suggestion. Our country's basic education has been reformed in the curriculum since 2000. On the standard of elementary school, junior high school and high school's curriculum and complacence of teaching material, they all lay emphasis on including the content of environmental education.

Environmental education of elementary and junior high school has the widest cover, the strongest prevention and it has greatly influenced one's whole life. It has the special action that other environmental protection measures can't take the place of.

2. Enforcement of Environmental Education in Elementary School and Junior High School

(1) Environmental Education's Goal and Content in Elementary School and Junior High School

Now environmental education's goal, the recognizance of content and operation are still at the stage of experimentation and exploration and we haven't got the final conclusion. We listed the aspects below.

1. At first make students conscious of the environment and the value of the environment.
2. Master initial basic knowledge and technology of environmental science.
3. Train the correct environment emotion and moral behavior from the beginning.
4. Train student's ability to participate and solve the problems.
5. Have the initial ability of estimation cope with the environment measure has been adopted.

Some schools make environmental education's goal and content from the angle of psychology. Such as knowledge, emotion, consciousness, behavior and so on.

There are also some areas requiring "light green" training according to the elementary school's environmental education. Generally, middle schools carry out "middle green" training, emphasize the spread of environmental consciousness, improvement and volunteer service. Some special schools keep the "deep green" as their aim, combine the knowledge of environmental protection, practice and responsibility, so it can reach the demonstration, radiation, movement, and demand of region in environmental protection.

By means of environmental education, students undergo a process which is non discipline ～ other' s discipline ～ self discipline ～ self-consciousness. So their independence of will and originality have been developed further.

(2). Environmental education's Way and Method

When environmental education was organized at the beginning of the 1980s, the way and the method were quite monotonous. The content of environmental protection has always been connected with homerooms. As a result of twenty year's practical exploration, environmental education emphasized synthetic study and systematic education currently. It combined classroom instruction with extra-curricular activities; spread of knowledge with the improvement of ability; rational recognize, emotional experience with practice; instruction in school with instruction out of school, total evaluation with different links and different stages of evaluation. Bring in classroom instruction, research and investigation, extracurricular reading, actual practice, information exchanges, some activities have a main theme, regional activities, summary of experience, action research, contests in school and so on. Environmental education can be conducted by means of such various kinds of forms.

<1> Green Classroom- Bring Environmental Education into the Classroom

After long efforts, the construction which includes compulsory lessons, elective lessons, and activity lessons "three green course" are being formed little by little. This construction that contains synthetic education, will take effect in many different kinds of classes. It also guides students to do synthetic study. Tinajin Shiyan NO.7 Middle School's seventh grade takes "Water Resources" as the main content for environmental education. Teachers teach water's physical properties in physics lessons; teach distribution of water resources in the world in geography lessons; teach the relations between water and life in biology lessons; teach the method to investigate statistical data in math lessons. Teachers also teach students how to write a report in Chinese lessons. Students and teachers jointly organize to investigate the situation of seas and rivers. They went to Jixian Yuxiao reservoir and mountains to extract water in order to write research reports. The eighth grade takes "Pollution Problem" as the main content and infiltrate it at all kinds of teaching. Teachers guide students to take the synthetic study. For example, in history lessons, we know that the education at that penetrate with environmental protection laws. The Chinese traditional figure Xia Yu used his own method to bring flooding disasters under control. The first environmental protection code in the world called "Tian Lv" was finished in the Qin dynasty. And we also have "Tang Lv" since the Tang dynasty. In the Song dynasty, planting trees in spring and protecting dams in summer was considered as common sense. This kind of compulsory study is still being used at few schools as experimentation currently. For example, set up the compulsory course like "Environmental Science Basis". According to the statistics, almost 80% of middle schools in our country put environmental education in the school education and teaching program. According to some imperfect statistics, there're almost 50 kinds of editions which have been compiled as teaching materials.

In addition, some outside reading is welcomed by middle school students. As newspapers we have "China Environment Newspaper", "Environmental Education", "Earth Family". As popular science books, we have "General knowledge of Environmental Protection", "Guide to Environmental Education", "Shout to Green" and so on. Especially, Jane van Lawick-Goodall's "In the shadow of man" is really very popular. Some schools and classes set up "Green books" as a special bookshelf. However, generally speaking, reading materials for environmental protection are still not enough and they can't satisfy the reading demand of students.

<2> Activities with Green Themes

From both sides of basic knowledge, technology of environmental protection and modern environment protection's popular and important problems, we should select the theme of environmental education to guide students to a synthetic study center on one theme. The theme such as "Protect the earth's lung-forest", "Protect biology's diversification", "Atmosphere and survival of human beings", "The earth village is on the verge of crisis", "Treasure the water of life", "Green food and green consumption", "Re-understanding China's vast territory and abundant resources", "Environmental Protection and Development that can be continued" and so on. There are also some environmental protection activities, in which literary and artistic creations are held. The song that names "the song of green team members" was also produced.

We have also developed some education activities according to the commemoration of the environment. Such as "forestation Festival", "The week of loving birds", "World Environment Day", "Ozone Day" etc...

In addition, lots of schools have a couple of green science and technology groups in order to protect the environment. They also have some mean themes. For instance, the working room of "Green Life", research group for environment protection chemistry", the geography group concern themselves with world affairs and love our country; the group for "survey of water quality"; the group for "noise testing"; the working station for new sources of energy.

<3> Green Base Activities

Some schools and areas, which are in the lead of environmental education, have their own education base. This kind of base activity has stabilization, systematism and substantial results of education.

Shanghai Caoyang NO.2 Middle School formed "room", "field", "river", and "road" four green synthetic synthetic study bases. "Room" is to build an environment protection laboratory about 100 square meters. "Field" means a botanical garden in school; it contains lots of kinds of trees and more than 20,000 kinds of flowers. "river" is a river near the school. For more than 20 years students continue to investigate, extract, analyze, write essays, take some measures of the pollution of river water's quality, plants, soil and so on. "Road" means the streets of the region that the school belongs to. As to the plants on the streets, car's exhaust gas, survival rate of vegetation, the influence of shops, they mentioned that different kinds of vegetation should be planted because of the road's different situation. They also participate in doing the activities to put the river in order.

<4> Green Society Practice Activities

Society practice activities are important channels for carrying out environmental education. Its the essential space for students to close society and develop their personality. Through these kinds of activities, students are endowed with the chance to contact the society and reality, to understand the environment, to society and reality, to understand the environment, to strengthen the consciousness of the environment and their ability of environmental protection will be increased also.

First of all, the cooperation between school and region is important. To organize the environmental community together, to give on the activities whose theme is "School, Family, Community-Our Green Homeland in common." Students take part in activities within their power like planting, protecting greenery, beautifying the environment, administering pollution and so on. And also develop the activity that is related to the contract "keep the green pledge and strive to be the green citizen. In the community, the students delegates work as "Green Ambassador", "Young Green Bodyguard", "The sentry post for supervising the environment" to do some service. Some families also take part in these activities very positively. The help each other and make some environmental under taking; the situation that school, family and community build the environment net together has been formed. School, family and community's activities have been realized. It makes students who have the synthetic study prove the way to environmental education. It contains realizing the mass of character, becoming a regular practice, knowing the system and scientific knowledge.

On the other hand, schools also organize many different kinds of social practice activities for students. It's useful for them to be close to nature, to be close to society, to study in the practice actively. It also helps them to cultivate their character. After some activities such as summer camp of environmental protection, doing some investigation by bicycle, students got lots of chances to understand nature. They wrote some reports of their research and investigation. One student said with deep feeling, "If we fully recognized the nature, then we can understand ourselves much more."

<5> Green Science Research Activities

On the way of environmental education, guide students to made lots of kinds of science groups by themselves and around some theme. Of course to imitate the science work person's manner is very important.

In order to research the air's quality, some group members went to different places to take snow on the snowy day. Then they put them together to do the laboratory test, analyze them from both physical property and chemical property. The final step is to compare them together, then complete the report.

In the activities of biology group, one student asked a question. There used to be a swallow living at his house, but since he moved to a new clean house, he could never see the swallow there. He wanted to know why. As everyone is interested in researching this problem, they made a theme that was "house's outside wall's affect for swallow building nests". Within 3 months they went to 359 houses to do the investigation, research 97 swallows' nests, read many data. At last, they got the result. Whether swallows can make a nest or not is not related to whether the house is new or old, but depends on whether the wall is rough or not. It is successful for students to learn some synthetic study through it.

Many science groups make lots of kinds of activities. For example, "the research of Tianjin wild animals", "the investigation of main road's vegetation pollution", "danger of noise and exhaust gas", "measure the amount of bacteria of disposable chopsticks", "investigation of used battery's environmental pollution", "research of the effect on creatures from cigarette smoke" and so on. More than ten middle schools in Tianjin have a good relationship with the Japan Community Education association, they cooperate to have the activities of "nature classroom".

By means of doing investigation, research, and practical activities like a young science work person, students became to lead these things by themselves. Their logical minds will be improved through this kind of synthetic study. Their ability was trained scientifically and the synthetic ability was improved a lot.

<6> Green Management

Environmental education needs the relevant organization in order to keep education under control and always be held effective. With the support of the Chinese government, according to the lines of national environmental education's action, the activities of having an education appraise through comparison about "Green School" is held in many places in China. These activities have been held for 5 years, even now there are 105 schools which have been evaluated as "Green School". More than 5000 schools were given commendations by prefectures and cities. This year we also had the national green school environmental education meeting. More than1000 green schools and 10 thousand teachers took part in this meeting. It took 5 months to finish it and the commendation ceremony was held in Beijing. These activities play an important role in the development of environmental education.

With the support of government, environmental protection associations and young people an environmental science fans association was set up. Schools set up lots of kinds of groups, graduate courses and the environmental education and then the education net is formed. Some schools developed environmental education very well. They established seven "one". They are one plan, one system, one base, one teaching material, one series of activity, one team (teachers and students), one group of typical case"

A lot of cities set up environmental education web sites and many schools have their own environmental education homepages. It strengthens the exchange of environmental education information not only in China but also in other countries. It also promotes the development of environmental education little by little.

3. The Problem that Elementary School and Junior High School Environmental Education are faced with

Environmental education in elementary school and junior high school in our country started a little late. The level of development in total is not so high. Especially, consciousness to protecting the environment is light; the environmental education in all places hasn't been developed on all sides. Some students have very heavy pressure of study, so it affects them to take part in the activities; the number of trained teachers of environmental education is still very small. We still lack funds for environmental education.

The Chinese government is paying more attention to protect the environment. We made fifteen plans for Chinese environment protection. We hope that with the support of the government, we can strengthen the system building of environmental education; strengthen the teaching material building of environmental education; strengthen the training of the teachers of environmental education; improve the fund of environmental education, then the environmental education will be developed much more.

We hope our new generations will be the generations who have much more strong environmental consciousness and can make some new contribution to the world's environmental protection.

Environmental Education in Wisconsin: A Teacher Education Approach

Randy Champeau* and Jennie Lane**

Jennie Lane

Introduction

Thank you for the opportunity to visit your beautiful country. You are such a great nation. I am very excited about visiting with your people and learning about environmental education in your country. There is so much in Japan to see and learn about.

In the United States (U.S.), I work in the Wisconsin Center for Environmental Education located at UWSP in the College of Natural Resources is one of the oldest university natural resources programs in the U.S.A. It is over 100 years old. Presently, 2000 students have major areas of study in ecology, wildlife, forestry, soils, water resources, land use planning, and environmental education.

Dr. Randy Champeau, the director of the Wisconsin Center for Environmental Education, was invited to attend this symposium, but prior obligations restricted him from attending. He approached me and asked me to present in his stead. I was very honored to be selected as Dr. Champeau's substitute. I have been with the WCEE since it began in 1990, I have a Master's degree in Environmental Education, and I direct a program within the Wisconsin Center for Environmental Education, called KEEP or the Wisconsin K-12 Energy Education Program.

In this paper, I will provide an overview of the Wisconsin Center for Environmental Education and how, through our teacher education approach, we see to improve and increase the environmental literacy of Wisconsin citizens. The Wisconsin program is considered to be one of the more advanced statewide environmental education programs in the U.S.A.

I. History or Rationale for Establishing Environmental Education

The history or evolution of environmental education in Wisconsin is similar to other states and the U.S.A. as a nation. In the 1600-1900s, most education or activity related to the environment was directed at developing, harvesting, or extracting natural resources from the environment for human use. Natural resources were viewed as abundant and even endless in supply. Our agriculture practices did not consider how soil fertility could be depleted. We harvested wildlife and fish with no concern for the ability of these species to reproduce. We dumped waste into the air, on to the lands, and into our lakes rivers, and streams

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without knowing these wastes would degrade the environment, kill other species, and ultimately, have a negative impact on human health and the quality of life.

In the late 1800's and on to today, we began to see the impact of past approaches to resource use. Species of wildlife and fish were disappearing. Air and water resources were identified as polluted or unfit for humans or other species. One major crisis, which swept across the U.S. in the 1930s, was the massive erosion of our fertile soils by wind and water as a result of poor agricultural practices. Farmers were losing soil - the natural resources that provided them with the basic needs to sustain their lives. This period of massive erosion is now identified in our history books as the Dust Bowl Era. In addition to depleting our soils, we had over harvested many of our forests. People were depleting the wealth of the land.

The general public was less aware of the large picture related to our declining natural resource base, but there were scientists, politicians, and business people who had the foresight to understand that this abuse of our natural environment could not continue because it would lead to a decline or even collapse of our economic system. They understood that natural resources or the environment is the basis of any country's economic prosperity and it contributes directly to the physical and spiritual health of a nation.

A noted early U.S. philosopher was John Muir (late 1800s), who taught that the environment was part of our spiritual well being. He ultimately founded the Sierra Club, which is very influential citizen environmental organization in the U.S. Theodore Roosevelt, one of our early presidents (1901-1909) is credited with establishing a national policy of "Environmental Conservation" meaning we must use our resources "wisely" or conserve them so that present and future generations will have them to support their quality of life.

Another influential scientist/philosopher/teacher in the mid 1900s was Aldo Leopold, a former professor at the University of Wisconsin, Madison. He proposed and taught a concept called the "Land Ethic," which stressed the fact that people are part of the environment and not separate from it. The following is a famous quote from Leopold.

> The question is, does the educated citizen know he is only a cog in an ecological mechanism? That if he will work with that mechanism his mental wealth and his material wealth can expand indefinitely? But that if he refuses to work with it, it will ultimately grind him to dust? If education does not teach us these things, then what is education for? (p. 210)

The teachings and policy positions of these historical leaders and others like them ultimately led to the acceptance by the public of the environment as an important part of public policy. In the 1970s, the U.S. experienced the passage, by our government, of many environmental laws and educational programs aimed at protecting the environment. The passage of this environmental legislation is now recognized in our history books as a major social movement. Today the debate does not question the need for protecting the environment, but rather to what degree do we protect it. Sustainability has become the goal of environmental

protection today in the U.S.A. That is, developing social systems that function while minimizing negative impact on the environment and protecting it for the long term. By sustaining quality of the natural environment, we will contribute to the long-term sustainability of our economy.

II. Development of EE in Wisconsin

Environmental education (EE) in Wisconsin's schools clearly was established as a response to the growing awareness of environmental problems. It grew out of and ultimately includes three earlier education efforts or movements. The first approach in the schools to EE was nature study (1500-present). This focused on studying the natural history of plants and animals out of interest appreciation and to determine utility for human use. The next contributor to EE is "Conservation Education" which developed in the early 1900s. Classes in Wisconsin schools were developed to educate students about wise natural resource management practices; for example, agriculture practices that minimize erosion of soil by wind and water. Conservation was taught mostly in specific courses for students that might be interested in fields like agriculture or forestry. In the 1950s to present, ecology became an important area of study within our science classrooms. Ecology is the study of how energy flows through and matter cycles within natural systems or ecosystems. In other words, how ecosystems work.

The process of environmental education evolved to include the concepts of nature study, conservation education, and ecology. However, it places an additional emphasis on involvement of each citizen in preventing and solving environmental issues. Wisconsin's definition of environmental education is as follows:

> "A lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions. By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment."

III. The Implementation of Environmental Education in Wisconsin Schools

Environmental education was formally established in Wisconsin through two pieces of legislation passed by the state government in 1985.

One piece of legislation or law requires that students studying to be teachers must receive formal university course work in environmental education. The other piece of legislation requires that all 400 school districts in Wisconsin develop curriculum for students that addresses environmental education. Each of these laws is more fully explained below.

Teacher Training Requirement

To become a teacher in Wisconsin, a person must attend and graduate from a four-year university teacher education program. After successful completion of the university program, they are then certified to teach

in Wisconsin's schools. Certification may involve teaching one or two age groups. A teacher can be certified to teach 5-year old-13 year old students. This is called "elementary school certification." These elementary teachers teach multiple subjects such as reading, math, English, and social studies. The second area of certification is for teachers teaching 13-year-old students to 18-year-old students. This is called "secondary certification." Secondary certification involves teaching in specialty areas. At the secondary level, teachers become specialists in teaching only math or only science and usually do not teach in multiple areas as the elementary teachers do.

The 1985 law required that all elementary teachers and secondary teachers in the areas of agriculture, science, economics, civics/government, and social studies receive university course work in the following environmental areas.

a. Natural resources and their conservation;
b. Ecological principles;
c. Energy in both biological and physical systems;
d. People-environment interactions, including;
    - a historical/philosophical review of such interactions,
    - implications of human population growth,
    - natural resource management,
    - the impact of technology on the environment,
    - the impact of the environment on physical and mental health;
e. The use of affective education methods to teach about the environment; and
f. The use of cognitive education methods to teach about the environment; and
g. Methods of teaching citizen participation skills.

The above areas were collectively called environmental education training.

Wisconsin has thirty-one university and college teacher certification programs. All of these programs are reviewed on a five-year cycle to confirm that these environmental education concepts are being covered in their teacher certification programs. If they are not covered, the particular college or university in violation could lose its clearance to have a teacher certification program.

School District Curriculum Requirement

The second piece of legislation or law that established environmental education in Wisconsin schools required school districts to develop curriculum or educational plans for implementing environmental education in the classrooms. The requirement reads as follows:

- Every school district must develop and implement a written, sequential curriculum plan incorporating instruction in environmental education into all subject area curriculum plans, with

the greatest emphasis in plans for art, health, science, and social studies education.

There are 2,000 schools making up 400 school districts in Wisconsin. These districts are associated with particular urban or rural communities. There may be a few too many elementary and secondary school buildings within a district. All of the school buildings within a district follow the district's classroom education or curriculum plan. The Wisconsin State Department of Education provides guidelines, which strongly suggest what should be included in the more detailed district educational plans. These state guidelines are called "Standards." For example, there are standards for mathematics, reading, science, and all the other subject areas taught in schools. Environmental education also has a set of standards (Wisconsin's Model Academic Standards for Environmental Education, 1998). If a school district does not follow the suggested standards, they could potentially lose their state funding, which supports about 60 % of their operation. The other 40% comes from local/community taxes.

There are too many standards to list here and I refer you to Wisconsin Model Academic Standards for Environmental Education, 1998 listed in the reference section of this paper. In general, the standards call for environmental education to be integrated into the elementary and secondary level within the areas of science, agriculture, economics, civics, language arts, and social studies. All the standards can be summarized into the following categories.

A. Awareness & Investigation of Environmental Issues
B. Ecological Knowledge and Knowledge of Resource Management Practices Leading to a Sustainable Society
C. Knowledge of how citizens can participate in the prevention and resolution of environmental issues.

IV. Support for Building Environmental Education in the Schools

Legislators/politicians did not feel that requiring environmental education in teacher certification programs and in district curriculum planning was enough to establish or nurture the long-term development of environmental education in Wisconsin. In 1990, the state government passed what might be called the Environmental Education Support Act. With this law, two statewide resources were established to help build environmental education programs in the schools. A Wisconsin Center for Environmental Education was established along with a statewide coordinating body called the Wisconsin Environmental Education Board. The structure and functions of each of these institutions is explained below.

Wisconsin Center for Environmental Education

The Wisconsin Center for Environmental Education (www.uwsp.edu/keep) was established to directly assist teachers in the development of environmental education, and it was placed within the state University System.

The goals of the Wisconsin Center for Environmental Education are as follows:

- To develop, offer and evaluate graduate and undergraduate credit courses in environmental education.
- To collaborate and develop partnerships with agencies, organizations and institutions on the development, implementation, evaluation and recognition of environmental education programs to benefit the state of Wisconsin.
- To develop and conduct environmental education needs assessments and program evaluations.
- To develop and conduct environmental literacy assessments of Wisconsin's students and teachers.
- To maintain an environmental education resources center or library for use by educators.

To meet these goals, the WCEE has a staff of eleven full-time faculty/staff and 15 part-time faculty/staff. A brief overview of programs that help meet the goals of the WCEE is provided below.

- An EE Masters Degree in Environmental Education Leadership for Teachers. This involves two years of advanced study beyond the four years required for teacher certification.
- An EE Resources Library was established for teachers. It contains hundreds of EE curriculum and activity guides, children's books, reference books, videos and other information that assist teachers in developing their classroom activities. It is one of the largest EE curriculum collections in the nation.
- Enrichment EE courses are offered around the state for certified teachers. Over 80 courses are offered and about 1,200 teachers participate each year. Teachers in Wisconsin are particularly interested in taking university courses because they must have an additional 125 hours of university instruction every five years to maintain their certification.
- On an annual basis, the WCEE facilitates a high school conference on the environment. Up to 300 high school students (16-18 year olds) meet at a central location to discuss and present papers on environmental topics.
- Special Topic Programs are another area addressed by the WCEE. Programs in energy, wildlife, waters resources, and forestry are available or are being developed. Generally, these curricula follow a similar structure. They contain activities that can be taught by elementary and secondary teachers. Activities relate to four areas: human need for the natural resource, developing the resource, effects of developing the resource, and managing the development of the natural resource in a sustainable way. The energy program, the Wisconsin K-12 Energy Education Program (KEEP) started in 1995 and is described further below. A K-12 forestry education program (LEAF - Learning Experiences and Activities in Forestry) started in 2001 and is modeled after KEEP.

Wisconsin K-12 Energy Education Program

The Wisconsin K-12 Energy Education Program (KEEP) is a comprehensive teacher education program that aims to increase and improve energy literacy in Wisconsin. It accomplishes these objectives by helping teachers integrate hands-on, standards-based, energy education into classrooms. The cohesive KEEP package-Conceptual Guide, Activity Guide, and inservice course-takes teachers from "What is energy?" to "How can we manage today's energy use for tomorrow?" Nearly 1,800 K-12 teachers have participated in the KEEP inservice. In addition, KEEP provides networking, student involvement, and funding opportunities.

KEEP is funded through Focus on Energy and administered through the Wisconsin Center for Environmental Education.

KEEP offers professional development opportunities, such as our introductory energy education course and an online course that covers fundamental energy concepts. KEEP is developing follow up courses that focus on specific topics such as renewable energy and school energy efficiency. KEEP provides teachers with resources, including the KEEP Activity Guide and energy education trunks will be available to teachers soon. Through the website (www.uwsp.edu/keep) and newsletter, teachers receive updates on energy happenings and events. KEEP is partnering with the Wisconsin Environmental Education Board to offer nearly $200,000 in energy education grants. Finally, KEEP involves students in energy education through a CFL fundraiser and works with the Midwest Renewable Energy Association (www.the-mrea.org) to coordinate statewide events for students.

V. Other Environmental Education Efforts in Wisconsin

Several Organizations have contributed to the development of environmental education in Wisconsin. These are the Wisconsin Association for Environmental Education and the Wisconsin Department of Natural Resources.

The Wisconsin Environmental Education Board was established in the 1990 legislation as the second major support mechanism for coordinating the development of EE in Wisconsin. Members of the Board represent various sectors of Wisconsin's society. The Board has two primary activities it pursues to address its goals. It facilitates a $450,000 annual grants program, and it has developed a statewide strategic plan for advancing environmental education in all community sectors across the state. The second major pursuit of the WEEB is the development of a Statewide Strategic EE Plan. This strategic plan consists of a series of recommendations for improving EE in all sectors of Wisconsin's society. The WEEB disseminates these recommendations and then uses its grant program as an incentive to encourage pursuit of the recommendations by various education programs in the state.

The Wisconsin Association for Environmental Education (WAEE) is described as a nonprofit professional organization set up and run by the volunteer efforts of its membership. Membership dues or payments serve as the primary funding base. The organization develops its own board of directors from its membership. Members include professional environmental educators, agency personnel, schoolteachers and nature center educators. The goal of the Wisconsin Association for Environmental Education is to provide networking/sharing opportunities for environmental education professionals. The WCEE sponsors annual statewide conferences for environmental educators where papers are presented on ways to develop and improve EE in the state. Often WAEE leaders sit on other influential boards such as the Wisconsin Environmental Education Board. Also, members of this organization are sometimes effective at influencing government and public policy. This organization was, in large part, responsible for promoting the legislation that created the Wisconsin Environmental Education Board and the Wisconsin Center for Environmental Education.

The Wisconsin Department of Natural Resources is the state governmental organization responsible for managing natural resources and enforcing environmental laws in Wisconsin. They have a Division of Information and Education, which places educators at natural areas and parks around the state. They are a primary source for information or publications about the status or quality of Wisconsin's natural environmental. The Wisconsin Department of Natural Resources often cooperates on various EE efforts with the Wisconsin Center for Environmental Education, Wisconsin Environmental Education Board, and the Wisconsin Association for Environmental Education.

The Global Environmental Management (GEM) Education Center at UW - Stevens Point is a unifying concept, program, and facility at the College of Natural Resources (CNR). GEM provides intercontinental learning bridges to build a sustainable future. It will serve as an international model for training leaders who think globally and act locally to make a world of difference in communities in America and abroad in the 21st century. The Education Center intersects CNR's teaching, outreach, and research components. GEM programs focus on many critical environmental issues including watershed management, smart growth land use planning, sustainable forestry, and sustainable energy systems. For more information visit the GEM website at http://gem.uwsp.edu.

VI. Evaluation of Environmental Education and Summary

The Wisconsin Department of Education cooperates with the Wisconsin Environmental Education Board to periodically evaluate the level of environmental literacy of the state's students. This is done by testing student's knowledge about the environment and their attitude towards it. The Environmental Education Academic Standards are used as a guide for the development of test questions. In general, student environmental test scores have improved and the feeling across the state is that all the efforts to improve EE are resulting in a more environmentally concerned public. The hope is that the public will continue to build this concern for the environment into their day-to-day lifestyles.

Summary

Environmental education in Wisconsin has developed in response to the awareness that the natural environment was and is being degraded and polluted by human activities. Yet, humans are dependent upon the natural environment for a strong economy and for their quality of life. Wisconsin requires environmental education in teacher training programs and in school curriculum or educational plans. These requirements have been in place for close to fifteen years in Wisconsin. To support the required EE in the schools, the state has provided resources in the form of a Wisconsin Center for Environmental Education, a Wisconsin Environmental Education Board, and its environmental grants program.

As a result of these laws and resources, environmental education is becoming a basic part of Wisconsin's educational system. The students' environmental literacy is increasing and we hope this will result in improved environmental conditions for the short and long term. The goal of a sustainable society is becoming more and more a part of public policy.

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Environmental Education and Information Technology

Yoshihiro Ugawa*

Introduction

Why an environmental education course is in a university of education?

In order to keep good environment, personal activities on the basis of environmental knowledge play an important role. Environmental education helps establishing such motivation. And I think it is important that knowledge and experience on environment have to be taught by teachers who had learned at an environmental education course.

What can be done while sitting in front of a computer?

In environmental education and environmental learning, actual experiences are the most important. Information technology can not contribute directly to them. In fact, however, there are qualitative differences between actual experiences and computer works.

Information technology may support environmental education

As a member of System Research of EEC, I provide web contents and biological and environmental-related database for environmental education. The purposes of providing database are to share more information and to use them effectively. I think that database is a basic tool for an analysis on a huge amount of information in environmental science.

Environmental problems, which sometimes are to worldwide, can not be discussed within a limited region. Every student can not join in various actual nature activities. Although it is virtual, additional experiences can be provided by using Web or new technologies. These information technologies might help learning information and acknowledgment in environmental education. In this time I will introduce you some examples that I had produced.

Example of support

Bulletin Board System for a school class, "Are fallen leaves garbage?"

It is just a season of fallen leaves. Sendai is called a city of forest. Fallen leaves from roadside trees cover roads and sidewalks so that many efforts have to be made for cleaning them. In this city, fallen leaves are gathered into plastic bags and finally burned. In a forest, on the other hand, fallen leaves are bearing an important role to become a home of living things and to give nutrition for the next year.

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In 1999, a lesson program. “Are fallen leaves garbage?”, was proposed at an elementary school of Sendai. This program aimed children to aware that fallen leaves might not be garbage where they could return to the earth, and to provide a chance to think about the natural environment.

In Japan, “an Integrated Course” was newly introduced, in which teachers could deal with a theme without limited in a specific field. Some schools adopted that program on fallen leaves as an integrated course.

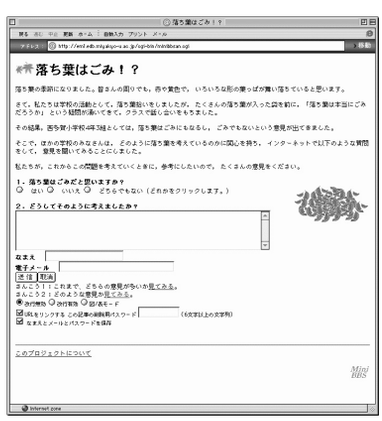
In 2000, another program, “Save fallen leaves”, was planned at another school. These two programs gave children a chance to study whether fallen leaves are garbage, to find their effective use, and to face to the nature.

For student classes of these programs, we proposed the use of computer networks to be able to ask for responses of many other persons on their studying matters and opinions. At the time, a bulletin board system was required for the expression and exchange of their opinions, at which EEC provided a server and technological support.

The BBS were produced through many tests from the stage of planning in order to enable the improved exchanges of opinions by introducing the ideas of teachers who actually need for their students.

At that time, Internet had just been introduced to the schools and E-mail was rarely used for students.

The use of BBS on a Web browser, which can be used easier than E-mail, enables students to have unusual experiences, such as having responses from far countries and a message directly from the Mayer of Sendai.



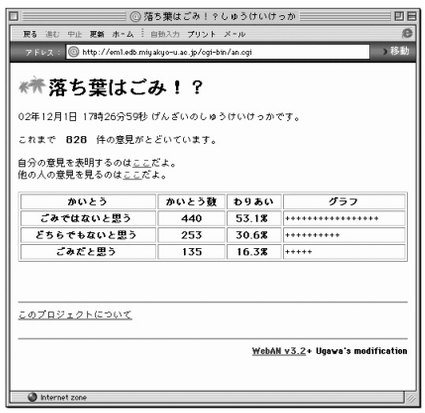
1. Explanation of a bulletin board

Ask for opinions about whether fallen leaves are garbage, and its reason.

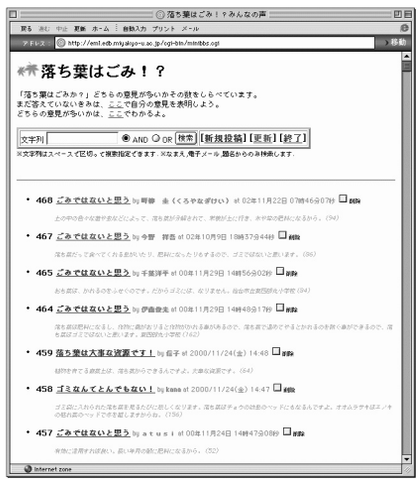
In this figure, a question is proposed to ask for an opinion and its reason about whether fallen leaves are garbage.

BBS is seemed to be easy to operate, however, it is hard for children to follow an opinion thread since opinions written through the network are not led in time order.

It is difficult for school sites to maintain such BBS. However,we could contribute only in providing the server for the program. Actually, we would not be able to maintain all Buss for increased number of schools with different requests.



2. Result by graphics.



3. Reason and comment can be seen at a same time.

it is not garbage. 53.1%

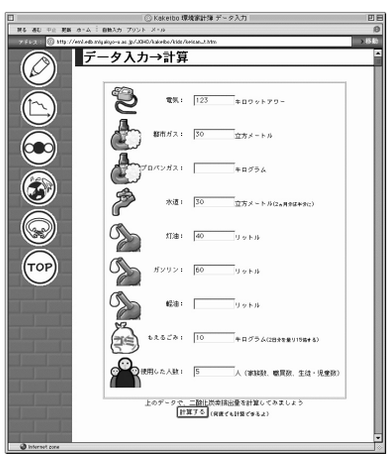
It is not which, either. 30.6%

it is garbage 16.3%

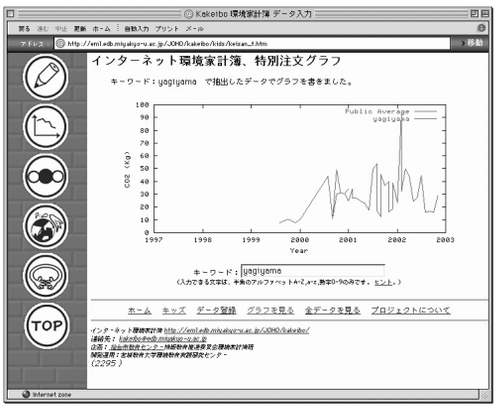
Environmental Balance Sheet for Kids

In Japan, there is a program of environmental education, called “Environmental housekeeping book”(An Environmental Balance Sheet). It consists of the estimation of CO_2 gas emission from daily activities and the learning of opportunities to reduce emission and to save energy and money.

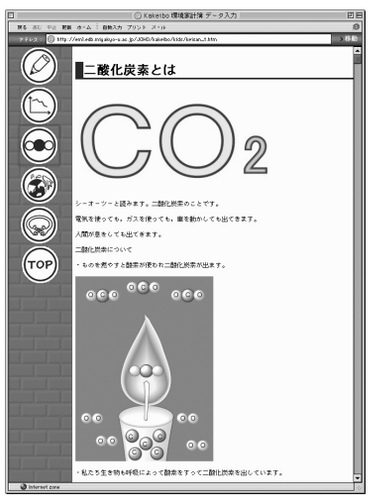
To utilize the program, a spreadsheet software was needed in the former state,but it was difficult for children. Then we provided a Web site for children in which estimation can be used in a class.



After entering data into a box besides an icon, the data will be converted into the volume of CO_2 gas emission. The volume is expressed not in liter but in the number of 20-liter tanks, which is a special idea proposed by school teachers. I remember that children were surprised and shouted at the number of tanks.



4. Graph can be produced on the basis of entered data.



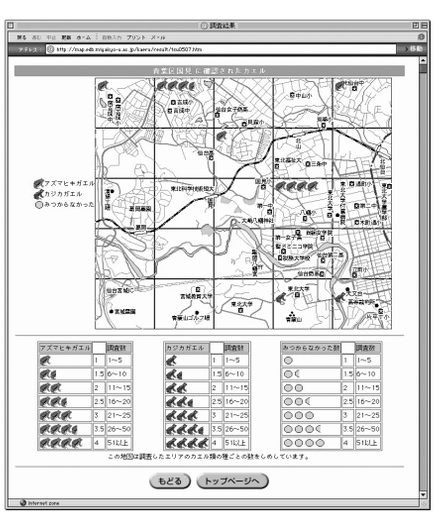
5. Reference materials relating greenhouse effects are prepared.

Map system for environmental education

Cooperation of Survey on living thing in Sendai

Environmental education involves complicated study research fields. It is typical in a map information which includes accumulated location data of different studies.

EEC has been cooperated with Sendai Science Museum in the surveys of some living things in Sendai.



Survey on Frogs in Sendai for Kids

Survey of a familiar animal, frogs encouraged kids in interests in environment. Results were shown realtime. In 2000, the survey of frogs in Sendai had been performed on the basis of maps we produced.

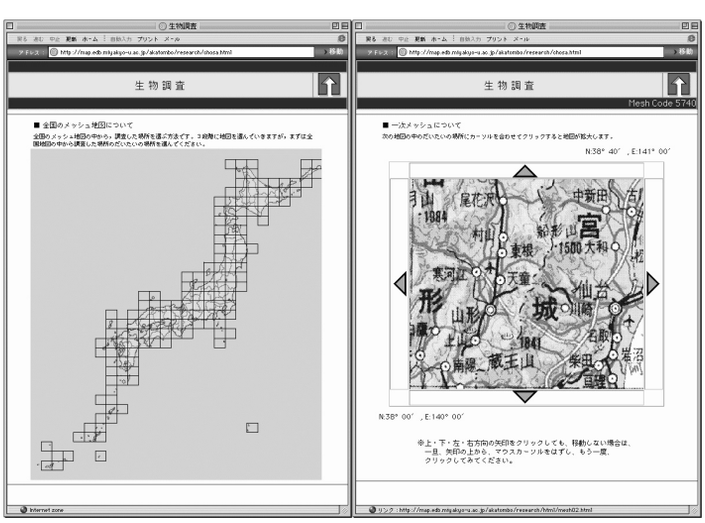
In a series of this surveys there was a special advantage that never seen before. The former surveys conducted by the government, the Ministry of Environment, are only paper based studies. When children would return their survey paper back to its conducted organization, the results of these data would be announced only in the next year. After so prolonged time, the children might graduate from their schools or lose their interests in it. On the other hand, our survey can be displayed in real time through the Internet, so that children can find their plots on the screen.

Besides, there is another profit, which indicates differences between town areas where no frog was found, town areas where several frogs were found and suburb areas where the nature remains, through the study of two typical frog species, *Bufo japonicus formosus* (Eastern-Japanese Common Toad) that can live in a town area and *Buergeria buergeri* (Kajika Frog) that can live only in a suburb area where the nature remains.

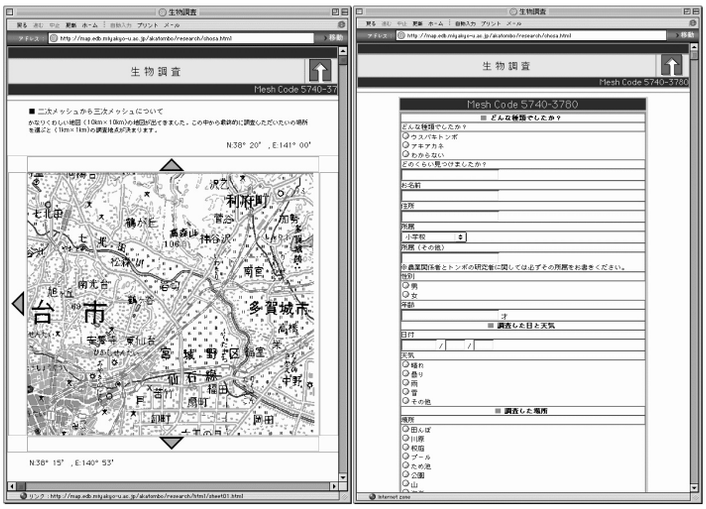
Survey map on living thing in Japan

The frog map covers the area of Sendai. We have a plan to extend the map coverage to all of Japan.

There is a survey map on bloom of cherry trees in Japan. Apart from the announcement by the Authority of the Government, we intend to produce a bloom map which is made by children. The map would show the transition of bloom points from the south area to the north. Besides, another survey is conducted on red dragonflies.

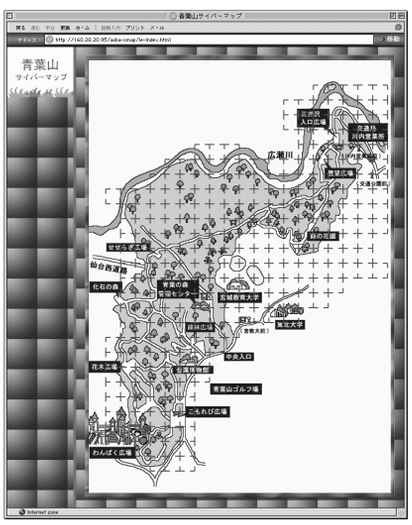


The first map consists of 80 Km mesh and the second consists of 10 Km. In 10 Km mesh map, data can be entered in 1 Km unit.



Map for field works

Besides, we produced a cyber-map of Aobayama-mountain,which is located behind our University, as a map for surveys of living things,environmental studies and fieldworks within a smaller area. In this map, the smallest mesh is 50 m which can be grasped at a glance, various data including texts, pictures and moving images can be stored.



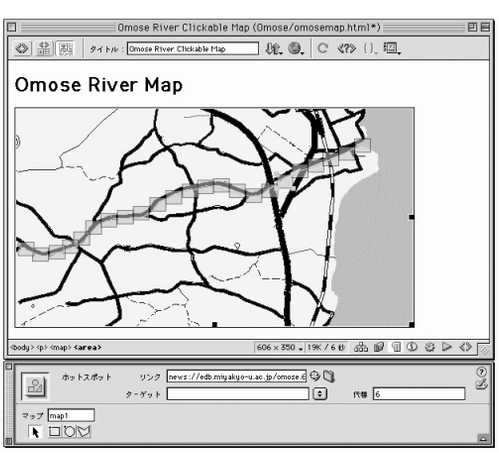
Map for a school

We also produced sample maps for teaching programs in environmental class.

In corporation with Omose Elementary School in Kesennuma city, in later a member of this school will appear on the stage, we attempt to provide a regional map near the school. Apart from the former maps, this map utilizes a simple clickable system for Web browser so that school teachers can edit by themselves. And this map uses a link to BBS system of “network news” which can easily be used through a mail client such as Outlook Express or Netscape Communicator.

The submission of a test message and another message attached with images was succeeded.

This shows an editing process to produce a clickable map by using a Web page editing software. URL of BBS is written in a window which enables the operation of map-linked BBS.

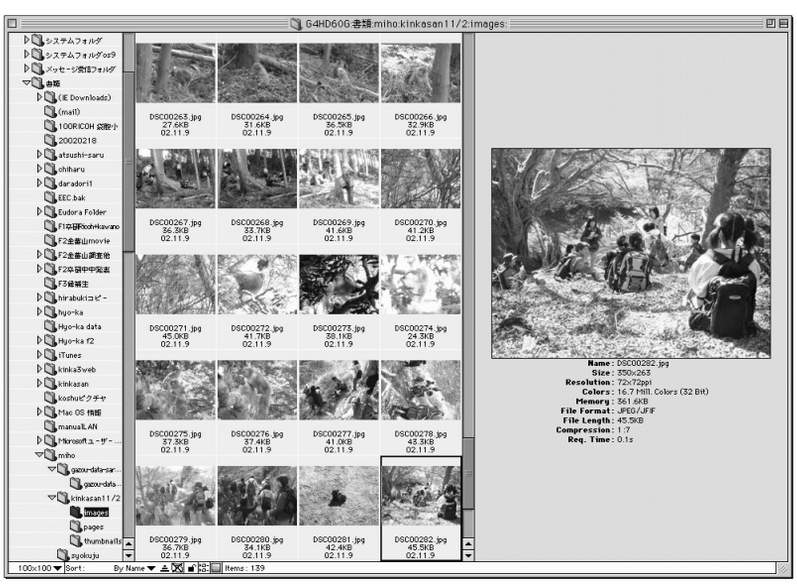


Submission by Becky Rosenberg and attached image are shown.

Taking records of activities on environmental education

In joined in the activities on environmental education, and in accompanied with the field works of EEC, I attempt to leave these records on the web.

In the activities including friendship activity at Kinkasan-Island, exploration of Aobayama-mountain and driving monkeys out of the west region of Sendai, the records and documents have been accumulated through video and picture images and written texts.



Fieldwork of Kinkasan, Aobayama

Conclusion

What have performed

Improvement of the communication and sharing of information through computer network

Bulletin Board Systems, Map Systems, Environmental Balance Sheets

Creation of the Web based teaching materials which can be used easily

Environmental Balance Sheets, Map Systems

Evaluation and advice are required.

These activities have begun just a few years ago. I have had no evaluation on these systems about their usefulness, and no opportunity to talk about them among EEC. In this time, I hope to know what evaluation would be made for my activities by many specialists gathered from the world. In addition, I want to know hints or opinions that guide me to more effective use of computer, network and information.

Community, School, Environment

Andrea Déri*

Summary

This paper addresses the interdependence of community, school and environment. It argues that the stronger their relationship, the better their respective quality. Survey results presented in this paper of learning preferences of 539 primary school students of age 8-14 in Sendai, Japan confirm that students are keen to learn about their community and their environment. The top three learning preferences include active approaches such as eLearning, hands-on learning in the local science museum and visiting nature reserves. By offering successful examples of community-based learning for sustainable development from five countries (Hungary, Japan, Ukraine, USA, Poland), the author encourages educators to engage in community-based learning and consider students' learning preferences.

I. Community[2] and learning

In traditional communities

"It takes a whole village to raise a child". This African saying perfectly captures the responsibility of the community in a successful education, the interdependence between good, relevant education and a dedicated local community.

There are, however, two important assumptions in this saying: the community knows the child's learning needs, and the community as a whole is dedicated to the learning process. These assumptions are inherent characteristics of a traditional, rural, self-sustaining community life. More importantly, these characteristics are vital to the survival of the community. The community not only knows what a child needs to learn to be able to participate in that community (work, family life, spirituality, culture etc.) but no other entity than that particular community knows exactly what the child — and ultimately the community — needs.

Therefore it is well understood that each community member has to contribute to the child's learning process as each member has something special to offer. Without taking this responsibility, the community's future is in jeopardy, as children are ill-equipped to produce food, fiber and shelter in that particular environment (climate, bio-geography, cultural norms). In this highly contextual learning, successful education means a composite of parallel, mostly hands-on learning processes that are essential to children's happy life in their community, and also to the sustenance of their community. As traditional communities are

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dependent on their natural environment, education is inherently "environmental": all aspects of the learning process include environmental and social considerations.

Helena Norberg-Hodge reflects on this process with astute clarity when she describes the traditional community-based learning in Ladakh, India: *"With the exception of religious training in the monasteries, the traditional culture had no separate process called 'education'. Education was the product of an intimate relationship with the community and its environment. Children learned from grandparents, family, and friends." "They learned about connections, process, and change, about the intricate web of fluctuating relationships in the natural world around them."* [3]

In the globalizing era

But how relevant is this practice of community-based learning in a rapidly globalizing world, in urban schools where teaching is isolated from the local community and indifferent to the immediate environment, where many children are actually commuters? To answer this question, let's explore first what concern educators have about modern schools and then explore what benefits community involvement can provide.

There is a deep-felt concern, voiced by sustainable development minded educators that "modern" education, rooted in the XIX. century's industrial paradigm[4], does not raise children to become happy, creative, responsible people but only prepares students to become part of the labor force as an efficient supporter of economic growth without due consideration to social and environmental values.

What role can schools play in re-orienting "modern" education towards a more holistic learning process? What can schools really change within a system where education as an institution supports the status-quo of societies? Re-orienting the economic growth agenda towards sustainable development goes beyond the capacities of learning institutions but schools can spearhead the re-orientation of education towards sustainable development[5] by aiming for more[6] than academic achievement and/or career development[7].

An important component of this re-orientation is the re-connection of education with real life issues in their complexity to learn about *"connections, process, and change, about the intricate web of fluctuating relationships in the natural,* [social and economic[8]] *world around".* And this is where the involvement of the local community-be that community a village or an urban housing complex-, can offer opportunities of not only a more holistic education but enriched personal and community / societal development, and as a result, better environmental care and quality, and ultimately a more sustainable development.[9]

Benefits

With the separation of education from real-life community issues, not only learning becomes more academic and thus less action oriented but the integrity of the local community also suffers from loosing the young generation's attention to social and environmental issues. By involving community members in the formal education, or complementing the formal education with informal community-based learning,

community and school are re-connected for both personal and social benefits, as it described in Figure 1.

Having compared the benefits in traditional and modern societies, there is a striking similarity: community-based learning is an immediate survival issue of traditional (self-sustaining) communities, and almost a pre-requisite for sustainable development of modern societies.

	Traditional communities	**Modern communities**
Personal benefits	• Learning is useful and fun • Ability to fully and happily function in the community • Acknowledgement for contributing with special individual skills • Sense of identity	• Learning is useful and fun • Ability to better understand and participate in the local community, and the whole society • Better chances for more rewarding career choices • Sense of belongingness
Community /societal benefits	• Survival • Sustained identity • Sustained social capital • Adaptation to climate and societal changes generated by innovation inspired by trans-generational learning • Environmental, social and economic considerations are inherent part of learning • Tacit knowledge is passed on for the survival of future generations	• Sense of community • Enhanced identity • Increased social capital • Ability to solve problems, reach goals by innovations through trans-generational communication • Environmental, social and economic considerations integrated into learning • Tacit knowledge and improved knowledge management contributes to a sustainable development

Figure 1. Benefits of community-based learning in traditional and modern societies.

The implication of knowledge management also highlights the significance of community-based learning. Interaction with other community members supports students' implicit learning[10] and the acquisition of tacit knowledge, the heritage of trans-generational experience related to that particular community in a given bio-geographical environment. Tacit knowledge can not be taught at school, can not be expressed by words, formulas or other explicit ways, but constructed only through direct, hands-on experience and social interaction. This is a critical point if we consider that environmental wisdom, or in other terminology local, indigenous knowledge, can only be acquired through implicit learning.

Opportunities for inter-generational interaction offer students with opportunities of implicit learning about their local environment (including nature conservation, farming, forestry etc.). It is, however, the educator's responsibility to make sure the learning leads to knowledge construction (tacit knowledge) which is indispensable for future decisions related to managing local environmental assets.

How it works: System thinking and scenario analysis

Increasing community involvement in learning (school-based, after-school and life-long learning) results in increased social capital[11] and thus increased ability to address community goals: a reinforcing cycle (Figure 2.) This cycle can go reverse as well: decreased community investment in education weakens the community's ability to reach its goals. The same phenomenon is articulated at a different level by the laconic statement: *"As the community goes, so goes the school"* [12] and vica versa[13].

Scenario analysis and scenario development conducted in the USA have also arrived at the same conclusion: community values exercise the driving forces in shaping public education[14].

Applying a system thinking perspective of school-community interplay helps also better understand the strong link between the social capital and the quality of local environmental management[15].

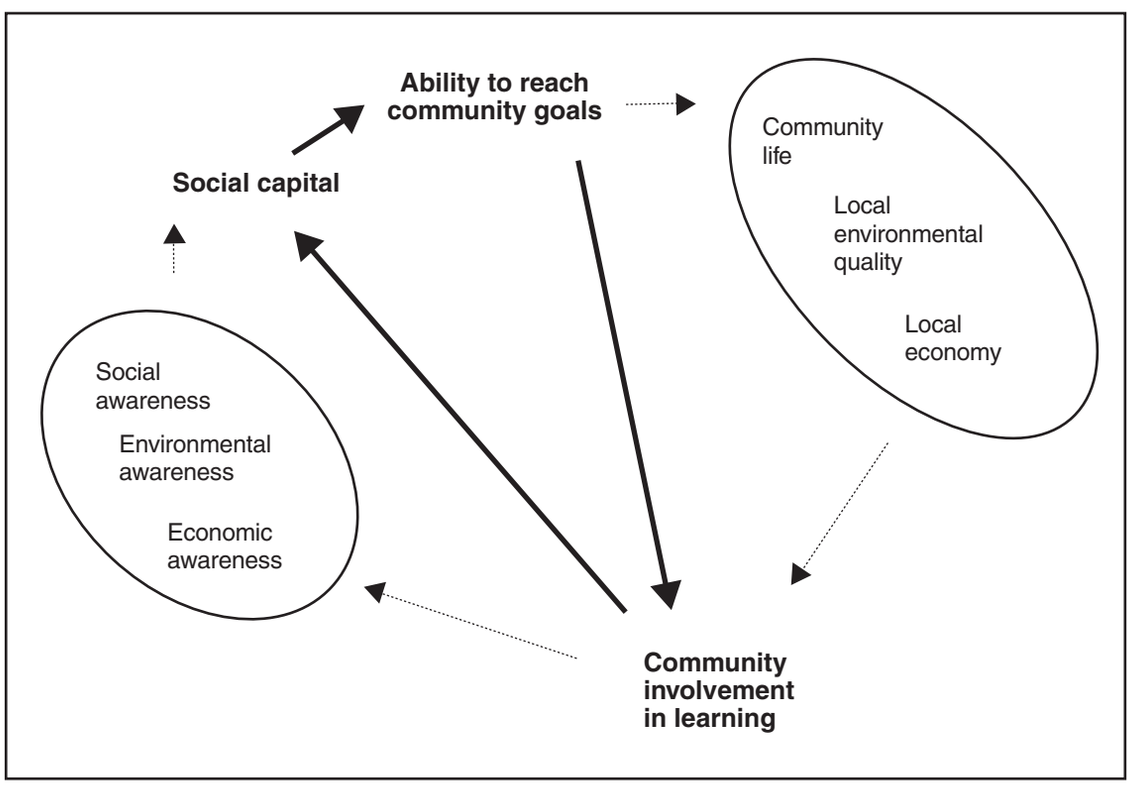

Figure 2. Reinforcing cycle of community involvement in learning.

II. Community-based environmental education in practice

There are inspiring efforts all over the world to purposefully re-connect schools and their communities. A quick search on the internet by using Google as a search engine for "community, school, environment" resulted in 4,300,000 hits (September 28, 2003). This is a promising sign of realizing the connection of community life, school-based learning and the quality of the local environment, and making purposeful efforts to re-establish the traditionally strong links among young people's learning, the activity of adult community members to sustain their bio-geographically, culturally and economically shaped local environment.

Improving science education with community-based projects in the USA[16] has been convincing. Although research data is not always available to assess the effectiveness of all community-based learning projects, schools with community-based learning integrated in their curriculum seem to have higher academic achievements, happier students who are also more willing to participate in their local community and take action for their environment.

Following are a few (just a very few) good examples of community-based environmental education and education for sustainability projects from five countries: Hungary, Japan, Poland, Ukraine, USA.

Hungary

The Forest School[17] programme, supported uniquely by both the Ministry of Education and the Ministry of Environment, offers interdisciplinary hands-on learning that involves local communities in the exploration of real life issues. The Hungarian Eco-School Network[18] is part of the Environment and School Initiatives project of the OECD-CERI (Organisation for Economic Co-operation & Development-Centre for Educational Research & Innovation), with having roots in earlier community-based environmental education demonstration projects with the Institute for Sustainable Communities[19]. Eco-schools do not only learn about sustainable development but they are managed sustainably as well from the operation of the school to the catering and working closely with the local community: they walk their talk.

Japan

The Learning Environment and Activity Foundation[20] in Nishinomyia, Japan trains community members to teach students about various aspects of their community, e.g. mothers teach young children about nature and art, businessmen introduce students to eco-products and eco-labeling, and government officials offer hands-on field studies on water quality assessment.[21]

Ukraine

Parents, teachers, students, NGO members, farmers, business people and other interested members of the community discuss what and how they want to learn together about their environment. Students learn together with parents to map air pollution, to map illegal garbage dumping, to solve the community's environmental problem - not only to learn for better grades.[22]

USA: Environment as an Integrating Concept

One of the best researched community-based environmental education initiatives is based on the concept of "Environment as an Integrating Context (EIC)". US schools used the environment as the integrating concept not only in science but for all subjects including literature, history, math, social studies. The EIC Model™, developed by the State Education and Environment Roundtable" (SEER) improved students' achievement by using local natural and community surroundings as a context for learning.[23] Integrating ecological principles into all subjects of education at school also included the adoption of system thinking which resulted in not only higher academic achievement but better use of higher order thinking skills and ability to grasp and solve complex problems creatively. "EIC didn't teach me all the facts that every traditional English or history teacher thought I should know," said one high school graduate. "What it did teach me was how to learn and how to process what I learned into my own facts." [24]

USA: Vermont

The Vermont Education for Sustainability Program[25] is "learning that links knowledge, inquiry, and action to help students build a healthy future for their communities and the planet." This initiative succeeded to integrate sustainable development in the education standards of Vermont! Community Mapping[26] helps young people to explore their landscape and discuss their local land-use planning. The Environmental Learning for the Future (ELF)[27] initiative trains community members, mostly parents, to teach elementary school age children about nature through hands-on explorations. The Linking Learning to Life[28] helps students to better understand the community and their career choices by giving students hands-on learning opportunities in various organizations including business in their community.

USA: Georgia

The Education for a Sustainable Future Project[29], supported by the U.S. Department of Education developed and successfully implemented curricula and lessons plans on education for sustainable future with the involvement of local communities in Georgia, USA.

Poland

A country wide network of Community-based Environmental Education Centers has been established to strengthen the quality of community life, school-based and after-school education and their environment[30]. In-service teacher trainings support educators with well-tested, innovative methodology.

III. Preferences in community-based learning : Survey in Sendai, Japan

"Sendai is ranked the 5th most attractive city in terms of economic activity and living conditions by Hong Kong's "Asia Week" magazine. "So no wonder," the population growth rate is the highest of the 13 major cities in Japan. Daytime population exceeded one million two years ago."[31] One of the factors in Sendai's attraction is its high quality education system which pays special attention to link learning with real life issues, bringing schools, communities and their environment to close connection.

Students in Sendai regularly have enjoyable and meaningful learning experience outside of the school, in their larger community of Sendai, well integrated in their curriculum. Also, the pre-service teacher training programme of the Miyagi University of Education includes community-based field studies which prepare future teachers for designing and effectively offering students with real life, community-based learning experiences.[32]

Students learning preference: survey results

Rationale

Having looked at the websites of Sendai's elementary schools, I was delighted to see that many schools had a strong environmental profile with vibrant community links. Schools must have a plethora of ideas, approaches and tools to make all this happens. What can other schools learn from Sendai?

Research question

Inspired by this motivation a simple research scheme was designed around the following research question: Given all the options, how students prefer learning about their community and their environment? In other words, what are the most motivating approaches?

There were two underlying agendas in this question: (1) To better involve students in their learning process by giving them an opportunity to share their voice, their preferences. (2) To help teachers adjust the curriculum according to students' preferred learning so learning can be more enjoyable, more motivating and eventually more effective in terms of raising environmental awareness.

Figure 3. Students of katahira elementary school in Sendai participate in an electronic survey about their learning preference.

Methodology

A survey was designed to assess the learning preferences of students in terms of the venue (at school or various out of school venues) and the generational composition (peer or mixed-generational learning) of their learning. The only choice which was more of a learning approach than an actual venue was the use of

the internet in learning. We wanted to include this option as we assumed many students enjoyed using the internet for learning not only at school where they had limited time but also at home and other venues e.g. in the science museum.

The survey asked students to select one, two or maximum three situations (out of the offered eight ones including their own additional choice) they would prefer learning in when they learn about their community, Sendai. Each option had two varieties: learning with friends (peer group), and learning with friends and adults (mixed generation group).[33]

An electronic survey[34] using single choice was designed in close consultation with the education authorities of Sendai. The survey's language used age-appropriate colloquial Japanese, without any unusual words, expressions for students of 8-14 years old. The electronic survey was hosted by the server of the United Nations University, Tokyo (UNU) using UNU's proprietary application designed for multi-language electronic surveys. Students could access the survey from the computer laboratory of their school for three days one week prior the conference. The Institute for Global Environmental Strategies (IGES) received the survey results and shared the analysis with the students and the education authorities in Sendai at the conference.

Results

539 students from more than 120 primary and secondary schools from the larger metropolitan area of Sendai submitted their 1,498 choices in the eSurvey.[35] Not every student submitted three preferences, some did less. Students ranked the offered choices (14), did not use the opportunity to add their own, individually articulated, different choice.

The top four learning preferences include eLearning (ICT-assisted, computer/internet-based learning), hands-on learning in the local science museum, visiting nature reserves and learning in their school.

The results can be summarized in the following five figures.

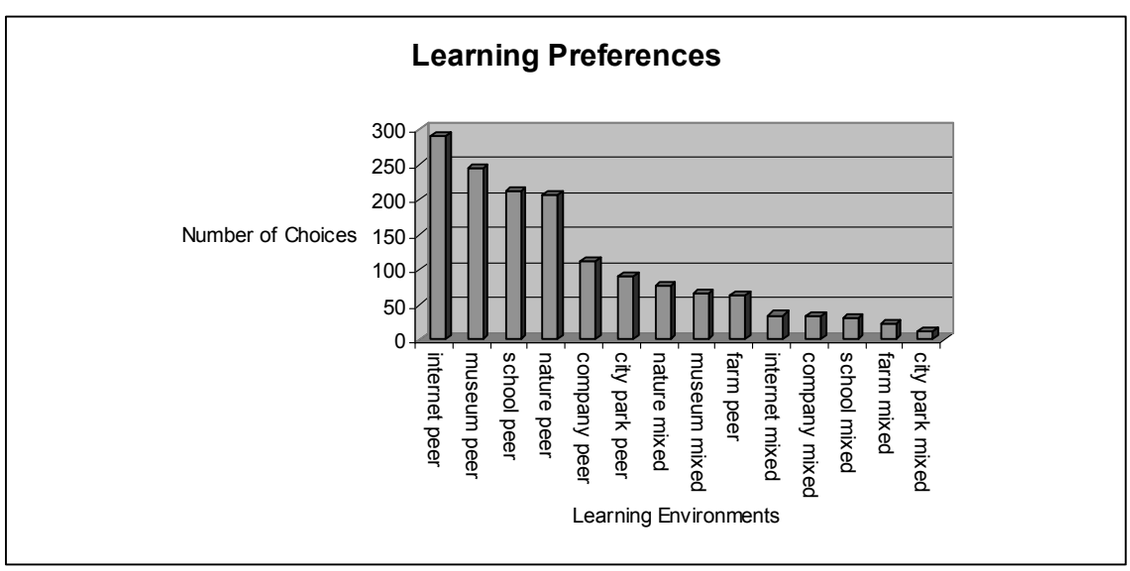

Figure 4. Learning preferences in all 14 categories.

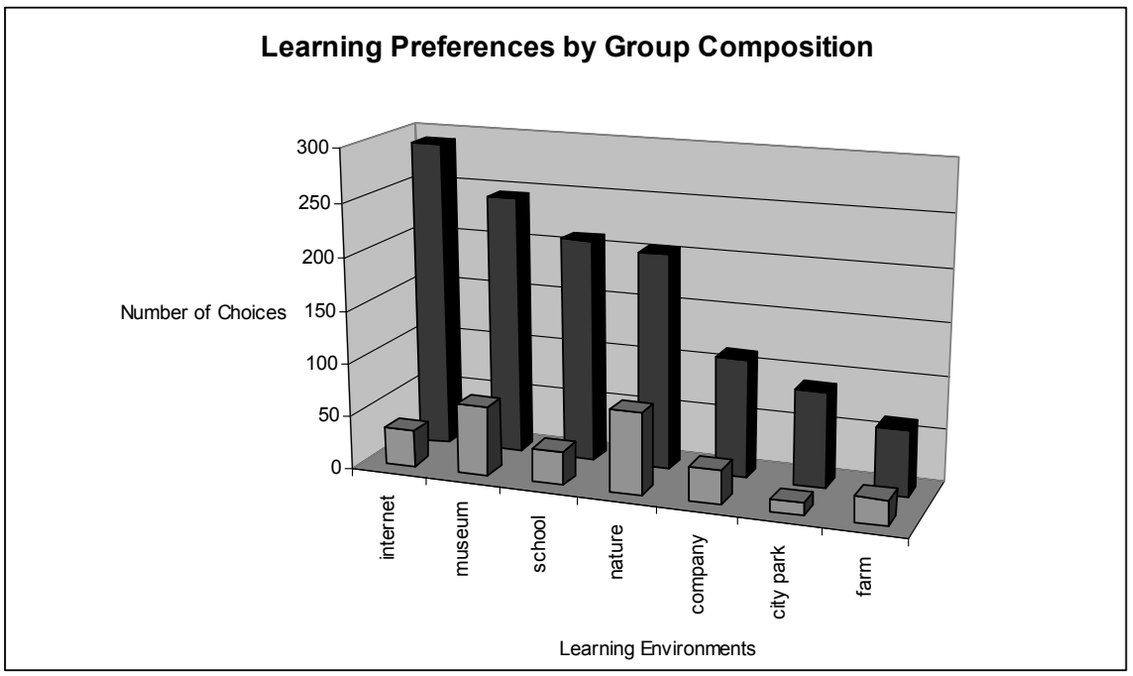

Figure 5. The same as Figure 1 but arranged in a way that the peer / mixed generational learning preferences are seen separately.

The ranking of peer-learning is different from the ranking of mixed-generation learning. Visiting nature reserves and the local science museum ranked highest in mixed-generational learning.

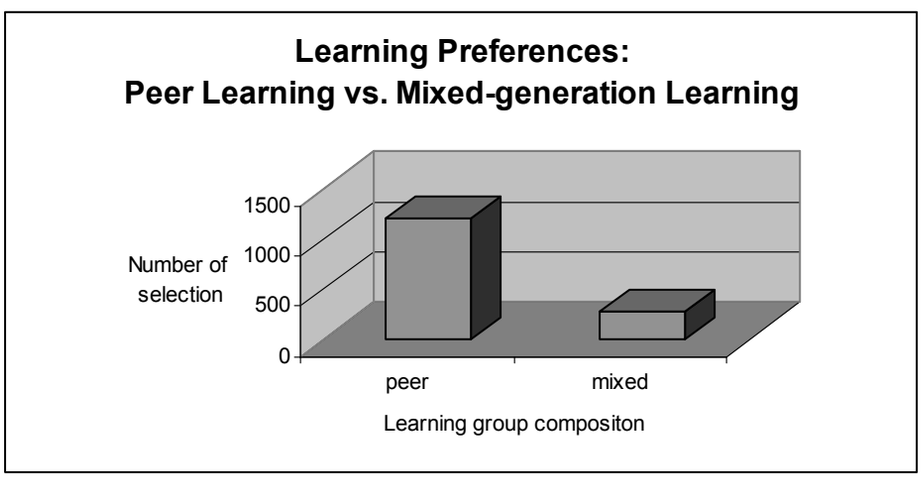

Figure 6. Learning Preferences according to learning group composition: peer-learning and mixed generational learning.

Peer learning was preferred (81%) to learning in a mixed-generation group (students, adults, grand-parents).

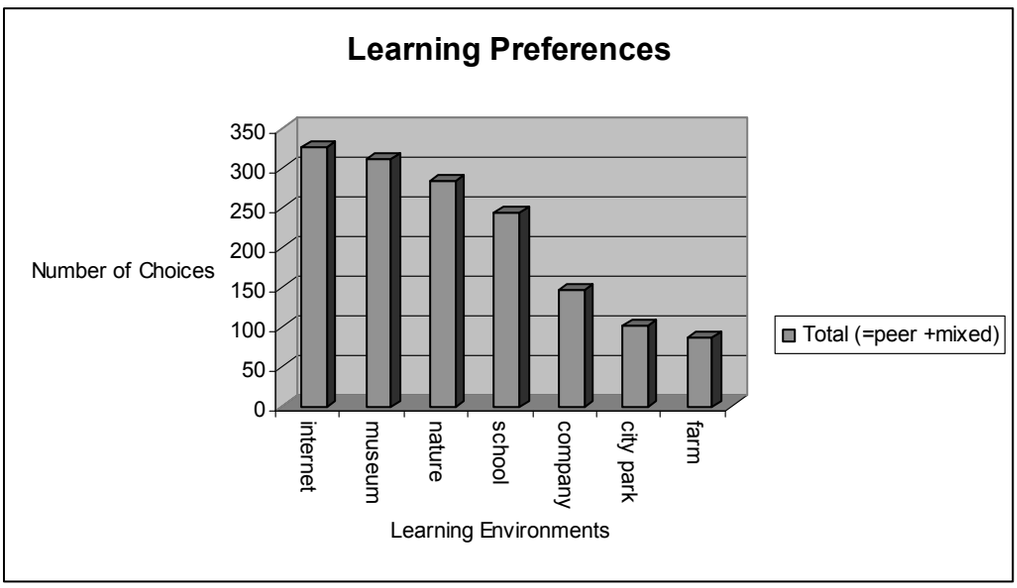

Figure 7. Learning Preferences with combined (peer learning and mixed generational learning) categories.

Electronic learning delivery systems (eLearning), like computer, internet-based learning, TV, radio etc. ranked first as students' preference in learning about their community. Visiting museums, culture houses came very close as second, visiting nature reserves third, and learning in traditional school-based environment ranked fourth. Visiting companies, offices, hospitals, banks, or city park, and finally farms ranked relatively low.

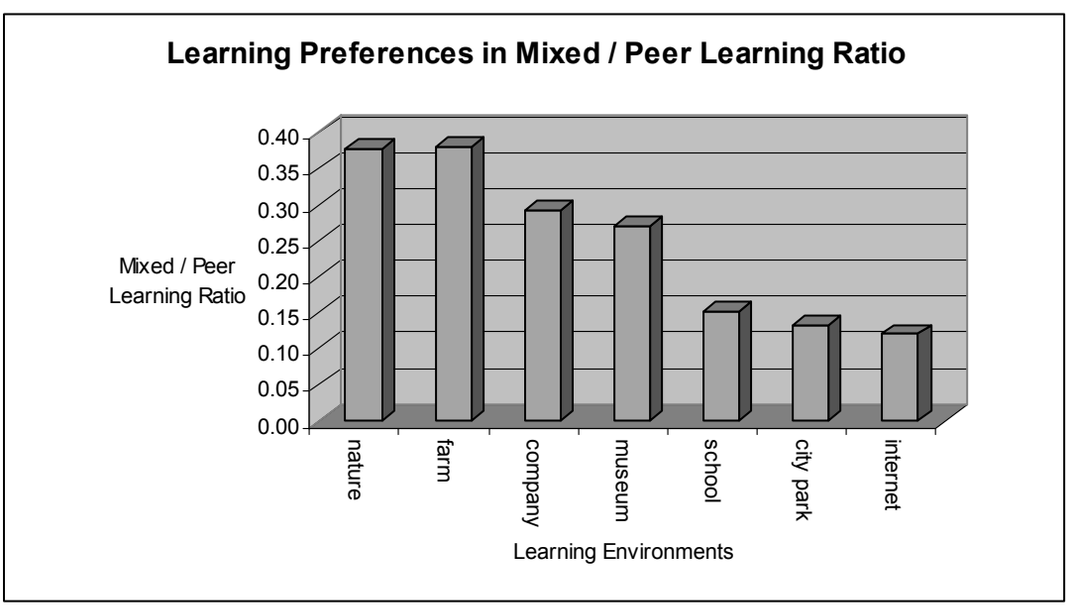

Figure 8. Mixed/peer learning ratio for each category (nature, farm etc.).

The mixed/peer learning ratio for each category (nature, farm etc.) shows students' relative preference to learn in mixed-generational environment.

Although students prefer learning with their friends in general, exploring nature and visiting farming activities are the most popular choice when students want to share learning with adults.

Interpretation

Survey results presented in this paper of learning preferences of 539 primary school students of age 8-14 in Sendai, Japan confirm that students are keen to learn about their community and their environment. The high number of survey respondents in limited time and short notice reflects students' willingness and enthusiasm to participate in their community-based learning.

Students' overwhelming preference of learning in peer-groups versus mixed-generational ones is not surprising given the age of students, students' previous experience and the strong socialization (school-based learning socializes students to learn in peer-groups in sharp contrast with community-based learning where mixed-generational groups are more the norms). Providing young people with mixed-generational learning opportunities, however, continues to be important to re-dress the balance for trans-generational learning and inspiring innovation.

Although students prefer learning with their peers, exploring nature and visiting farming activities are the most popular choice when students want to share learning with adults. Learning about nature and farming in mixed-generation groups is perhaps the most critical areas for acquiring tacit knowledge, wisdom passed down from generation to generation. Although the ratio of mixed/peer-generational learning is the highest in these two categories-a sign of appreciation of trans-generational tacit knowledge which is more associated with mixed-generational learning-it is desirable to strengthen this trend with well-designed community-based learning programmes.

Students' top three choices constitute active learning approaches: eLearning, hands-on exploration in the local science museum and learning in nature reserves. This result confirms the often reported experience that active / interactive learning is the most motivational, most engaging[36], and most effective especially for learning about the environment[37]. The local science museum in Sendai provides a formative, state-of-the-art learning experience to explore local and global environmental phenomena by using a wide range of tools including remote sensing, laboratory experiments etc. Applying active approaches to community-based learning is recommended not only for increased motivation but also for understanding that learning about fast changing local issues one should always take an active approach, a self-motivated initiative. By using active approaches young people ability and willingness to act for local environmental issues are greatly enhanced.

Given the fast development and forceful promotion of ICTs, it is not surprising that the favorite choice of learning is eLearning: 54% (in peer groups). One of the most attractive features of eLearning is its learner-centered design: students can immediately see, hear and evaluate the impact of the actions, decisions and this tight control with strong motivation keeps them engaged, motivated. The increasing amount of information about local issues can offer teachers, students and community-members a great resource for learning and informed cooperation. The threats of using eLearning often prevent teachers to even consider

it as a tool. Wisely designed and applied eLearning programmes that add value to other learning forms, however, can greatly enhance the effectiveness of community-based learning without falling in the trap of escaping into a virtual reality.

Although school-based learning ranked as the fourth in popularity, given the choice, students would spend less than a day per week (16 %) of their learning in classroom when it comes to learning about their community. This is a good evaluation of classroom-based learning methods in Sendai as otherwise students significantly preferred non-traditional learning setting which they associate with community-based learning.

When students learn together with their parents, neighbors, people from business and administration, farmers, craft men, etc. on a regular basis-as they do in community-based learning-they meet people they would otherwise not, and they become acquainted with parts of the community which would stay hidden in the regular school education. Through these interactions, the bonding among people, the "social capital", thus the sense of belongingness and sense of community gets stronger, more diversified and deeper. To purposefully enhance this process, the current good policies on community-based learning need to be supported and further studies (e.g. gap analysis) are needed to prioritize action for improvement.

Recommendations

- Keep involving the local community in education.
- Keep high profile of environmental issues across the whole curriculum.
- Strengthen educational programs understanding rural development (more on farms).
- Address more the social and economic aspect of community-development.
- Honor students' learning preferences.

IV. The "shin-do-fuji principle

In conclusion, let's reflect on the "Shindofuji Principle, and old Japanese principle which has a message for us about community, environment and learning. Originally a Buddhist teaching, the shin-do-fuji(身土不二) principle literally means that our body and its environment are inseparable:

身 (shin) — our body
土 (do) — environment (Earth)
不二 (fuji) — inseparability (not two = one)

It sounds like a succinct articulation of system thinking or the precautionary principle: the interplay between the physical environment and ourselves warns us to learn more about this system, and beware of the limits of adaptability of these actors. The globalization-induced mobility and the emergence of mega-communities (mega-cities) pose a new challenge in (re) learning mobility and the opportunity of (re) defining our relationship with our environment. The key is learning the system. This is a lifelong learning process. The oneness of human kind (individuals, communities) and our local and global environment gives

us both responsibility and hope.

Acknowledgement

Noriyoshi Sato, Sendai Board of Education
Professor Kazuyuki Mikami, EEC, Miyagi University of Education, Sendai
Dr. Yoshihiro Ugawa, EEC, Miyagi, University of Education, Sendai
Dr. Masahisha Sato, Reiko Koyama, Mami Takanarita, IGES, Hayama
Dr. Brendan Barrett, Ng S.T.Chong , UN University, Tokyo
Ms. Motoko Mezaki, interpreter, translator, Tokyo

Notes:

[1] This paper summarizes the main points presented on 2 December, 2002 in Sendai, Japan Contacts: deri@iges.or.jp, http://www.iges.or.jp/, http://iges.net

[2] In this paper community is defined as a group of people with common geographical locality, common interest and common aspiration (goals).

[3] Norberg-Hodge, H. (1991). Ancient Futures, Learning from Ladakh, Learning the Western Way, P 110. Sierra Club Books. USA

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[5] Agenda 21, Chapter 36 (1992):
http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21toc.htm
Earth Summit: Agenda 21 (The United Nations Program of Actions From Rio), 1992. United Nations Department of Public Information, USA

[6] UNESCO "Educating for a Sustainable Future" (1994 - 2001)
http://www.unesco.org/education/esd/ ;

[7] It is important to acknowledge that community involvement ranks as the third of the five most important school-level factors that influences students' academic achievements. In Marzano, J. Robert (2003) What Works in Schools: Translating Research Into Action. ASCD, USA

[8] Addition by the author.

[9] Community-based learning as a tool in education for sustainable development is promoted in several international educational initiatives, most recently: UNESCO Decade of Education for Sustainable

Development (2003)
http://unesdoc.unesco.org/images/0013/001311/131163e.pdf

[10] Implicit learning: complex learning in the absence of conscious recollection of what has been learned. It can be accessed more readily on implicit memory tests (e.g. performance) than on explicit memory tests (e.g. direct questioning). Source: Eysenck, M.W., Keane, M.T. (2001). Cognitive Psychology. Psychology Press, Taylor and Francis Group

[11] Social capital can be described as the relations between individuals and groups, often referred by sustainable development minded economist in addition to economic and environmental capitals. "Shared knowledge, understandings and patters of interactions that a group of people bring to any productive activity" in Roseland, M. (1998) *Toward Sustainable Communities: Resources for Citizens and Their Governments,* New Society Publishers, Gabriola Island BC, Canada and Stony Creek CT, USA
For further reading: Sustainable Measures: Community Capital
http://www.sustainablemeasures.com/Training/Indicators/Capital.html

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[13] See also: Deri, A. (2003) "Community-based Education for Sustainable Development." (eCourse). http://iges.net

[14] Further readings:
GBN.org (1998). "Scenario Thinking: Education and Community." *Scenario Planning* Global Business Network.

Chase, Bob. (1998b). "Welcome to Connecting Schools, Families, and Communities." *National Education Association*

Ogilvy, J. (1995). "Education and Community: Four Scenarios for the Future of Public Education." Global Business Network. http://www.gbn.com/ArticleDisplayServlet.srv?aid=505

[15] The benefits of system-thinking-based community management are described by Gwendolyn Hallsmith (2003) The Key to Sustainable Cities, Meeting Human Needs, Transforming Community Systems. New Society Publishers, USA

[16] Rapp, K.A., Lal, C. (ed.) (1996) Improving science education with community-based projects.
National Science Teachers Association, USA

[17] Environmental Education and Communication Programme Office, Hungary, homepage: http://www.prof.iif.hu/konkomp/indexa.htm

[18] Hungarian Eco-School Network homepage: http://www.okoiskola.hu/

[19] Read more on the Institute for Sustainable Communities homepage: http://www.iscvt.org/

[20] Learning Environment and Activity Foundation's homepage: http://www2.ocn.ne.jp/~leaf-j/

[21] Read more on the Institute for Sustainable Communities homepage: http://www.iscvt.org/

[22] Read more on the Institute for Sustainable Communities homepage: http://www.iscvt.org/

[23] State Education and Environment Roundtable (SEER) homepage: http://www.seer.org/

[24] Sherman, P. (1998). Empowering Students to do Extraordinary Things: Environment as an Integrating Concept http://www.rmc.sierraclub.org/pandp/1998-02/eic.html

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[26] Orton Foundation's homepage: http://www.orton.org/

[27] Environmental Learning for the Future (ELF) http://www.vinsweb.org/education/

[28] Linking Learning to Life's homepage: http://www.linkinglearningtolife.org/

[29] Center for Education for a Sustainable Future's homepage: http://csf.concord.org/esf/

[30] Read more on the Institute for Sustainable Communities homepage: http://www.iscvt.org/

[31] Outline of Sendai City, Slide Show on Sendai City's Homepage: http://www.city.sendai.jp/information/SlideShow/frame15.html

[32] Environmental Education Center of the Miyagi University of Education: http://www.eec.miyakyo-u.ac.jp/english/

[33] The text of the eSurvey (original in Japanese):
"At school you will learn about Sendai in different ways. What would make you most excited, what are you

really looking forward to? Choose three."

1. Classroom lesson in school
2. Visiting a factory, a bank, a hospital, an office etc in the city
3. Visiting a museum, a culture-centre in the city
4. Visiting a city-park
5. Visiting a farm, rice-paddies in rural areas
6. Visiting a nature reserve: mountains, seashore
7. Using computer/Internet, TV, radio
8. Other: Your ideas....

[34] Survey URL: http://c3.unu.edu/sastrial/survey_statistics.cfm?id=229

[35] Total student population in Sendai: 539
Total number of primary and secondary schools in Sendai: 148

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Global Environmental Issues and the Education for Sustainable Development, Now and in the Future

Ryokichi Hirono*

This presentation, entitled as "Global Environmental Issues and the Education for Sustainable Development, Now and in the Future," aims to identify effective policy recommendations for the improvement of education for sustainable development, in particular environmental education both in industrial and developing countries.

In Section One it makes an overview of the current state of the environmental degradation the world over and in particular in the Asia-Pacific region.

Industrial countries are characterized in terms of environment by:

1) the exploitation at home and abroad of non-renewable resources and the wasteful use of renewable resources including marine resources resulting from the unsustainable lifestyles of the people and the intensive competition among private sector enterprises in the increasingly globalized world economy, steadily leading, though on a decelerated basis, to the destruction of the Nature and its ecosystem including deforestation, desertification, the loss of clean extended beaches and biodiversity,
2) a rapid pace of urbanization, resulting in an increasing traffic congestion, air, water and soil pollution, noise, vibration and odour as well as an enormous expansion of household garbage and industrial wastes coming out of extensive housing and industrial and commercial facilities, and
3) an increasing threat to environmental destruction resulting from the possible use of mass destructive weapons such as chemical, biological and nuclear weapons.

Developing countries, on the other hand, are characterized by:

1) a steady loss of fertile farmland, tropical forests, clean water and other natural resources essential to the survival of human and other animal species, resulting from abject poverty especially in rural areas, an excess use of chemical fertilizer and pesticides, over-grazing, deforestation on the land and unsustainable fishing using dynamite in the sea,
2) a rapid rise of air, water and soil pollution resulting from a high tempo of unbridled industrialization particularly in metropolitan areas and unregulated urbanization without proper zoning and a steady destruction of clean ocean, lakes and rivers polluted by surging industrial and solid wastes and household garbage,
3) the destruction of the Nature and human lives in many developing countries resulting from the lack of early warning anti-disaster systems and from a growing number of internal armed conflicts leading to the

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surge of internally displaced persons (IDPs) and refugees, and

4) the spread of energy-, resources- and waste-intensive, in other words, unsustainable lifestyles coming from industrial countries under an increasing intensive global competition among multinational corporations operating the world over.

Section Two discusses those measures taken by governments of both industrial and developing countries to deal with those environmental issues facing their people and identify major successes and failures encountered by them. It identifies common features of policy responses against environmental degradation in industrial countries, in the decided shift from "Command-and-Control" (C&C) approaches to "Commun ity-Market-Regulatory" (CMR) ones, itself symbolizing the integration of environmental concerns into national development plans and programmes and corporate pricing policies internalizing the social cost of environmental degradation. It also evaluates the contribution made by various partners of development, including central and local governments, the private sector including multinational corporations, local and international NGOs and Official Development Assistance (ODA) by both bilateral and multilateral organizations, specifically in China, India, Indonesia and the Republic of Korea, the countries where the author has been concentrating his analytical studies on major issues of environmental deterioration and the public and private sector responses to it.

In Section Three the presentation focuses on the current state and major issues of environmental education in both industrial and developing countries.

A. Its findings in industrial countries are:

1) a great step forward made during the last decade or two in experiential environmental education in allowing the participants often targeting at school children and now increasingly involving adult community residents including housewives and senior citizens to identify the state of environmental degradation in local communities and the need for environmental conservation/protection measures at the community, local and national levels,

2) a gradual shift from environmental education/learning focused on Nature Observation, birds and wild animal watching to that on the critical importance of biodiversity, global warming and sustainable lifestyle including the reuse of natural and man-made resources, the reduction and recycling of household and industrial wastes, organic fanning emphasizing food safety, health and prevention of HIV/AIDS and communicative diseases and industrial and traffic safety as well,

3) an enormous progress made in public organizations including government agencies and private sector enterprises in environmental education/learning among their employees, resulting from the installation and implementation of of corporate environmental guidelines, reports and standards such as ISO14001 certification, the Zero Defect, the Quality Control and the Zero Emission movement spreading from one firm to another, often initiated or supported by respective industry associations at the local, national and international levels including Business Council on Sustainable Development. In preparing these corporate environmental guidelines and reports and monitoring their implementation, a number of environmental NGOs have been invited to participate to make it not only more effective but also more transparent, participatory and accountable to the consumers of their products and services and to the

local community in which those firms operate,

4) a legal requirement of environmental assessment approval process for all public and private sector projects exceeding certain amount of investment expenditures and ensuring a greater involvement of community residents and environmental NGOs in preparing long-term city and regional development plans, urban redevelopment plans, programmes and projects such as road building, park construction and the building of school and other public facilities to take into account their environmental concerns and impact,

5) SEVEN MAJOR ISSUES being identified as requiring urgent action by governments, central and local, private sector enterprises and NGOs;

a) an urgent need for improving evaluation methodologies and systems including measurements for project, programme and policy monitoring and performance in environmental education/learning,

b) an urgent need for organizing, implementing and evaluating environmental education/learning FROM THE GLOBAL PERSPECTIVES AND IN THE BROADER CONTEXT OF EDUCATION FOR SUSTAINABLE DEVELOPMENT BEYOND NARROW CONFINES OF ENVIRONMENTAL EDUCATION AND LEARNING. This is one of the most important lessons coming out of the World Summit on Sustainable Development held in Johannesburg in August/September this year, resulting in the adoption of the United Nations Decade of Education for Sustainable Development as proposed by Prime Minister Koizumi in his endorsement of its original proposal advanced by a Japanese NGO network Japan Forum for Johannesburg,

c) an urgent need for developing professional manpower capable of supporting community citizens and groups in planning and programming environmental education/learning activities in the community, in facilitating the mobilization of participants in such community activities, and in networking and coordinating those organizations and individuals concerned with and interested in them,

d) strengthening on a systematic basis environmental education/learning activities in different communities and organizational and functional linkages and coordination among them,

e) providing accurate environmental information on a timely basis to those in need,

f) strengthening systematic linkages among various actors of environmental education/learning such as concerned individuals, NGOs, private sector enterprises and central and local governments, and

g) support to private sector organizations in strengthening in-company environmental education/learning activities, green purchases, environmental labeling and in drafting and publishing environmental reports and support to NGOs and private sector organizations in organizing experiential environmental education/learning activities.

B. Its finding in developing countries are:

1) top priority being given to education for the reduction and eradication of poverty which constitutes one of the major causes of environmental degradation in developing countries as shown in Section One, which by definition requires environmentally sustainable development integrating environmental conservation and protection into national and local strategies for economic growth,

2) considering the critical importance of girls' and women's basic education to income-generating capability and their health education to restraining high birth rates and poverty syndrome, top priority be given to basic education for all, which makes environmental education/learning more effective in developing

countries,

3) considering that basic education for all constitutes a fundamental prerequisite to the provision of technical, professional and other tertiary education required for technology- and knowledge-intensive industrialization aimed by many developing countries, and considering that MNCS operating in developing countries also increasingly require high-calibre employees both on the production floor and in offices and R&D laboratories, all the more importance be given to the provision of high-quality basic education which should be only possible with high-quality teachers, teaching curricula, materials (textbooks and reference materials), equipment and facilities as well as excellent school administration and dedicated education personnel,
4) with a growing importance being attached to the installation of legal framework administrative and judiciary machinery for environmental protection, an urgent re-orientation is being required in the assistance of bilateral and multilateral donors in favour of environmental ODA and education/learning, along with further efforts by developing country governments and private sector enterprises for integrating environmental concerns into all their national and corporate development plans, programmes and projects,
5) a constant adaptation in environmental education/learning being required in developing countries to take into account changing needs and requirements of environmental conservation and protection in response to changing panorama of environmental degradation both in substance and degree,
6) top priority in environmental education in developing countries will continue to shift in favour of the conservation and protection of the Nature, biodiversity, rare animals, birds and fish, and tropical forests which all form the critical basis for eco-tourism now becoming quite popular in developing countries which all require needed foreign exchange and job creation for millions of youth coming into the labour market every year, and
7) with the rapid pace of urbanization and industrialization, the importance of environmental education/learning for proper collection, treatment and disposal of household and industrial wastes to reduce environmental hazards and risks should be quite clear and obvious.

Section Five presents some policy recommendation with respect to the direction and approaches to environmental education/learning in developing countries and to assistance by bilateral and multilateral donors in line with the above.

On the demand side

1) Reorienting national development strategy in favour of sustainable development and greater environmental education/learning interface;
2) Enhancing environmental, quality-of-life and human rights awareness among among people of all walks of life, particularly among children and youth in and off school;
3) Strengthening environmental governance including administrative and legislative measures and judiciary system and CBOs/CSOs against pollution through public information disclosure, pollution charges, facility licensing, green product certification and appropriate resource pricing;
4) Provision of tax and other incentives for those households, schools, firms and other organizations

interested in environmental improvement;

5) Need for a gradual shift from "Command-and-Control" principle to "Community-Market-Regulatory" approach, taking into account the variation of regions or areas in terms of damage and abatement cost in setting the level of standards and avoiding their uniformity as well as the equity effects of such standards setting and their enforceability: need for introducing source-specific emission standards rather than across-the board ones;
6) Reorienting foreign assistance in favour of improving environment education and governance; and
7) Promoting subregional, regional and international cooperation in environment including environmental education/learning, governance, emission trading and CDM as seen with the CJK tripartite arrangement,

On the supply side at home and from overseas

1) Upgrading tax and financial incentives and support to households, farmers and private sector firms to install cleaner production technology and increase green investment, purchases and financing;
2) Enhancing human and institutional capital and improving environmental management know-how;
3) Strengthening administrative support for environmental protection through private-public sector collaboration, inter-sectoral policy integration and community-based resource management;
4) Promoting partnership among all stakeholders at the corporate, local and national levels in improving environmental management through participatory planning, implementation, monitoring and evaluation processes;
5) Re-orienting and increasing foreign assistance at favourable terms in favour of capacity development, i.e.,human capital and institutions; and
6) The CJK tripartite and regional cooperation for accelerating environment technology, financing and management know-how through private sector cooperation such as joint ventures and technology licensing and private public partnerships.

The Research in the Environmental Consciousness and the Interacted Education of Teachers in the Middle School

Ning Wang

Ning Wang* and Lianxi Sheng*

Abstract: The environmental education in the higher normal colleges and universities plays a vital and indispensable role in improving the national quality and strengthening students' environmental consciousness in whole-course. This article discusses intensifying the environmental consciousness on the students who are not major in emironment, rearing the interacted teaching parts and the methods of training extracurricular activity skills, so as to lay a foundation for the systematization and regularization of higher college's environmental education.

The UNESCO and UNEP have put forth the theme that environmental education should be all-life which faces to any ages. Correspondingly, the outline of 9 years' compulsory education in China has also posed the principle that penetrating environmental education in the curriculum of compulsory education. The whole-nation and whole-course of environmental education has become one objective of Chinese national quality's education. Currently, many higher colleges are probing actively the ways and methods of realising the objective. Our school also has made some beneficial attempt.

1. The status and function of teacher's education in environmental education

There are about 1,100 state-run universities in China, among which the normal colleges and universities take account for a quarter. The higher normal academy is not only the base for bringing up middle school's teacher but also the chief force which take part in the whole-nation and whole-course environmental education in the future. Therefore, the teacher's education in the higher normal academy is particular and indispensable in the field of environmental education. The outline of 9 year's compulsory education in China regulates finitedly that we should penetrate the content of environmental education into geography, chemistry, and other related subjects. It means that environment has not yet been compulsory in the primary and secondary school, and it is necessary for teacher to penetrate relevant content in their majority teaching by virtue of their own environmental awareness, knowledge level and practice skill. So the higher normal education's effect on training students' environmental awareness is much more important. As to the future teachers, they should not only grasp systematic basic knowledge of environment science but also improve their all kinds of abilities, which including penetrating environmental knowledge in related subjects, initiating environment protection course indispendedly, leading and nurturing students to be close to the nature, know the nature, find environmental problems and improving environment practically. Due to above reasons, the teacher education's function and responsibility in environmental education are both very important and definited.

2. The methods and ways of training environmental consciousness in teacher's education

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This research subject is being probed actively in Chinese environmental education, the following are the measures we take in education.

(1) Introduction of theory and environmental ideas

① Combining establishing curriculum indispendedly with penetrating teaching

Northeast Normal University is a comprehensive normal university, establishing 46 specialities, among which including Chinese, education, history, politics, maths, physics, chemistry, geography, biology and so on. It began to initiate the public optional course of probability theory of environment science from 1986. Students have been liking this course and the amount of selecting the course is growing year by year. The number is over 600 at present, which is about 25 percent of whole number in the same grade. To satisfy the students'demand, we have initiated another serial course called environment and health. During the teaching, we not only attach importance to environment science knowledge and environmental awareness but also seek to explorate the relationship between environment science and many other subjects such as geography, chemistry, biology and education. We set out the correspond contents and chapters related to environment science in secondary school's textbooks, so that students can find out the junction point between environment science and their specialities. And then they can lay a foundation for realising penetrating environment knowledge more rapidly in secondary school's teaching in the future.

② Emphasis on the textbook construction of environmental education

When it comes to the environmental education of students who are not major in environment, the popular science has always been chief in the past, so, there isn't any satisfactory teaching material at home and abroad. Having established the environmental courses for many years, we compose systematic textbooks, such as modern introduction theory of environment science, environment and development, protect human's homeland--the Earth and so on. They have the same features in that their common theory guide, value pursuit, theme, object is respectively sustainable development, environmental ethics, suggesting green civilization and harmonious coexistence and cooperate development between man and nature. Because of these characters, they are very popular with students.

③ Training teacher's capability of launching environmental education according to the secondary school's educational demand.

Considering the current demand of the secondary school's environmental education, we lecture theory, intensity training of demonstrated experiment in class, in addition, we found interacted education course, making the theory of environmental education penetrated into classroom instruction and extracurricular activities, so that students master interacted education approach and teaching parts. As far as the teacher's successive education training class is concerned by ways of research and discussion, we focus on teaching the difficulties and problems in the course of environmental education, intercommunicating good teaching experience, so as to obtain the goal of teaching and learning advance together. By this form, we not only lecture the knowledge of environment science but also learn from each other and improve mutually.

(2) Consolidating the practice ability's training

If only by ways of classroom teaching and training, we can't complete the work of training the secondary school's tearchers to develop environmental education. It is required we strengthen their practice ability by varieties of methods. Fortunately, the practice activities of environment science and technology provides methods and means.

① Analysing and inducing

In this activity, teacher presents topic research content at first, then students continue to complete it by means of questionnaire, information retrieval. During the course, we aims to train students' ability to retrieve documentation, design questionnaire. Take the research in dust and soil storm's courses for example. Students looked up lots of data and made on-the-spot investigation in western drought and semiarid grassland and desert in Jilin province. Under school's organization, they analysed and researched the course in many terms and then finish papers which to be published in school's or other newspapers and periodicals. Another example is about the current situation and growth of environmental education in China. We guided students to collect and compare information about every country's present state of environmental education, to investigate student's environmental consciousness in university, middle school and primary school, to make statistics, analyse, induce, summarize and to write article finally.

② Probing into question

At first students pose problems by themselves, then teachers guide. Its form includes society survey, visit and study. The activity can foster students' practice ability to investigate and analyse, organize and apply, induce and summarize. Some students submitted the problem about urban garbage pollution at present. Teachers guided and organized them to investigate the garbage's dumping and transportation in urban residential district and the waste tip's construction. Having done these jobs, students wrote paper named the advantage and disadvantage of collection of classified refuse and gave some suggestion about garbage disposal in residential district. Other students presented water pollution. We organized students to investigate the lake's water quality on the spot, to sample and analyse, then to finish the topic research. The activity team of environment science went to investigate the water quality in South Lake in Changchun. Students measured the water quality indexes, visited the sediment dredge spot. Their environmental awareness was improved and their ability of designing investigation programme, organizing and practising, experimentalizing on-the-spot, analysing and summarizing were also trained further.

③ Open-experiment

According to the classroom lectures, we design and develop small scientific experiments. They were finished by teachers and students interactedly, we established not only demonstrated experiments which are simple and easy to do and audio-visual but also some field test methods, so as to make students understand the basic theory. So far, me have established 7 big categories, 26 kinds of methods in all.

①' simple and easy methods of water quality monitoring (8 kinds)

②' simple and easy monitoring methods of atmospheric pollution index (3 kinds)

③' the demonstration of atmospheric pollution's emergence and effect (3 kinds)

④' the identification of indicator plants for atmospheric pollution (2 kinds)

⑤' the identification of water pollution indicating animals (2 kinds)

⑥' the raise of acid rain (1 kind)

⑦' green-house effect experiment (2 kinds)

⑧' water treatment methods (2 kinds)

⑨' the rapid test for contaminant in food (2 kinds)

⑩' other (1 kind)

The simple and easy demonstrated experiment is to in support of classroom instruction. On the one hand,

it can make students understand the theory directly and profoundly. On the other hand, it can enlighten students' creatived thought, so that they can develop more classroom demonstrated and course experiments to put them into implements in their future work.

3. Conclusion

The student in normal college will be the middle school's teachers in the future, so their education conception, knowledge structure, teaching and experiment skills, organizing and designing abilities are important sector and base of finishing environmental education. Therefore, (1) Initiating curriculum is one of main methods of improving students' environmental consciousness whose majority are not environment; (2) penetrating education is the best way of enhancing students' ability of finding out the relationship between environment science and other subjects and looking for the junction point; (3) Interacted practice activity is indispensable teaching part of making students master skills to guide and launch environmental protection activity and to exploit the creatived thoughts.

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The Environmental Education Strategy for the Practical Arts Subject in S. Korea

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Abstract

The purpose of this study was to find the strategies to execute the environmental education through the Practical Arts subject in elementary school. This study was conducted by the review of literature, the content analysis, and the discussions with panels of judges composed of experts in the environmental education related fields.

The major conclusions of this study was as follows:

1. The Practical Arts subject is appropriate to conduct environmental education.
2. The Practical Arts subject set the basis to start environmental education in Korea.
3. The 'Life Resource and Environment Management' area in the Practical Arts subject is very suitable to widely conduct environmental education.

The followings were recommended based on the findings and the conclusions of the study. First, it is recommended for the Practical Arts subject teachers to conduct environmental education in various ways such as introducing environment-related jobs, daily work related to preventing environmental pollution, and so on, when teachers are teaching the 'Understanding Family and Work' area in the Practical Arts subject. Second, the environment contents should be included in all sub chapters in the 'Living Skill' area in the Practical Arts subject. Third, 'Hands-on' education or 'experience-based teaching skill' should be executed in teaching the Practical Arts subject. Forth, elementary school teachers should find a way to conduct environmental education in a way of content integration between subjects so that teachers can save some time to perform experience-based teaching which takes more time than other teaching skills.

The scientific technology and the economic advancement not only have brought material prosperity to human but also have endangered the life of human beings by destroying the environment. In Korea, since 1970, the accelerated industrial development has brought an enormous amount of environmental damage such as air, water, and soil pollution, and so on. This environmental destruction made people try to protect and to recover the environment.

There are several approaches in many areas to protect the environment such as developing the environmental purifying technology in science areas, establishing the environmental laws, provisions, and regulations by the legal system, and establishing the least damaging economic development policy in administration areas, and so forth. These approaches for environment protection are, however, symptomatic and short-term solutions for the environmental problems. On the other hand, there is a new and common opinion that the educational approach is the fundamental solution for environmental problems (Seo, 1998; Shin, 1991). There are several reasons that show the educational approach is the one.

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The basic idea of the educational approach is that people need to change their conceptions toward the environment so that they cultivate their practicing ability on environmental problems. It is also necessary for people to be awakened to the environment and to take part to achieve the goal of continuous environmental development. Furthermore, ignorance of human beings toward the environment is the fundamental cause of environmental destruction from the start. Therefore, the educational approach is not only fundamental but also effective for solutions to prevent and to overcome the environmental problems (Ghang, 1995).

There are two major reasons to attach more importance to school environmental education. One is that the environmental education in the Korean school system is required so that it is more likely to be effective with students. The second reason is that the elementary school years are the time for students forming environmental concepts. That is, by educating students on the appropriate environmental concepts, they are able to contribute to solve the problem of the present environmental destruction and to prevent future environmental problems.

To educate the younger students environmental education can bring better results because environmental education does not give students knowledge or a simple skill related to environment but does give students the right values and attitudes toward the environment. Therefore, it is more important to educate elementary school students on the environmental subjects.

In Korea, there were environmental contents in the Practical Arts subject during the first national curriculum term (1965-1962) and that was even before the environmental education was dealt with as an important subject. Furthermore, environmental education becomes one of three major areas in the Practical Arts subject in the 7th national curriculum. That is, the Practical Arts subject has played an important role in the elementary education in Korea.

However, there is not much research on how the Practical Arts subject has dealt with the environmental content, and what kind of environmental content should be put into the Practical Arts subject based on the characteristics of the Practical Arts subject. Therefore, it is needed to conduct the research on analyzing the environmental contents in the Practical Arts subject in the 7th national curriculum and on suggesting better way of organizing and teaching the environmental contents.

Purpose of the Study

The purpose of this study was to find the strategies to execute the environmental education through the Practical Arts subject in elementary school. The specific objectives for this study were as follows:

1. Investigate the background of environmental education in the elementary school.
2. Analyze the contents of the environmental education in the Practical Arts subject in the 7th national curriculum.
3. Suggest strategies for developing the contents related to the environmental education in the Practical Arts subject.

Methodology

The research project was a qualitative study. This study was conducted by the review of literature, the content analysis, and the discussions with panels of judges composed of experts in the environmental education related fields.

Review of literature

The literature related to environmental education was reviewed to investigate the basis of discussion on the elementary environmental education and to find the categories to analyze the contents of elementary environmental education.

Content analysis

A content analysis was utilized to analyze the amount of the environment contents in the Practical Arts subject. The subjects of the content analysis were all part of the Practical Arts subject from the 1st national curriculum to the 7th national curriculum.

To analyze the environment contents in the Practical Arts subject, the content analysis framework was developed (Table 1). A total of 9 analysis categories in the environmental education contents was selected based on previous research (Shin, 1977; Shin, 1987; Nam, 1995; Lee & others, 1997). The selected 9 analysis categories were 'Natural Environment (NE)', 'Artificial Environment (AE)', 'Population (P)', 'Industrialization and Capitalization (IC)', 'Resource (R)', 'Environmental Pollution (EP)', 'Environment Conservation (EC)', 'Environment Sanitation (ES)', and 'Environmental Ethics (EE)'.

In the national curriculum, there are characteristics, objectives, contents, teaching methodologies, and evaluation methods for the Practical Arts subject. Furthermore, all the elementary school teachers must use and follow the national curriculum guide. Analyzing the national curriculum is the most proper method to analyze the contents related to environmental education in the Practical Arts subject. Therefore the environmental education contents in the Practical Arts subject were analyzed by the 9 analysis categories.

Panel of judges

Apanel of judges was utilized to verify the quality and the propriety of the content analysis framework. Also, the panel of judges verified the appropriateness of the environmental education strategies in the Practical Arts subject.

History of the Environmental Education in the Elementary Education in Korea

History of the environmental education in the elementary education

It was the 4th national curriculum (1981-1988) when environmental education was considered in earnest even though there was little content of environmental education before the 4th national curriculum. In the 4th national curriculum, the objective of environmental education was provided as 'nature conservation, environment pollution, and population problems must be taught properly and efficiently'. The contents of environmental education, also, were suggested to be taught in various subjects in elementary schools.

The environment conservation model school system, which was coordinated by the Ministry of Education and the Ministry of Environment together in 1985, pulled the trigger to make environmental education alive. There were 4 environment conservation model elementary schools that received enormous amounts of financial aid from the Ministry of Education and the Ministry of Environment and conducted the model environmental education for two years. The environment conservation model schools were selected every two years and the number of the environment conservation model schools were getting higher and higher. From

1993, the environment conservation model school system is being operated for preschool, elementary school, middle school, and high school (Ministry of Environment, 1998).

In the 5th national curriculum (1989-1995), the objective of environmental education was prescribed as 'environmental education must be conducted in most educational activities, and environmental education activities must be enforced especially in environment related subjects such as Ethics, Social Science, Science, and Practical Arts subjects'. During the 5th national curriculum term, the Ministry of Education performed the environmental education related tasks with the assistance of the Korean Education Development Institution, which developed a great deal of the environmental education materials. With the support of the Ministry of Education, the Korean Environmental Education Association was founded. That is, the major interested people in environmental education changed from individuals such as government officers, schoolteachers, etc. to the environmental experts such as professors, professional researchers, and administrators. All of the interested parties came to work together (Ministry of Environment, 1996). However, the contents of environmental education didn't meet the satisfactory level in the 5th national curriculum even though the environmental education contents were much better than those in the 4th national curriculum (Choi, 1991).

There was a big progression in environmental education in the 6th national curriculum. In the 6th national curriculum (1996-2001), the Ministry of Education made the 'Environment' subject separate as a selective course for the secondary education system, which means environmental education was conducted in many courses and the 'Environment' subject was added as an elective course. For elementary education, there was no elective course for environmental education. Instead of a separate course, the Ministry of Education developed a 'School Discretion Course' for 3rd-6th grades, 34 hours in a year, and elementary school teachers would be able to select the environmental education subjects to teach students. However, the environmental educational subjects were not required for the 'School Discretion Course'.

In the 'Guidance for Organizing and Conducting Curriculum' developed by the Ministry of Education, there were several directions for environmental education in the 7th national curriculum. First, the environmental education must be mainly conducted in the 'School Discretion Course' and environmental education related courses. Second, the environmental education must be integrated with the 'School Discretion Course', environmental education related courses, extra-curricula activities, and school activities. Third, the environmental education must be conducted in relation with community and home. This was the first time for the national curriculum to give very specific directions for integrating environmental education with all kinds of school activities (Ministry of Education, 1998).

The Practical Arts subject and environmental education

In Practical Arts education, the environmental education contents were dealt with in the 1st national curriculum while environmental education was considered in earnest in the 4th national curriculum for all of the educational system. Especially in the 7th national curriculum, one of the three major areas ('Understanding Family and Work', 'Practical Arts', and 'Managing Life Resources and Environment') is all environment related.

Three chapters of the Practical Arts subject are offered for the 'Managing Life Resources and Environment'area. The 'Living Environment Arrangement' chapter is provided for the 5th grade with two sub-chapters of 'Arranging Desk and Closet' and 'Cleaning and Wastes Management'. There are two chapters

related to 'Managing Life Resources and Environment' area. One is the 'Utilizing Resources' chapter, that consists of 'Utilizing Life Resources and Saving', 'Recycling House Supplies', and 'Investigating the Environmental Problems and Practicing the Solutions'. The other one is the 'Fixing the Home Interior', that consists of 'Decorating Indoor Environment', and 'Planting, Growing, and Pruning Trees'.

Furthermore, there are more environmental education related contents in the Practical Arts subject. That is, Practical Arts education has played a very important role for environmental education in elementary education.

Practical Arts education is appropriate to conduct environmental education due to several reasons of the teaching methodology and the way of approaching subject contents. Basically, the contents of environmental education should be related to the daily life environment and should be approached in an integrated way. Also, environmental education should be conducted in 'learning by doing' based on actual experience and should not be in instructing knowledge related to the environment. These reasons have very similar points to the 3 major characteristics of the Practical Arts subject, including 'life subject', 'experience subject', and 'integrated subject'.

The following specify what the commonness between the characteristics of the Practical Arts subject and the environmental education should be.

First, Practical Arts education and environmental education both set importance on 'life experience'. In elementary education, environmental education should be related to children's experience of perceiving social and natural phenomena, which means the environmental education should be connected directly to children's daily life experience. That is why environmental education in elementary education should be focused on children's lives, not on transferring the environmental knowledge (Kim & Nam, 1993). Remember that the secondary education system already takes a part in transferring the environmental knowledge.

The Practical Arts subject puts importance on the problem-solving attitude that children should be able to find the environmental problems and to try to solve the problems in real life. Therefore, the results of environmental education by the Practical Arts subject do not remain in the classroom situation, but remain in children's life habits. Therefore, planning and executing the 'wild flower exhibition' or culturing the 'indoor garden in the classroom' or 'outdoor garden at school' would be a good way for students to get an environmental education.

Second, both of Practical Arts education and the environmental education attach much greater importance on practice than knowledge or attitude. The environmental education not only lets students perceive the seriousness of environmental problems, but finally makes students solve those problems in real life, so that students get into habit of improving the environmental situation. Thus, it would be more effective for environmental education to adapt the teaching-learning methods which are utilized in the Practical Arts education including 'learning by doing method', 'hands-on practice', and so on. This would be another reason that the Practical Arts subject is the proper subject in which to conduct environmental education.

Third, the Practical Arts education and environmental education are in common in that they both are developed and practiced based on integrated and multi-originated subjects. Ideally, both forms of education must implement their subject in a certain scholastic area, which is integrated in many and different scholastic areas, so that students should be able to apply what they learn in their lives.

Based on above theories, the Practical Arts subject fulfills and sets basic standards for executing

environmental education. Therefore, it is needed for us to provide schemes in the Practical Arts subject so that environmental education is performed properly in the Practical Arts subject.

The Environmental Contents in the Practical Arts Subject

The environmental contents in the Practical Arts subject by the national curriculum term

As a result of the content analysis by each national curriculum term, 'Resource', 'Environment Conservation', and 'Environmental Sanitation' were major topics related to environmental education in the Practical Arts subject in last 50 years of elementary education in Korea (Table 1).

In the 1st national curriculum, the Practical Arts subject consisted of 10 major areas. Among the 10 areas, environmental education was dealt with in 'Decoration', and 'Sanitation and Nurturing' areas. The 'Cultivation' and 'Sewing and Knitting' areas also were related to environmental education. The major contents of the environmental education in the 1st national curriculum were 'Environment Conservation (EC)' and 'Environmental Sanitation (ES)'.

There were 7 major areas in the Practical Arts subject in the 2nd national curriculum. 'Resource (R)' and 'EC' areas were dealt with in 'Cultivation', 'Utensil Manufacturing', 'Upgrading Living', and 'Living Management Education' areas. There were 9 areas in the Practical Arts subject in the 3rd national curriculum including 'Cultivation', 'House and Environment Sanitation', and 'Cooking' which were related to the environmental education such as 'ES' and 'EC'.

'Living Plan and Management', 'Living Skills', 'Consumption and Saving', and 'Understanding Work and Job' were 4 major areas for the Practical Arts subject in the 4th and 5th national curriculums. The environmental education contents in the Practical Arts subject were 'R', 'EC', and 'ES' which were dealt with in 'Living Plan and Management', 'Living Skills', and the 'Consumption and Saving' area.

In the 6th national curriculum, the Practical Arts subject was composed of the 'Handling', 'Making', 'Raising and Cultivating', and 'Arranging' areas. The environmental education contents such as 'R' and 'EC' were dealt with in 'Raising and Cultivating', and 'Arranging' areas.

There are 3 areas of 'Understanding Family and Work', 'Living Skills', and 'Life Resource and Environment Management' in the Practical Arts subject in the 7th national curriculum. This is the first time for the Practical Arts subject to have the environmental area separately, which means the environmental education was strengthened in the Practical Arts subject. The environmental education contents are conducted under the title of 'Arranging Living Environment', 'Utilizing Resources', and 'Fixing the Home Interior', which are dealing with 'R' and 'EC' in the Practical Arts subject. In the 7th national curriculum, the Practical Arts subject is partially dealing with 'ES', too.

Table 1. Environmental Contents in Practical Arts Subject in National Curriculum

NC*	G**	Contents	NE	AE	P	IC	R	EP	EC	ES	EE
1st	4	Cleaning and Arrangement in the Classroom							o		
		Gardening							o		
		Planting							o		
		Neat Dressing								o	
		Exterminating Parasite								o	
		Infectious Disease								o	
		Mouth Sanitation								o	
		Washing & Bathing								o	
	5	Managing and Cleaning the School Building							o		
		Wall Papering							o		
		Planting and Forest Management							o		
		Decorating Inside of School Environment							o		
		First Aid Treatment								o	
		Sterilization								o	
	6	Decorating Outside of School Environment							o		
		Nursing								o	
		Caring Children								o	
2nd	4	Recycling					o				
		Planning and Managing Daily Life					o				
	5	Soil Conservation and Pruning							o		
		Repairing and Managing Living Goods					o				
	6	Decorating Living Goods							o		
		Recycling					o				
3rd	4	Making a Flower Garden					o		o		
		Purposes of House Cleaning and Management							o	o	
		Cleaning Skills								o	
		Handling the Cleaning Tools								o	
		Managing School Supplies								o	
	5	Planing and Pruning							o		
		Hygienic Washing Dishes								o	
		Environmental Hygiene and Decorating								o	
		Managing Furniture								o	
		Managing Family Life								o	
	6	Decorating the Environment							o		
		Environmental Hygienic Life								o	
4th	4	Arranging Living Environment									
		Fixing the Home Interior					o				
		Rational Food Management					o		o	o	
		Non-wasted Clothing Habits									
	5	Clean and Safe Living									
		Managing and Arranging Furniture					o			o	
		Collecting and Safekeeping					o				
	6	Environment Conservation								o	
		Trimming and Utilizing Trees								o	
		Recycling Old Clothes					o				

*: National Curriculum, **: Grade

Table 1. Continued

NC*	G**	Contents	NE	AE	P	IC	R	EP	EC	ES	EE
5th	4	Arranging Living Environment Fixing the Home Interior Rational Food Management Rational Clothing Habits					 o o		o o		
	5	Clean and Safe Living Arranging and Managing Furniture Collecting and Safekeeping						 o o		o	
	6	Environment Conservation Tree Pruning Recycling Old Clothes					o		o o		
6th	3	Managing Clothes Arrangement with Utilizing Boxes Segregating Trash and Cleaning					o o		o o	o o	
	4	Flower Gardening with Flower Garden (Box) Selecting and Managing School Supplies					 o		o		
	5	Managing Computer System					o				
	6	Decorating In- & Out-door Environment Safekeeping Food Washing and Arranging Dishes					 o		o	 o o	
7th	5	Arranging Living Environment: - Arranging Desk and Closet - Disposing Trash and Cleaning					o		o	o	
	6	Utilizing Resources - Using and Saving Living Resources - Recycling Living Goods - Investigating the Environmental Problems and Practicing the Solutions Fixing the Home Interior - Decorating Indoor Environment - Planting, Growing, and Pruning Trees					o		 o		
Total							22		27	26	

*: National Curriculum, **: Grade

The environmental contents in Elementary Education in the 7th national curriculum term

The results of the content analysis of environmental education contents in elementary education in the 7th national curriculum term were shown in Table 2. For the 1st grade students, 'EC', 'Natural Environment (NE)', 'Artificial Environment (AE)', 'R', and 'ES' were given much importance, while 'Population (P)', 'Industrialization and Capitalization (IC)', 'Environment Pollution (EP)', and 'Environmental Ethics (EE)' were partially conducted in the 7th national curriculum.

The environmental content of 'NE' was reflected in various subjects such as 'Social Studies', 'Science', 'Disciplined Life', and 'Intellectual Life', while 'AE' was reflected in the 'Social Studies' subject. 'P', 'EP', and 'IC'were included only in the 'Social Studies' subject, while 'R' was reflected in several subjects including 'Moral Education', 'Social Studies', 'Practical Arts', and 'Disciplined Life'.

Table 2. Environmental Contents in Elementary Ed. in the 7th National Curriculum

S*	G**	Contents	NE	AE	P	IC	R	EP	EC	ES	EE
Moral Ed.	3	Cleanness, Sanitation, Arrangement Sparing and Caring Objects Protecting Environment					o		o o	o	
	4	Etiquette and Order in the Public Place									o
	5	Pursuing Common Profits									o
	6	Caring Life Preserving and Loving the Nature							o		o
Social Studies	3	Way of Living in the Community Terminal Station and Transportation Changes in the Traffic and Communication Institutes and Organization in the Community Efforts of People in the Community		O o o	o	o		o	o		
	4	Shape of our community Resource & Production Activity in Community Self-government of and Life in Community Problems and Solutions of Community Future of the Community	o	O o			o	o o	o o		
	5	Nature Environment and Life in Korea Efforts for Preserving Environment Life in the City Area Life in the Rural Area	o o	O o		o			o		
	6	World Problems and Korea			o		o	o	o		
Science	4	Observing Animal Life			o		o	o	o		
	5	Life and Environment	o								
	6	Pleasant Environment							o		
Practical Arts	5	Arranging Living Environment					o		o	o	
	6	Utilizing Resource Decorating Indoor Environment				o		o			
Physical Ed.	3	Hygiene								o	
	4	Hygiene								o	
	5	Hygiene								o	
	6	Hygiene								o	
Disciplined Life	1	Cleaning Body Caring the Public Goods					o				
	2	Saving and Arranging Objects Cleaning Environment					o		o		
Intelligent Life	1	Looking for Animals and Plants Arranging Objects	o o						O		
	2	Observing Surroundings Observing the Animal (Plants) Growing	o o	O					O		
1st G***	1	Cleaning Body Cleaning the Room							O		o
Total			8	8	2	2	7	4	14	7	4

*: Subject, **: Grade, ***: We are the 1st Graders

The environment content of 'EC' was provided in most of all subjects. 'ES' was dealt mainly in 'Physical Education', and partially in the 'Practical Arts' subject. 'EE' was reflected in 2 subjects, 'Moral Education' and 'We are the 1st Graders'.

Conclusions, Discussions, and Recommendations

Conclusions and discussions

Based on the results of this study, the following conclusions were made:

1. The Practical Arts subject is appropriate to conduct environmental education. Environmental education in elementary education should have contents related to daily life environment, should take hands-on teaching methodology, and should be conducted in integration with other subjects. These three points for environmental education in elementary education are directly related to three major characteristics of the Practical Arts subject including the 'life subject', the 'experience subject', and the 'integrated subject'.
2. The Practical Arts subject set the basis to start environmental education in Korea. Environmental education has been conducted and focused on the Practical Arts education before other subjects started to teach environmental education (1982-). From the 1st national curriculum term (1954-1962), the environmental contents of 'Resource', 'Environment Conservation', and 'Environment Sanitation' were taught in the Practical Arts subject.
3. The 'Life Resource and Environment Management' area in the Practical Arts subject is composed of contents, which are related to environmental education except one sub chapter. Therefore, the 'Life Resource and Environment Management' area is very suitable to widely conduct environmental education.

Recommendation

1. There is no environmental content in the 'Understanding Family and Work' area in the Practical Arts subject. However, there should be environmental content included. Therefore, it is recommended for the Practical Arts subject teachers to conduct environmental education in various ways such as introducing environment-related jobs, daily work related to preventing environmental pollution, and so on, when teachers are teaching the 'Understanding Family and Work' area.
2. The environment contents should be included in all sub chapters in the 'Living Skill' area in the Practical Arts subject. Or when setting the objectives for the lesson plan for the 'Living Skill' area, teachers should include the environment-related objectives in each lesson plan.
3. 'Hands-on' education or 'experience-based teaching skill' should be executed in teaching the Practical Arts subject.
4. Some of the environmental contents in elementary education such as 'Population', 'Industrialization and Capitalization', 'Environmental Pollution', and 'Environment Ethics' are less focused while others are given much more importance in the national curriculum. That is, some of the environmental contents are overlapped in several subjects. Therefore, teachers should conduct more specified content analysis to separate each environmental content. Then, they should find a way to conduct environmental education in a way of content integration between subjects so that teachers can save some time to perform experience-based teaching which takes more time than other teaching skills.

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Four Support Systems and the Ideas of Widen School

Masahisa Sato*

The discussion was focused on the how to support formal education for the development of environmental education. Discussion was conducted based on the series of presentation and the discussion of/among resource persons who attended to the International Symposium on Environmental Education. At the summary session, some approaches and principles are pointed out for the effective development of environmental education, and then support systems were categorized into four. Finally, ideas of "widen school and learning community" were shared among the participants as a result of the series of discussion.

1. Lessons learnt from the session.

Participants pointed out that some learning approaches and principles are needed when doing environmental education in formal education. The followings are the list of approaches and principles discussed among the participants.

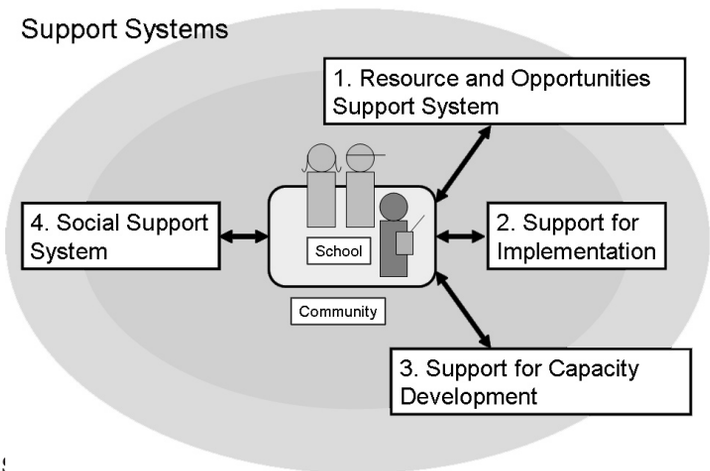
- Enquiry Based
- Based on Participation and Practice
- Community Based
- Be Collaborative
- Respect for Heterophily as well as Homophily (Culture & Practices)
- Think Globally, Act Locally
- Be Holistic and about Connections
- Involve Everyone
- Integration
- Learn from Community
- Sense of Wonder & Exploration
- Socially / Ecologically Relevant
- Life-Long
- Partnership and Network

* LEAD Japan Program, Academic Coordinator, Institute for Global Environmental Strategies, JAPAN

- Reorienting Education for Sustainability

2. Four Support Systems

Based on the some learning approaches and principles as pointed out by the participants, four support systems are raised by the chair of summary session. They are; (1) resources and opportunities support system; (2) support system for implementation; (3) support system for capacity development; and (4) social support system. The chair pointed out that 4 support systems are strongly linked together.



2-1. Resource and Opportunities Support System

"Resources and Opportunities Support System" includes (1) access to communities; (2) access to events and projects; (3) access to information; (4) access to regional and global communities; (5) access to natural areas; and (6) daily access to nature area and agricultural areas. Particularly, daily access to natural area/ agricultural field and local communities are important for students to realize the local resources and values.

2-2. Support for Implementation

"Support for implementation" implies that it is important to develop contents for environmental education with three aspects; (1) education in/ from/ trough the Environment which uses students' experiences in the environment as a medium for education; (2) education about the environment, which emphasis knowledge about natural and social systems and processes; and (3) education for the environment, which has an overt agenda of values education and social change.

2.3. Support for Capacity Development

"Support for Capacity Development" includes not only individual capacity development i.e. teacher training, but also institutional capacity development. Setting school policy and rules, developing curriculum, making decision on the educational policy, managing resources, are needed for the effective development of environmental education at the school level. Inter-institutional capacity development is also important for the conduction of environmental education, such as joint implementation of environmental education, and joint research on environmental education, which can be done in cooperation with the other schools or the other stakeholders.

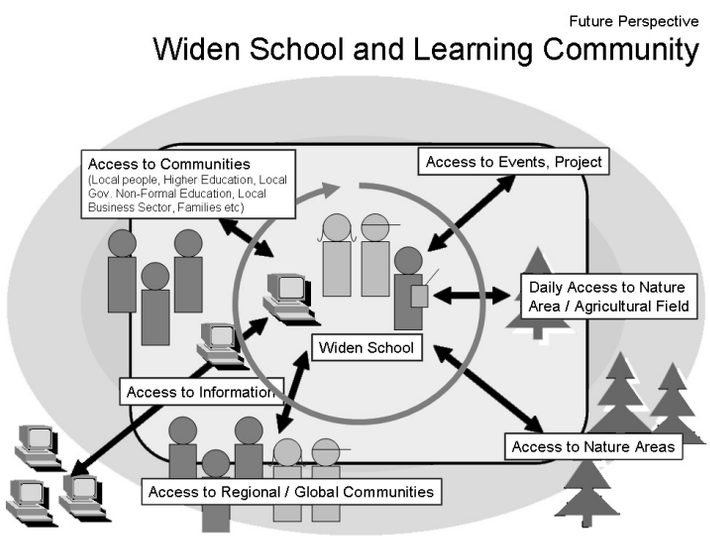
2.4 Social Support System

It is pointed out that "Social Support System" is also important for community development and the

conduction of environmental education at the local level. This system enables community and school to be very much involved, they are; (1) shared vision, slogan and norm; (2) shared opportunities and resources; (3) funding support system; (4) shared power and decision making, and open communication structure; (5) setting rules, mandates, action plan, agenda at the local level; and (6) managing resources and opportunities.

3. Widen School and Learning Community

Lastly, the idea "widen school and learning community" is raised by the participants. By linking with local resources (human resources, natural resources, financial resources, cultural resources), school itself is going to be widen as a center of community. For the further development of communication between school and community, Rogers (1995) suggested that "Change Agents" should provide a communication link between a resource system of some kind and a client system. Also, he mentioned that the communication relationship between the agent and client is important and that a good deal of two-way information exchange should take place. It may be expected that the function of the Change Agent has a role in making a bridge between school education and local communities. NGOs, professional educational organizations, school teachers may have a role to play in this process.



Progam/Schedule:

2 December 2002 at Sendai Excel Hotel Tokyu

Afternoon, Registration & Get together

3 December 2002 at Sendai International Center (Opening 9:00)

(with English/Japanese Simultaneous Interpretation)

9:30-12:00

Opening address

Chairpersons: Y. Sasaki & T. Muramatsu

President of MUE

Ministry of Education, Culture, Sports, Science and Technology

Miyagi Pref. Board of Education

Sendai City Board of Education

Aims of the Symposium Director of EEC

— Recess —

Special Lectures

Jack T. Moyer (Japan) "Natare and Human Life"

Paul H. Williams (U.S.A.) "Environmental Education : Accessible to All"

12:00-13:30

Lunch Break

13:30-17:00

Presenting Papers and Discussion

— Challenges from Supporters' Viewpoints (Part I) —

Chairpersons: N. Hagiwara & T. Watanabe

Vicki Keliher (Australia) "Environmental Education in Australia: Towards Sustainable Schools"

Alisara Chuchat (Thailand) "Environmental Education: A Case of Thailand"

Heiko Crost (Germany) "Environmental Education in Germany : Towards Sustainable Schools"

— Recess —

Toshihiko Higuchi (Japan) "Support for Promotion of Environmental Education in Japanese School"

Chiemi Saito (Japan) "Learning in Nature:Perspective from Behavioral Biology"

18:30-20:00

Welcome Reception (at Sendai Excel Hotel Tokyu)

4 December 2002 at Izumity21 (Opening 9:00)

9:40-12:20

— Challenges from Supporters' Viewpoint (Part II) —

Chairperson: M. Yasue

Zongmin Wang (China) "The Development of Environmental Education of Elementary School and Junior High Schools in China"

Jennie Lane (U.S.A.) “Environmental Education in Wisconsin : A Teacher Education Approach”

Yoshihiro Ugawa (Japan) “Environmental Education and IT ”

― Recess ―

― Expectations and Requests from Schools ―

Chairperson: N. Komatsu

Miyagi Pref Board of Education

Sendai City Board of Education

Kesennuma City Board of Education

12:20-13:00

Lunch Break

13:00-14:10

― Children’s Forum for Environment ―

Sponsored by the Board of Education of Sendai City, Co-Sponsored by Miyagi University of Education

Special Lecture:

Andrea Déri (Japan) “School, Community, Environment”

― Recess ―

14:40-16:00 (Simultaneous Session of Junior High School in other Hall)

Presentations: Elementary School Coordinated by K. Saijo

14:40-16:00 (Simultaneous Session of Elementary School in other Hall)

Presentations: Junior High School Coordinated by T. Kawamura & Y. Ugawa

5 December 2002 at Sendai International Center (Opening 8:30)

9:00-12:15

― For the Future of EE ―

Chairpersons : T. Muramatsu & Y. Hirabuki

Ryokichi Hirono (Japan) “New Currents for the Next Decade”

Ning Wang (China) “The Research in the Environmental Consciousness and the Interacted Education of Teachers in the Middle School”

Namyong Chung (S. Korea) “The Environmental Education Strategy for the Practical Arts Subject in S. Korea”

― Recess ―

Discussion

― On support systems on School EE ―

Chairpersons: T. Koganezawa & M. Sato

Summary: M. Sato (Japan)

12:15-13:30

Lunch Break

13:30-18:00

Excursion

Visiting Windbreak Forests “IGUNE” (T. Koganezawa & K. Mizota)

Objectives:

In this symposium, we aim to explore and discuss what environmental education ought to be under the notion that the foundation of environmental education is based on sensitivity toward our surrounding environment and love for human beings in terms of how we interact with nature by learning from the current state of environmental education abroad. Then, we will explore suitable environmental education programs for the Japanese educational system in the light of possible assistance for EE by local authorities, non-government organizations, and academic institutions.

In order to nurture such compassion, it is not sufficient to learn only through written documents and photos. It is essential in environmental education to let people in the real field actually feel and touch their surrounding environment and raise their awareness, in addition to the acquired knowledge, toward the fact that we humans are a part of other living things and are maintained by coexisting with each other.

To achieve it, we should transform the existing "knowledge acquisition-oriented" classes into more "empirical" ones. We also need teachers who are capable of implementing various fieldwork events.

Today, environmental education in Japan has been put into practice as a part of each related school subject such as science and social studies and the "hours for comprehensive studies." Yet, what environmental education deals with should be more diverse in a variety of realms. Thus, a certain system to provide support for schools is needed for this education. The assistance includes suggestions for teaching curricula, provision of professional expertise and methods for environmental education. In this symposium, we will focus our attention on the "EE utilizing natural fields" so as to have a detailed and animated discussion.

This symposium aims to contribute to advancing the level of scholarship on a variety of interdisciplinary fields for researchers from all over Japan and elsewhere in the world, and thus to promoting international friendship among the participants. This is one of the subsidized projects of Japan's Ministry of Education, Culture, Sports, Science and Technology. The symposium is being held as an International Symposium in 2002 adopted by the Ministry.

Participants/Discussion Format:

In addition to the 10 international guest speakers, we will welcome 10 speakers domestically.
About a hundred participants making a special study of this field can also take part in discussions as well as Q & A sessions. The symposium is open to the public. Admission free.

Date:

3 — 5 December 2002 (Tuesday — Thursday)
2 December 2002 at Sendai Excel Hotel Tokyu
Afternoon: Registration & Get together
3 December 2002 at Sendai International Center
Morning: Opening Remarks, Keynote Address

Afternoon: Paper Presentations

Evening: Banquet

4 December 2002 at Izumity21

Morning: Paper Presentations

Afternoon: Reports from School Children

5 December 2002 at Sendai International Center

Morning: Paper Presentations, Closing Remarks

Afternoon: Small Excursion “Igune”

Venue:

Sendai International Center (Aoba-ward, Sendai City), Izumity21 (Izumi-ward, Sendai City)

Special Lecturers:

- Jack T. Moyer (Japan)
  Naturalist, The president of Miyakejima Ocean Family, Adviser to the Miyakejima Nature Center
- Paul H. Williams (U.S.A)
  Professor Emeritus, University of Wisconsin-Madison, Center for Biology Education

Lecturers:

- Alisara CHUCHAT (Thailand)
  Faculty of Education, Chulalongkorn University, Professor
- Andrea DERI (Japan)
  IGES, Capacity Building Program, Program Manager
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  Miyagi University of Education, EEC, Associate Professor
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  Head of the Frankfurt Teachers in Service Training Institute, Hesssisches Landesinstitut fur Padagogik
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  Wisconsin Center for Environmental Education, Energy Education Program, Program Director
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  Taegu National University of Education, Assistant Professor
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  Seikei Univeristy, Professor Emeritus
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Snapshot


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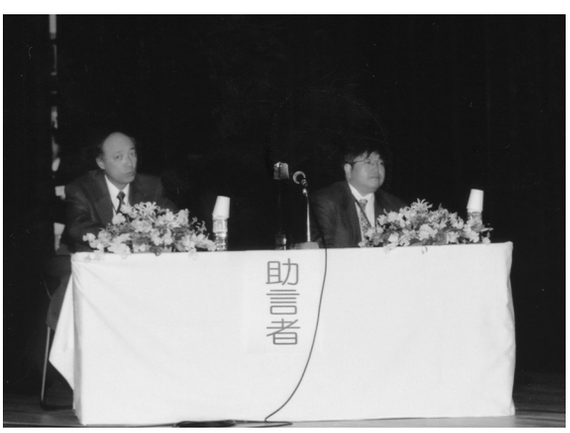
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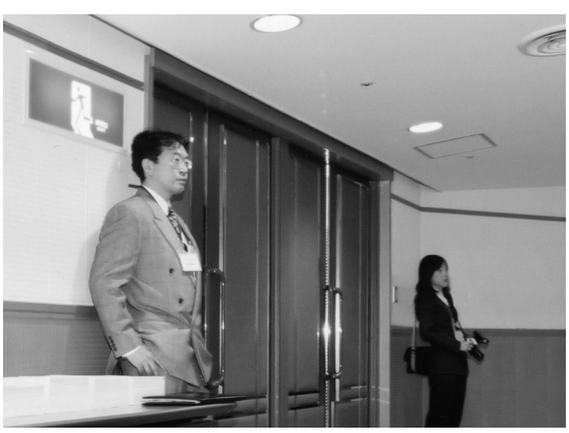


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