Special Issue

JSEE/ACCU Asia-Pacific Conference for
Environmental Education Research Professionals
"Past, Present, and Future: Reorientation of Environmental Education
Practices
towards ESD in the Asia-Pacific"

February 27 – March 5 2006
Tokyo and Kyoto

Organised by the Japanese Society of Environmental Education and
the Asia/Pacific Cultural Centre for UNESCO

Based on a research exchange in the field of environmental education in the Asian-Pacific region, the Japanese Society of Environmental Education and Asian/Pacific Culture Center for UNESCO organized a conference, in agreement with the implementation of the UN decade of Education for Sustainable Development. The purpose of the conference was to review past and present EE research activities and practices in the region, and discuss future EE research and practices to better the needs of the region and to improve the quality of education for sustainability.

This special issue republishes the reports presented at the plenary and group discussions dealing with past and present EE research activities and practices, and compiles many participants' ideas presented at plenary and group discussions as a final report.

Environmental Education　　Special Issue

Contents

Final Report of JSEE/ACCU Asia-Pacific Conference for Environmental Education Research Professionals, "Past, Present, and Future: Reorientation of Environmental Education Practices towards ESD in the Asia-Pacific"

INTRODUCTION and PROCEEDINGS OF FINAL REPORT

Hiromi KOBORI (Musashi Institute of Technology)

INTRODUCTION

SCOPE OF THE MEETING

JSEE/ACCU Asia-Pacific Conference for Environmental Education Research Professionals, "Past, Present and Future: Reorientation of Environmental Education Practices towards ESD in the Asia-Pacific," was convened by the Japanese Society of Environmental Education (JSEE) and the Asia/Pacific Cultural Centre for UNESCO (ACCU) from 27 February to 5 March 2006. The conference was organized as an ACCU International Exchange Programme under the UNESCO Japan Funds-in-Trust for the Promotion of International Cooperation and Mutual Understanding.

The Conference was attended by 4 Environmental Education (EE) research professionals from the following 4 countries: the Republic of Korea, China (Taiwan), the Philippines and the United States of America. Approximately 40 experts that belong to the JSEE and an ACCU representative participated in the Conference.

MAIN OBJECTIVES

The conference aimed at reviewing past and present EE research activities and practices in the region, and discussing what future EE research and practices are necessary to better the needs of the region and to improve the quality of education for sustainability.

IMMEDIATE OBJECTIVES

Review of EE Research Development and Achievements in the Asia-Pacific:
- to share information regarding the history and present status of EE research throughout the Asia-Pacific region;
- to clarify research trends and achievements in EE.

Consideration of Measures to Integrate EE Research and Practice:
- to share and learn from examples of current EE practices in the area of: (a) Primary and Secondary Education; and (b) Higher Education and Educator Training; and
- to consider and propose measures to integrate EE research and practice, also aware of the need to integrate EE practice and theory under the following themes: (a) Pedagogy/Teaching Methods & Programme Development; and (b) Monitoring and Evaluation.

Reorientation of EE towards ESD:
* to review and reassess conventional EE practice from the viewpoint of "ESD," or education that contributes to the realization of a sustainable society;
* to discuss and propose measures to effectively integrate prior research achievements into practice in diverse fields, such as specialist training, partnership and practice evaluation, and realize the importance of EE for a sustainable future.

EXPECTED OUTCOMES

* Realization of the "Regional Conference of Research Institutions," to identify and further delineate the key research issues.
* An academic exchange among Asia-Pacific EE researchers and professionals regarding significant EE research achievements from the past, as well as the present situation, and future outlook.
* Prioritization of EE research for the next decade.
* Methods of integrating EE research achievements into practice.

PROCEEDINGS

OPENING

The meeting opened with a welcome address by Prof. Kimiko KOZAWA, President of the Japanese Society of Environmental Education, and a professor at Tokyo Gakugei University. First, she welcomed all the participants and expressed her heartfelt gratitude to them and sincere appreciation to the Asia/Pacific Cultural Centre for UNESCO (ACCU). She mentioned that the theme of this Conference, "Past, Present, and Future: Reorientation of Environmental Education (EE) Practices towards Education for Sustainable Development (ESD)," is very important for the promotion of EE in the Asia-Pacific Region. It was also mentioned that this Conference will be an exceptional opportunity for exchanging and creating many good ideas and insights on EE. Lastly, Prof. Kozawa again expressed deep appreciation and gratitude to all involved and wished an enjoyable stay and good discussions to all.

Following her address, Prof. Hiromi KOBORI, chairperson of the Steering Committee of the Conference, and a professor at Musashi Institute of Technology, extended her heartfelt welcome to all the participants. Referring to a series of international initiatives that began with Stockholm in 1972, and include the World Commission on Environment and Development (WCED) in 1987, World Summit on Sustainable Development (Earth Summit, WSSD) in 1992, International Conference on Environment and Society held in Thessaloniki in 1997, it was addressed that the importance of EE has already been recognized as an important element in realizing a Sustainable Future. After pointing out the historical development of EE, she mentioned that the year 2005 marked the start of the UN Decade of Education for Sustainable Development (UNDESD). Then, she addressed that the Conference was co-organized by the Japanese Society of Environmental Education (JSEE) and the Asia/Pacific Cultural Centre for UNESCO. Further, it was noted that the conference was a reply to UNESCO's call to implement an international conference in the Asia-Pacific region to discuss ESD from the joint perspectives of EE research and practice.

Then, Prof. KOBORI introduced the overall objectives, immediate objectives, and expected outcomes of the Conference. At the end of the opening session, she expressed her hope for a fruitful outcome of the Conference and a pleasant stay in Tokyo for all the participants.

AGENDA 1: Learning From Environmental Education Practices (DAY 1)

Agenda 1 aimed to share information regarding the history and present status of EE research throughout the Asia-Pacific region, and to clarify the research trends and achievements in EE. Under the moderation of Prof. Osamu ABE, professor at Rikkyo University, six presentations were provided regarding China, the Republic of Korea, Taiwan, Philippines, U.S.A. and Japan.

For details, please see the Analytical Report.

AGENDA 2: Connecting EE Practices and Theories (DAY 1-2)

Agenda 2 aimed to discuss and consider measures to integrate EE research and practice. The after noon session of DAY1 and morning session of DAY 2 were used for the discussion. The session was structured with both plenary discussion and group discussion.

- Plenary Discussion I. Primary & Secondary Education:
  presented by Dr. Sun-Kyung LEE (Cheongju National University of Education), Mr. Masakazu GOTO (National Institute for Educational Policy Research), and Mr. Ryoji IZUMI (Yokohama City Board of Education)
- Plenary Discussion II. Higher Education & Professional Development:
  presented by Dr. Tzuchau CHNAG (National Taiwan University), Dr. Hiromi KOBORI, Mr. Herbert A. DONOVAN (Rikkyo University), and Dr. Toshihiko HIGUCHI (Tokyo Gakugei University)
- Plenary Discussion III. Pedagogy / Teaching Methods & Programme Development:
  presented by Dr. Joseph Heimlich (Ohio State University), Dr. Lucile GREGORIO, and Dr. Shinichi FURIHATA (Japan Nature Game Association)
- Plenary Discussion IV. Monitoring and Evaluation:
  presented by Dr. Masahisa SATO, and Ms. Ikuko YABUNAMI (Graduate Student, Rikkyo University)

Then, the session was divided into four Group Sessions:

- Group Discussion I. Primary & Secondary Education:
  chaired by Dr. Sun-Kyung LEE and Dr. Toshihiko ANDO (Saitama University)
- Group Discussion II. Higher Education & Professional Development:
  chaired by Mr. Herbert A. DONOVAN, Prof. Toshihiko HIGUCHI (Tokyo Gakugei University), and Dr. Tzuchau CHANG (National Taiwan Normal University)
- Group Discussion III. Pedagogy / Teaching Methods & Programme Development:
  chaired by Dr. Lucile GREGORIO, and Prof. Kazuyuki MIKAMI (Miyagi University of Education)
- Group Discussion IV. Monitoring and Evaluation:
  chaired by Dr. Masahisa SATO

For details, please see the Discussion Reports.

AGENDA 3: System Thinking and Holistic Approach, Future Direction (DAY 2)

Agenda 3 aimed to: (1) review and reassess conventional EE practice from the viewpoint of "ESD," or education that contributes to the realization of a sustainable society: (2) to discuss and propose measures to effectively integrate prior research achievements into practice in diverse fields, such as

specialist training, partnership and practice evaluation, and realize the importance of EE for a sustainable future. Under the moderation of Prof. Kimiko KOZAWA, President of the JSEE, Dr. Lucille GREGORIO, Consultant of UNESCO National Commission of the Philippines, and Dr. Masahisa SATO, Senior Programme Specialist of ACCU, "System Thinking" and "Holistic Approach" were discussed as the cross cutting approaches for the reorientation of EE.

For details, please see the Discussion Report.

AGENDA 4: Field Trip (DAY 3-4)

Agenda 4 aimed to present current EE practices in Japan. Under the arrangement of Mr. Kousuke TODA (Learning and Ecological Activities Foundation for Children) and Dr. Akira OGIHARA (Mie University), overseas participants traveled to Kyoto, and visited the Lake Biwa Museum, and Learning and Ecological Activities Foundation for Children in the city of Nishinomiya.

For details, please see the Field Trip Report.

AGENDA 5: Open Forum: Reorienting EE towards ESD in the Asia-Pacific (DAY 5)

Agenda 5 aimed to open the conference to ordinary citizens as well as JSEE members who were in the audience, regarding the reorienting of EE towards ESD in the Asia-Pacific.
The open forum consisted of following three sessions:

· Open Forum I : Report: Analysis Report on the Past and Present of EE Research in the Asia-Pacific
· Open Forum II: Open Forum: Implication of "ESD," for Further Improvement of Quality Education for Sustainability
· Open Forum III: Open Forum: Linkages between Theory and Practice, its Meeting Point and Praxis

For details, please see the Discussion Report.

CLOSING

Prof. TANIGUCHI, the chairperson of DAY5, invited Prof. KOZAWA, on behalf of JSEE, to make some closing remarks. Appreciative of the active participation in the meetings of each and every one of the participants, she assured them that the JSEE would proceed to organise a series of meetings for the further promotion of EE research and practices, to be based on the invaluable comments and suggestions obtained during the five-day conference. Although the meeting was about to finish, Prof. KOZAWA expressed that she expects participants' future cooperation and contribution for the promotion of EE research and practice in the Asia-Pacific region.

For the closing, Prof. ABE laid emphasis on the cooperation between academic societies of EE, which he asserted would help promote effective implementation of EE research and practices. Then, the conference was officially closed with applause.

ANALYTICAL REPORT
AGENDA 1: Learning From Environmental Education Practices

Moderator: Osamu ABE (Rikkyo University)
Rapporteur: Rie IMOTO (Fukuoka Institute of Technology)

The history and present status of EE research were reported by six country presenters from China, the Republic of Korea, Taiwan, Philippines, U.S.A. and Japan, for sharing information regarding research trends and achievements in EE.

At first, Qing TIAN's report titled 'The history and trend of EE research in China' was presented by Donovan. The report showed that after the contents of the academic papers in EE from 1979 in China are analyzed and the paper numbers are made quantity statistic the fact that EE research began hotter and hotter in China after 1994 was discovered.

It was followed by Sun-Kyung Lee's presentation titled 'Reflecting and Rethinking Environmental Education Research in Korea.' She classified environmental education in Korea as three periods, and raised issues of research methodology, research themes and contents, relevance to local community coupled with consideration of context, the importance of participatory action research for sustainability.

Next Tzuchau CHANG's report titled 'The status of sustainable development education in Taiwan' was presented. He reported that The Taiwan Sustainable Campus Program and the Green School Partnership Program were two important endeavours supported by the Ministry of Education in Taiwan to promote education for sustainable development.

Then Lucille C. GREGORIO's report titled 'Think Globally Act Locally: Environment Education Has Always Been Here' was presented. The evolution of the program EE – EPD – ESD was discussed in her report based on her extensive experience in UNESCO.

Fourthly, Joe E. HEIMLICH's report titled 'EE/ES Research Trends in the United States' was presented. He showed a major shift in EE from an internal view of contexts, risk, and reflection to one of EE as a means of mediating change in others leading toward achieving the goals of the organization.

At last, Kimiko KOZAWA's report titled 'Environmental Education in Japan: The Role of The Japanese Society of Environmental Education in Linking Theories and Practices' was presented. In her report, the problems resulting from the theories and practices of environmental education in Japan were clarified.

DISCUSSION REPORT
AGENDA 2: Connecting EE Practices and Theories
Group Discussion I : Primary & Secondary Education

Toshihiko ANDO (Saitama University) and
Sun-Kyung LEE (Cheongju National University of Education)
Rapporteur: Yasuo IKARI (Environmental Learning Centres' Network of Japan)

To provide the platform and raising issues for discussion on EE/ESD implementation and research in primary and secondary education, three presentations were shared with participants.

First, Sun-Kyung Lee gave a presentation titled *'Education for Sustainable Development through Environmental Education in Primary and Secondary Schools in Korea'*, where she introduced various EE practices in schools, such as EE integration into various subjects, discretional activities, and 'Environment' / 'Ecology & Environment' as the independent selective subjects. She showed four quality cases of EE in primary and high schools, which reflected ESD.

It was followed by Masakazu Goto's presentation titled *'Science-centered and Fieldwork-based Integrated Learning with Local Actions and Global Perspectives'*. He shared the integrated curriculum and teaching method in his presentation, which he had developed during as a junior high school science teacher. He also explained how Earth System Education, on which his curriculum was based, could be related to various aspects of common elements of ESD.

The final presentation *'Environmental Education in Hanoi City, Vietnam'* was given by Ryoji Izumi, which dealt with the BoE's international EE cooperation project for Hanoi, Vietnam. This project aims to improve awareness and enhance understanding on environmental issues of teachers and students in schools in Hanoi City, which began in 2005 and will continue until 2007.

This discussion group included more than twenty participants from schools, universities, nature centers, and community education organizations, where they presented short comments on presentations and discussion regarding EE/ESD issues in primary and secondary education based on the presentations and their own experiences.

Relationship between EE and ESD was the most popularly issue raised, which was discussed over and over again in terms of definition, philosophy and purpose, etc. Many participants considered ESD as the broader concept than EE, as it included other perspectives like human rights and culture, etc. and they thought the implementation of ESD needed a clear distinction between EE and ESD with clear criteria. However, some participants expressed their concerns that the broader concept of ESD would overwhelm nature-centered (or nature-oriented) EE. On the other hand, there was a comment that teachers should not pay much attention to the distinction between EE and ESD because the most important thing in educational practice is developing humanity, and refining the distinction of EE/ESD does not contribute to that goal.

The possibilities of integration of ESD into subjects in schools and the measures for it was another popular issue in the discussion. Teachers from elementary and high schools mentioned that ESD seemed to

be possible in many subjects referring to the three presentations, but they were wondering how to integrate EE/ESD into subjects in schools or how to teach EE/ESD in their own subjects. Also some people mentioned the importance of interdisciplinary approach based on the case of special education in one new school.

The role of the citizens and NPOs as partners of schools in ESD implementation was stressed out in the discussion. It was said that schools needed partnerships with local communities and environmental groups in order to offer better ESD programs, where the participation should not be merely helping in classrooms but more substantial ones including planning and managing the environment. *The important role of administrative sections* such as the boards of education was mentioned using the case of a Japanese local board of education, which coordinated the event on the rehabilitation of the local Tsurumi River. The board invited teachers and NGOs to that event in order to increase participation of NGOs in primary and secondary education.

Attitudes or beliefs of teachers toward ESD were also discussed. It was commented that teachers needed to have their own vision and passion for ESD, so that they should be encouraged to conduct real action and to develop their own teaching materials. There was a comment stating teachers needed to give pupils hopes that their action can make differences towards a sustainable society.

After these comments, participants were suggested to discuss on the following questions:
1. *What are the criteria for quality ESD cases in primary and secondary schools?*
2. *What are the drivers or challenges in implementing ESD?*
   Who should play roles to overcome these barriers or challenges?
3. *How can research contribute to ESD implementation or promotion?*

The actual discussion, however, was more practical than suggested. It focused on how teachers could implement ESD in classrooms and how practitioners and scholars could help them. There was a proposal to document good ESD teaching practices that would be useful for teachers in classrooms and many participants expressed their support to this proposal. There was a consensus that providing information on *quality cases of ESD* in Asia and Pacific countries would be helpful for teachers in schools. Participants pointed out that perception of and practices in ESD might be different among different countries, so that publishing a booklet of quality cases of ESD would contribute to improve communication among countries.

A comment was made that quality case studies should include not only what they have done and how they have done in a case but also contextual information such as socio-economic circumstances and community and government support. It was also commented that the process of writing quality ESD requires skills and there should be workshops to improve such skills so that clear case studies could be established. It was followed by pointing out of *the importance of research* in collecting quality cases and finding the quality criteria for ESD.

In addition to the quality cases documentation, *establishing the framework for ESD* was also suggested. It was because interpretation would be needed to make or suggest models for grasping environmental problems, natural disasters or other ESD related issues such as peace and human rights, or to guide stakeholders to start actions in their own contexts. However, it was not fully discussed because of time constraints.

In conclusion, it was suggested that the Japanese Society for Environmental Education and participants of this conference should play an indispensable role to build an international learning community by linking theories and practices such as collecting quality cases and further works.

DISCUSSION REPORT
AGENDA 2: Connecting EE Practices and Theories
Group Discussion II : Higher Education & Educator Training

Herbert DONOVAN (Rikkyo University),
Toshihiko HIGUCHI (Tokyo Gakugei University),
and Tzuchau CHANG (National Taiwan Normal University)
Rapporteur: Herbert DONOVAN (Rikkyo University)

Before discussion, there were some questions and comments to the four presenters, Dr. Chang from NTNU, Dr. Kobori from Musashi Institute of Technology, and Dr. Higuchi from Tokyo Gakugei University. After that, the group was divided into two subgroups and had fruitful discussions on the two themes. After these discussions, participants shared the information and results of discussion from each workshop, and looked at relations between each theme.

In the question session, Dr. Kobori was asked about the shape of collaboration between the university and the local community. Mr. Harada suggested the University should not only support the community for EE/ESD leaning but also lean from the local community. To this question/comment, Dr. Kobori answered, although their action is one-way, they should be interactive.

There was also a comment from Dr. Heimlich on the experience of university extension programs in the US. He said that universities in the US have also leaned from this kind of outreach that they must contribute (come in) as a convener and facilitator, not as the source of knowledge, or claiming to know the right way. "In playing the role of expert, which was done in the past, we cut ourselves from a lot of indigenous and local knowledge." Dr. Chang added that universities, in their research role, are being pushed by the government to publish papers in highly ranked journals, taking time and resources away from community involvement.

After the questions and discussion, the groups divided to consider separately these two questions:

1. What kind of capacity/ability of school teachers/community leaders should be developed at university and teacher training?

2. What kind of educational programs in universities and teacher training courses are required for EE/ESD including educational approach?

In their answer to Question 1, the group listed the following keywords for capacity/ability, grouped here into four categories:

1. Optimistic Personality
   · Hope
   · Confidence & attitude
2. Skills
   · Communication
   · Facilitation

3. Comprehensive Perspective
   · Wide View
   · Common Understanding of ESD
4. Participation
   · Community Involvement
   · Place: understanding local area

The group also emphasized having a place to have practical training and experience, that children should be helped to develop certain capabilities and capacities, as should teachers, and that both should learn how to form agreements. The group also thought that ESD could be separated, in the sense of "E" : for education ability/capacity for the teachers, such as making agreements, and "SD" : for sustainable development ability/capacity, processes that need to be considered and organized.

Question 2: What kind of educational program in university and teacher training course is required for EE/ESD including educational approach?

Assumptions
Science will already be covered in the curriculum, so we focused on education.
There were four broad categories, Theoretical base, Thinking skills, Technical skills, and Application skills

Theoretical Bases:
   · Learning Theory
   · Instructional Theory
   · Curriculum Theory
   · Measurement Assessment (both environment and learning)

Theoretical foundations of EE/ESD
   · Thinking Skills
   · Critical thinking
   · Decision-making/problem solving
   · Comparative studies

Inquiry-based learning
   · Technical Skills
   · Science skills
   · Social Science skills
   · Communication skills

Application Skills
   · Methods of Instruction
   · Integrated Interdisciplinary learning
   · Critical Thinking
   · Holistic approach
   · Applied integrative learning
   · Action research
   · Service Learning
   · Community Service
   · Classroom Management

We shared the outcome of each group's discussion and looked at the relationship between the two topics. It is important to emphasize that the many single phrases that we proposed here on EE leader capacity and educational program/approach are not final conclusions. Many of the phrases suggested in our group II discussion were introduced only by comments that participants described on EE/ESD in each country through their experience. Therefore, we should regard these phrases as a base for future discussion and examine them again next time.

We conducted only round table discussions this time. If we could have a chance to discuss about EE/ESD research looking one at a time at specific educational practices, it will be an excellent complement to the work we have accomplished in this conference.

DISCUSSION REPORT
AGENDA 2: Connecting EE Practices and Theories
Group Discussion Ⅲ: Pedagogy/Teaching Methods & Programme Development

Kazuyuki MIKAMI (Miyagi University of Education),
and Lucille C. GREGORIO (UNESCO National Commission of the Philippines)
Rapporteur: Yasuo IKARI (Environmental Learning Centres' Network of Japan)

Group Discussion Ⅲ divided in two mini-groups to answer the following:

· **Topic 1:** What are the effective Pedagogy/Teaching Methods for implementing the program to re-orient EE Practice towards ESD in the Asian/Pacific region?

· **Topic 2:** What actions could be implemented using the pedagogy for effective ESD, particularly on the issues of (1) School education, (2) Teacher training, (3) Research, (4) Community action, and (5) Policy formation?

What are the effective Pedagogy/Teaching Methods for implementing the program to re-orient EE Practice towards ESD in the Asian/Pacific region?

The differences between EE and ESD were identified, and one difference is "outcome" from the two processes. EE aims to change an "individual" behavior" while outcomes from ESD are focused on "systematic" change. A similarity is that both EE and ESD are not only "learning about" the environment and sustainable development, but also "learning for" the environment and sustainable development.

On the teaching approaches and methodologies of EE and ESD. EE focuses on changing individual behaviors and development of higher order thinking skills. The goal is to develop decision-making skills and critical thinking skills, therefore, action-based learning, experience-based learning and inquiry based learning approaches could be selected. ESD that aims to change the social system including community participation in education, therefore, would utilize community-based learning approach, such as community action research and community service.

What actions could be implemented using the pedagogy for effective ESD?

The discussion focused on:

· School Education: Environmental education should be taught in an integrated manner, however, in the Japanese school system there are about 300 themes to be taken up during the studies, and EE is only one of them. ESD could be a major theme utilizing the strategies to integrate the variety of issues in the subject areas.

· Teacher Training: There is still a lack of effective program of training school teachers on

EE/ESD. The existing teacher-training programs are often subject-based, but with ESD concepts integrated in the different subjects, teacher-training programs need to be reviewed and if possible renovated. A life-stage-based training program could be adopted. Japan has subject-based teacher training programs for newly hired teachers, for teachers with 10 years experience, and for teachers with 20+ years experience. These programs could be developed as ESD training programs for teachers with certain number of years teaching experience.

· **Community Action:** The concept of "community" has three levels, local, national and international. People tend to pay attention more to the local or community level, and less on the national and international levels. Perhaps the issues at the local level are more visible, and less controversial. However, we should not forget that national and international perspectives are also important for local actions.

· **Policy formation:** The goal to be realized is "the Ladder of Participation" of Roger Harts. It maybe difficult to achieve but it could be tried out and faced as a challenge. A balanced perspective could be created, not only goal-oriented education but also rather a process-oriented education important for ESD. It requires building consensus while developing critical/analytical thinking and problem-solving skills and positive values and attitudes for the environment through education. Therefore, policies need to be formulated and special actions implemented especially to improve literacy. In order to improve environmental literacy, which will require a variety of multi-level strategies and methodologies.

DISCUSSION REPORT
AGENDA 2: Connecting EE Practices and Theories
Group Discussion Ⅳ: Monitoring and Evaluation

Masahisa SATO (Asia/Pacific Cultural Centre for UNESCO)
Rapporteur: Yuko OGURI (Kagoshima University) and Tai HARADA (ESD-J)

The group discussion session was organized to: (1) provide common understanding on the international trends and situation on monitoring and evaluation activities for EE; (2) to share related terms on monitoring and evaluation; (3) share some cases of monitoring and evaluation activities for EE in Japan as well as Asia-Pacific Region; (4) deepen understanding on the monitoring and evaluation activities in line with the implementation of UNDESD related programmes; (5) discuss points to be considered for the promotion of monitoring and evaluation activities for EE; (6) identify some prioritized areas for further quality improvement of monitoring and evaluation activities.

Before discussion, Dr. Masahisa Sato, chairperson of the group discussion, provided opportunities for participants to share their interest on the evaluation and monitoring activities and their expectation to the session. Then, he pointed the reasons why the evaluation activities are needed: (1) for the improvement of quality of a project and practice through constant feedback and real time understanding; (2) for the improvement of the skills of the staff facilitating or managing the project and practice through the continual process of self-testing and refining; (3) for the improvement of the project and practice, increasing a project/practice's impact and effectiveness. Then, he summarized different evaluation types in terms of the time series (diagnostic, formative, summative and follow-up), evaluators (self evaluation, international evaluation, external evaluation, joint evaluation and participatory evaluation), evaluation methods and methodologies (quantitative and qualitative manner, and semi-structured interviews, questionnaire, observation, longitudinal study, dialogue, analysis of process documentation, analysis of teaching logs and educational guidelines, word association survey, etc.), and evaluation content (not only skills, knowledge of individuals, but value and attitude point of view, as well as that the project management, i.e. effectiveness, efficiency, relevance of the plan, project sustainability, social impact, degree of community involvement, degree of satisfaction of the beneficiaries).

Then, Dr. Sato provided a case presentation on the ACCU's EE Packaged Materials on Environment
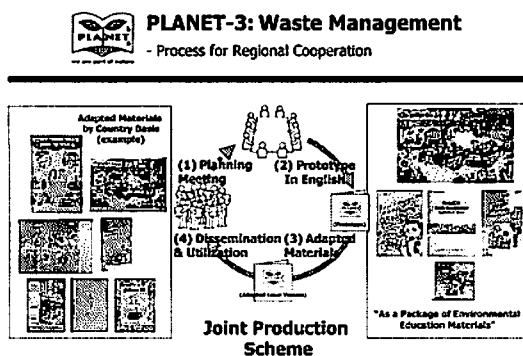
Figure 1: PLANET Regional Programme
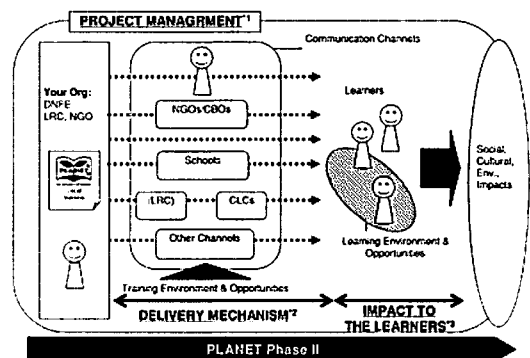
Figure 2: ACCU PLANET Dissemination and Utilization Scheme

(PLANET) Programme, its dissemination and utilization scheme, and the evaluation activities on the project management, delivery mechanism and its impact to the learners. Dr. Sato introduced the overall framework of the Programme, and the evaluation framework employed: (1) Project Management; (2) Delivery Mechanism; (3) Impact to the Learners.

After his presentation, the following points are raised by the participants of the session:

- Importance of both views: project management and individual learning.
- Consideration of that whose will are reflected. Political will might be reflected for the design of the indicators, and implementation of evaluation activities.
- Importance of sharing the framework and leaving the details to the individual cases.
- Process of future scenario building of SD
- Consideration of the impact to the community, as well as individual and institutional level.
- SD is the important part among ESD
- Indicators need to be easy understandable and transparent

Finally, based on the discussion framework prepared by the Dr. Sato, the following points were recommended by the participants as points to be added for the conduction of evaluation activities in the context of ESD.

Table 1: Points to be added for the Implementation of Monitoring and Evaluation Activities in the context of ESD.

Why Evaluate	What to be Evaluated
• check the direction • educational purposes • acquire the social relevance • improve the quality of educational practices in ESD • improve sustainability of community • consideration of evaluation about "evaluation society"	• About learner • Impact to the community • Biological species
How Evaluate	**Others**
• various level and various stakeholders • holistic approaches • participatory approaches • scenario building • process documentation	• Appeal to media • Differences of view point of researcher and practitioner • Can we have a common model/image of the sustainable future among the stakeholders?

DISCUSSION REPORT
AGENDA 3: System Thinking and Holistic Approach, Future Direction

Kimiko KOZAWA (Tokyo Gakugei University),
Masahisa SATO (Asia/Pacific Cultural Centre for UNESCO),
and Lucille GREGORIO (UNESCO National Commission of the Philippines)
Rapporteur: Rie IMOTO (Fukuoka Institute for Technology)

The summary of the session is indicated in this part of the report. The session started with Dr. Masahisa Sato's presentation where he showed 3 diagrams: (1) an example of a balancing leap; (2) the effect of a gap and the system and, (3) systems thinking of natural environment (adopted from Okayama, 1985). Discussion followed

Systems Thinking is based on "Cause Effect Relationship", "Proactive Ways of Thinking", and "Time Frame rather than Phenomena", thereby requiring a "time series".

Questions can also be raised, such as:
- How factors are related, how one factor will change when another changes?
- How factors may feedback in either balancing loops or reinforcing loops?
- How external factors impact on the system?
- How gaps operate?
- How delays affect the system?
- What are the complexities of the system?

Some examples of how Systems Thinking works could be shown in tsunami affected areas wherein several factors relate to the natural disaster – the cause and effect and the complexities of the process. Since there was no systems' thinking, the disaster took place. It was only after the damage that learning took place. This refers to behaviors, rather than systems dynamics.

Concrete examples were cited on why systems thinking affect the "carrying capacity" of the natural environment. One example is on certain deer overpopulation. The movie "Bambi" shows this. The same thing is occurring in Mt. Yatsugatake and Yakushima Island in Japan. The colonization of living organisms needs systems thinking. Another concrete example is the setting up of "ecological ponds." Decisions are made after systems thinking.

The final statement on this topic mentioned the risks involved. The thinking seems sophisticated and difficult to apply to any community.

Holistic Approach could be applied from a "Management Viewpoint", following the sequence: (I) Situation Analysis (SWOT Analysis, Force Field Analysis, Cause-effect Analysis, etc); (II) Scenario Building; (III) Logical Framework (Preconditions and Important Assumptions); (III) Implementation; (V) Monitoring; and (VI) Evaluation.

From an In-service Teachers Capacity Point of View, a holistic approach involved (I) a Social

Support System: (II) the Institutional Capacity of the formal system: (III) the in-service teacher's capacity: and (IV) the programme or curriculum. All four needs the support of communities. social context and culture. and others.

One concrete example is the "Paddy Field Project" of the Environment Education Center. Miyagi University of Education where the social. economical. environmental. and cultural points of view were considered.

For a "Lifelong Learning Local System" for promoting ESD. there needs interconnectivity of content. methods. processes. and contexts among various partners of formal. non formal and informal systems with an underlying "Social Support System."

To conclude the session. it was mentioned that "Systems Thinking and Holistic Approach" are words which are not easy to understand. Concrete models are needed to illustrate how the concepts would illustrate ESD for improving quality of education and learning towards a knowledge society. The models would come out when good practices are documented. Additional components could include: participation. accountability. individual understanding in addition to eco-geographical and eco- socio-historical issues.

FIELD TRIP REPORT
AGENDA 4: Field Trip

Akira OGIHARA (Mie University)

March 1, 2006
We left the Olympic center at 8:00 p.m. We walked through Yoyogi Park and arrived at Harajuku Station. In Yoyogi park, the plum blossoms were already blooming and dogs were playing on the grass.
While riding on the Shinkansen, We were talking about environmental education.
We went to Biwako Museum. We ate lunch there. We ate soba, udon, and black bas "tendon" (tempra rice bowl !. Mr. Kusuoka and Mr. Mr. Grygier lectured us about outline of the museum.
Then Mr. Grygier took us on a tour of the museum. The exhibits were all very interesting. But as far as I could see, what interested all participants is the most in Gallery A was "Uplifting and folding of rock strata" and "A preserved tree stamp of the dawn redwood, in Gallery B was "Maruko-bune on display", "A wooden waterwheel", in Gallery C was "The floor of the circular 'birds-eye' room",

"The kawaya of the farmhouse", "The barrel-shaped bath". In the aquarium, foreign guests seemed to feel that the Japanese fish were the most interesting. For example, Biwa catfish, Biwa salmon, ko-ayu. We were standing in front of the salamander tank for about 5 miniutes. When Japanese giant salamander appered, everyone let out a cheer.
For dinner we were guided by Mr. Mizuyama from Kyoto Educational University. We ate very delicious Kyoto-style foods.

March 2nd
Before we left Kyoto we visited the Higashi Hongannzi Temple. We are deeply impressed by how big this temple was and the solemn atmosphere of the place of worship.
On the day we went there, we had the chance to observe the Nishinomiya City LEAF (Learning and Ecological Activities Foundation for Children) special event.
Mr. Yamada lectured us about outlining what is being done by LEAF. He showed us the "Eco-Panel Exhibition" posters relating to the environment by children of Nishinomiya city and other foreign countries. The posters showed a close examination of local environmental problems and what needs to be done to protect the environment in the future. We are really moved by the expressiveness of this art work.
In the afternoon we visited the beach at Kosien. The people in charge of Kosien beach for

Nishinomiya city gave us a lecture about creatures living around the beach and how to protect marine life. We went to the beach and saw many wild birds and realized that this is an important part of nature that is being preserved by Nishinomiya citizen.

We deeply appreciated the kindness of staff of Biwako Museum and LEAF and Mr. Mizuyama.

02-03 MAR. 2006   Field Excursion Lake Biwa Museum and Nishinomiya-city

DAY		SCHEDULE	
02Mar. (Thu.)	8:00Lv.	Hotel Lobby	
	8:25Lv.	Harajuku St. to Shinagawa by JR-L*	
		Shinagawa St. transfer to JR-S	
	8:54Lv.	to Kyoto	
	11:04Ar.	Kyoto St. transfer to JR-L	
	11:13Lv.	to Kusatsu	
	11:31Ar.	Kusatsu St.	Lake Biwa Museum
	12:00Ar.	**Lake Biwa Museum**	
		Lunch Time	
		Presentation and Lecture (Lake Biwa Museum)	
	16:30Lv.	To Kusatsu St. by bus	
	17:13Lv.	Kusatsu St.	
	17:31Ar.	Kyoto St.	
	17:45Ar.	Hotel	
03Mar. (Fri.)		Breakfast at hotel	
	8:30Lv.	Hotel Lobby	
	8:56Lv.	Kyoto St. to Nishinomiya by JR-L	
	9:48Ar.	Nishinomiya St. meetting Local staff	
	10:10Ar.	**Nishinomiya Public Gallery**	
		Presentation about Environmental Education of Nishinomiya-city	
	11:30Lv.	to Koshienhama by car	
	11:50Ar.	**Koshien-hama Nature and Environmental Center**	
		Lunch Time (Lunch Box)	
		Presentation (Koshien-hama Nature and Environmental Center)	
	14:20Lv.	to Nishinomiya St. by car	
	14:45Ar.	Nishinomiya St.	
	14:58Lv.	to Shin-osaka by JR-L	
	15:13:Ar.	Shin-osaka transfer to JR-S	
	15:30Lv.	to Tokyo	
	18:00Ar.	Shinagawa St. transfer to JR-L	
	18:30Ar.	Shinjuku St.	

DISCUSSION REPORT
AGENDA 5: Reorienting EE towards ESD in the Asia-Pacific Open Forum I : Report: Analysis Report on the Past and Present of EE Research in the Asia-Pacific Research Themes that Emerged from the Six Research Papers

Joseph E. HEIMLICH (Ohio State University)

Looking across the six papers, several clear themes emerged in the papers from China, Japan, Korea, Taiwan, Philippines, and United States. These themes were identified by the researchers present at the conference through the oral presentations of the papers and the written documents in the Program Preprints. Although not exhaustive, the themes presented here were echoed throughout the dialogues that followed and so are highlighted as they appear to be salient and prescient to the participants.

First, however, it is interesting to note some underlying observations offered by the researchers in their discussions regarding the papers. First, although each country uses different terms/language and the time scale and frames differ, all the countries seem to have moved through parallel 'life spans' in terms of environmental education history. The similarity of progression and the parallel issues leading from one period to another are striking. A second observation is that there is a definite need for (and current lack of) best practices indicators or indices, especially relating to impact. The final underlying observation relates specifically to the progression of EE in Japan: the constructs of Pollution Education, Environmental Protection, and Education for Sustainable Development are not exclusive and not truly linear. Although the focus related to EE follows this general pattern, the concepts are all related and interwoven (as are the 'labels' used in other countries such as conservation education, outdoor education, nature study, environmental education and the like).

The researchers noted eight themes that seem to be important in the papers.

- The first theme is that of *political context*. Every paper contained some discussion that referred to the political will of the country, the policy statements and actions that drive or inhibit education and environmental action, and the political shifts that affect EE and ESD.
- The second theme that emerged was that all countries seem to be dealing with *professionalization* of EE/ESD. In all cases, there are stages of development of the field starting with early definitional work and moving toward impact measurement. As the field matures, there are increased studies related to career paths, effectiveness measures, comparative studies and basic research.
- *Definitions of environmental education and education for sustainable development* was a third theme observed. There is a tremendous challenge in differentiating between EE and ESD – each individual has a clear perspective, but there is no shared distinction nor has there been a clear enunciation of the motivation for change beyond the political drivers. ESD is different from EE, but as the movement grew from political rather than educational motivations, the differentiation is not theoretically grounded.

· The fourth theme to emerge was the need to *broaden the concept of stakeholder.* In all the reports, there were various stakeholders identified: administrators, politicians, schools, citizens, students, teachers. Yet, few of the trends reflect a view that all stakeholders are engaged concurrently and consistently in planning, implementation, and valuing outcomes.
· *Considering multiple levels of community* also was revealed as an emergent trend or need. ESD is concerned with the individual in the context of their immediate culture and community, but also placed in the larger contexts of nation, region, and world.
· There was a clear gap in *best practices/indicators.* The papers as a whole identify ways in which cultural and contextual conditions vary among learning experiences, and that such variance can and should lead toward building a base of understanding of what works, when, where, how, and why.
· Another clear gap was that of *research on the media.* Whether the research is on the mass media or on media for transmission of information in the classroom, the concepts of ESD that are delivered via the various tools have not been well studied. The prevalence of media driven programs and resources being used in education suggests a need exists for critical analysis of the materials, the use of each medium, and the messages and relationships of educators with the mass media.
· The final theme is also the theme that evoked the most passion: *giving voice/exploring power relationships in ESD.* In all situations, there are challenges of whose vision is being used; what components of society are being sustained; who is invited to the "table" and how are they heard; continued views of equity and justice; and equity and access issues.

Each of these themes could warrant a great deal of discussion and exploration. Given the constraints of the setting and time, the themes were introduced with examples from the various papers and countries represented by the researchers, and offered to the participants as issues that need to be explored.

DISCUSSION REPORT
AGENDA 5: Reorienting EE towards ESD in the Asia-Pacific Open Forum I : Report: Analysis Report on the Past and Present of EE Research in the Asia-Pacific Implication of "ESD", for Further Improvement of Quality Education for Sustainability

Masahisa SATO (Asia/Pacific Cultural Centre for UNESCO)
and Fumiaki TANIGUCHI (Konan University)

Dr. Fumiaki TANIGUCHI, a chairperson of afternoon session, briefly explained the structure of the afternoon session, which consists of two parts under the titles of: (1) Implication of ESD for Future Improvement of Quality Education for Sustainability: and (2) Reorienting EE towards ESD in the Asia-Pacific. Linkages between Theory and Practice. Then, Dr. Masahisa SATO, co-chairperson of the session, invited four reporters from each group session, i.e. Prof. Toshihiko ANDO from session I: primary & secondary education, Prof. Toshihiko HIGUCHI from session II: higher education & educator training, Prof. Kazuyuki MIKAMI from session III: pedagogy/teaching methods & programme development, and Prof. Yuko OGURI from session IV: monitoring and evaluation. Each reporter explained the components of presentation, process of discussion and the discussion points at the group discussion. The details can be found from the enclosed discussion reports prepared by the chairpersons of group discussion.

After reporting the discussion points by the four reporters, panel discussion was conducted with the reporters under the title of "Implication of ESD for Further Improvement of Quality Education for Sustainability", which was as a meeting point of the group discussion sessions. First of all, for the basic understanding of EE and ESD as a result of a series of international discussion, Dr. Masahisa SATO briefly introduced the origins of ESD by referring to the UNDESD International Implementation Scheme (IIS) published by UNESCO in 2005, which include (1) basic education, universalizing access and promoting equity: and (2) sustainable development and education. In particular, it was pointed out that EE was one of the roots of ESD as referred to the Thessaloniki Declaration (1997), however, it was also pointed out that preliminary findings indicated that ESD was still predominantly conceptualized in the context of EE by many key stakeholders and decision makers, and the moving from EE to ESD would be a key challenge for the Decade, as referred to the Asia-Pacific UNDESD Regional Strategy (2005).

Then, he proposed the following points to be discussed at the panel discussion: (1) values, ethics and ways of thinking; (2) approach, process and relativeness; and (3) attitude, participation and action: (4) civil capacity and life long learning society. The following points were raised by the panelists and the participants from the floor.

Values, Ethics and Ways of Thinking
 · Importance of moral education
 · Transmission of knowledge on sustainability from forefathers
 · Knowledge of historical development of the situation
 · Roles of education for respecting differences of values and ethics

- Acknowledgement of different knowledge systems
- High-order thinking, e.g. meta-thinking, critical thinking and system thinking, analysis, synthesis, application, and evaluation
- Locally oriented values and ethics (economical aspects, socio-cultural aspects and environmental aspects)
- Probing into the essence of a problem
- Critical review of the concept of ESD
- Consideration of ownership, historical context, community of environment, and communication
- Democratic consensus
- Danger of the abuse of the word "ESD"
- Potentiality and difficulties brought by the ambiguity of the concept of ESD
- ESD under the political context, and its potentiality for political change
- Implication of "change", not only as an individual change but as an institutional and social change

Approach, Process and Relativeness
- Linkages between social issues and leaning objectives
- Acknowlegement of different ways learning/teaching
- Interactive communication
- Collective decision making
- Participatory and dialogical learning process
- Promotion of collaborative works for identifying the common issues and resources at multi-level and multi-sectoral
- Linkages among pedagogical approaches
- Narrowing knowledge-action gap
- Vision building to make a bridge between knowledge and action
- Shared vision for the effective linkages between social development (environment, socio-cultural, economic perspectives) and education
- Action oriented/Action learning
- Culturally sensitive

Attitude, Participation and Action
- Shared vision and scenario building which enable to identify the role of stakeholders
- Narrowing knowledge-action gap
- Action oriented/action learning

Civil Capacity and Life Long Learning Society
- Potential for multi-level and multi-sectoral impact
- Promotion of collaborative works for identifying the common issues and resources at multi-level and multi-sectoral
- Shared vision and scenario building which enable to identify the role of stakeholders and level
- Setting common objectives for community development
- Inter-personal relationship for community development
- Dialogue among different stakeholders, which enables to develop community identity

After break, panel discussion was moved onto the next session, which was under the title of "Reorienting EE towards ESD in the Asia-Pacific, Linkages between Theory and Practice" Dr. TANIGUCHI summarized points raised by the panelists, then he invited five panellists who presented at the morning session, Dr. Sun-kyung LEE, Dr. Tzuchau CHNAG, Dr. Lucile GREGORIO, Dr. Joseph HEIMLICH and Dr. Kimiko KOZAWA. In this session, discussion was focused onto the conceptual relationship between EE and ESD. In particular, the discussion was done under the

questions of: (1) whose society we want to be sustainable?; (2) with whom we want to do partnership for sustainable development?; and (3) how do we develop vision/scenario building which enables to promote action?

In this discussion, it was pointed out that:
· Relativity of the concept of sustainability
· Individual, institutional and social change
· Process of ESD should be educational not as political, importance of learning individuals, institutions and societies.
· Importance of contextualization
· Spiral learning structure at multi-level and multi-sectoral

Finally, a series of the discussion was recommended by the panellists and participants for further development of the concept of EE and ESD, and linkages between theory and practice.

Comments and Suggestions

Hiromi Kobori

Chairperson of the Steering Committee of the Conference

Feedback from program participants

The program was evaluated using the data sheet of the ACCU Evaluation Form, by four of the invited foreign participants.

Overall impression of the program

All four participants evaluated the program as "excellent." All commented that the conference was well organized and well prepared. Some additional comments were: 1) program was productive and professional, 2) stimulating with engaging discussion, 3) dynamically structured with various perspectives, 4) addressing many important issues in EE and ESD, 5) good participants, and 6) the staff were very friendly and helpful.

The most useful/valuable activities of the program

All participants mentioned that the "Group Discussion" was most valuable, because of the exchange of various experiences, including dialogues on important themes. Two of them answered that the "Panel Discussion of Plenary Session I" was valuable, because of the stimulating discussion on several issues and the country reports, where participants could share their experiences. One participant wrote down that the "Field Trip" was useful, as she was able to see firsthand a successful example of theory transformed into action.

Your objective in participating in this program and whether or not your expectations were met.

All mentioned that their objective was to 1) learn about other countries' practice and research related to EE and ESD, especially in Japan, 2) share experiences with other participants, 3) engage with colleagues from Japan and other countries in the Asia-Pacific.

Three evaluated that their expectations were fully met and one evaluated that most were met.

Your plan for applying the ideas and skills you acquired through your participation in the program upon your return.

All participants answered that they would share ideas with members of the Society of EE in their own country, and share ideas with colleagues at their universities. Two stated that they would write a report on the conference for publication in the newsletter of the Society of EE in their own country.

Suggestions on how to improve the Program in the future

All mentioned "more time," especially for discussion, dialogue, and panel discussions, to delve deeper into the topics. Two mentioned that they would like to see more participation from the floor and local participants.

Program evaluation from the organizer

We received many comments and feedback from conference participants and members of the Japanese Society of Environmental Education. Most of them evaluated that the conference was "excellent." Most of them mentioned that "Country Reports" on EE and ESD from other countries'

participants were informative, and "Group Discussion" was very helpful to connect experiences with theory, and to deepen understanding regarding the important issues within EE and ESD.

As an organizer of this conference, I evaluated that the conference was "very successful," as the conference was implemented as we had planned, except that two of the foreign guests could not join the conference due to illness and a visa problem.

At its onset, this conference had the following three aims:
1) Analyze the history and trends of EE research in the Asia-Pacific.
2) Reorient EE towards ESD.
   a) To review and reassess conventional EE practices from the viewpoint of
     'ESD,' or education that contributes to the realisation of a sustainable society.
   b) To identify EE research priorities for the next ten years.
3) Consider measures to connect EE research and practice.
   a) To share and learn from examples of current EE practice in the areas of:
     "Higher Education/Educator Training" (Group Discussion 1).
     "Primary & Secondary Education" (G.D. 2).
   b) To consider and propose measures to integrate EE research and practice, also incorporating the concept of ESD, under the themes:
     "Pedagogy/Teaching Methods & Program Development" (G.D. 3).
     "Monitoring & Evaluation" (G.D. 4).
     "System Thinking and Holistic Approach, and Future Direction"
     (Plenary Session II).
These are some of the areas for which intensive future research and theory development are necessary.

In the end, the aforementioned three aims were fulfilled and participants were actively involved in the "Group Discussion" and "Panel Discussion."

However, the following three improvements are necessary:
More time is needed to delve deeper into the topics.
More time is needed to build a network between participants from countries of the Asian Pacific.
We should spend more time listening to the participants from the floor, allowing them to express their ideas and join the discussion.

Proposal for ACCU

I would like to express our sincere gratitude for providing a grant for our International Conference, and giving us many useful suggestions to implement the conference. It was especially helpful for us that ACCU decided to give us the grant only a short period after we submitted our proposal. As a result, we could start preparation for our conference earlier than we had expected, and break down our budget easily. I do not have any special suggestions for the ACCU.

The History and Trend of EE Research in China

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ABSTRACT

After the contents of the academic papers in EE from 1979 in China are analyzed and the paper numbers are made quantity statistic the fact that EE research began hotter and hotter in China after 1994 is discovered. And from 2000 the contents and research method mentioned in some academic papers in EE in China disclose the trend of EE transforming to the direction of ESD. It is from 2004 that the trend of EE to ESD is disclosed by the fact that the number of EE academic paper is decreasing and ESD paper number is increasing in China. In most of these academic papers the significance of EE and introduction of EE in other countries are their research contents. The methods mentioned in these papers corresponding with the mainstream education research methods means that EE is sensitive to mainstream education and can respond to it in time. But most research method used in these academic papers is single metaphysics method. Positivism research method and humanistic quality research method are insufficient. The analysis to the authors of the papers discloses that the researcher number is unstable for the reason of research fund shortage, which is also the reason for the absence of positivism research and humanistic quality research in EE in China.

Key words: Environmental Education, Academic paper, Quantitative statistic, Sustainable Development

One of the roles of academic paper is to reflect the development history and trend of a research area quickly. In this paper the history and trend of EE research will be discovered after the numbers and contents of the academic papers in EE from 1979 being analyzed in China.

The Numbers of Academic Papers in EE in China Analyzed

The starting point of EE in modern meaning was in 1973 in China influenced by Human Environment Conference in 1972 in Stockholm. Taking "Verbatim Record Data Base of Academic Journal in China" (2006) as information source and using "Environmental Education" as key word 4257 papers are searched from 1979. After the repeated papers, book sale information and advertises being picked out there are 3831 academic papers in EE in China from 1979. The distribution of academic papers in each year from 1979 is illustrated in figure 1.

During the period of 1979-1993 the maximum number of academic paper is 25 in 1993 (Figure 2). There is only 1 paper in 1979, 1981 and 1985 separately. Not more than 5 papers every year during 1979-1988 and 10 papers during 1989-1992. The reason for paper shortage in this period is that people in China pay all attentions to economic development at that time. There is only a small number of researchers concerning about EE in university, institute or National Environmental Protection Bureau.

The annual number of academic paper in EE is more than 100 after 1994 (Figure 1). From then on the increasing trend in paper number sustains from 1994 to 2000. In this period people all over China

concerned about EE step by step. The Chinese Education Committee at that time required school to permeate EE in varied subjects and carry out EE in out class activities time, which are written in Chinese Education Syllabus for Primary and Middle Schools. And then there are responses to EE from schools. In the mean time the environmental issues breakout together at that time. People in cities have clear perception to the pollution like air pollution and rubbish issue. Peasants in village also have perception to the chemical pollution. All kinds of EE institute and NGO in environment appeared quickly. The requirement for EE from people increased greatly. Researchers interested in EE also increased greatly. Most of researcher in EE at that time is in university, institute and schools.
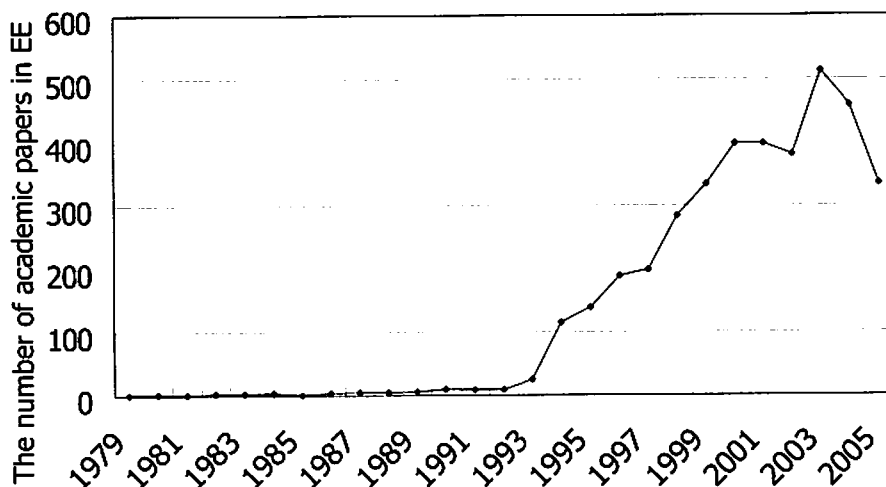

Figure 1. The number distribution of academic papers in EE during 1979-2005 in China
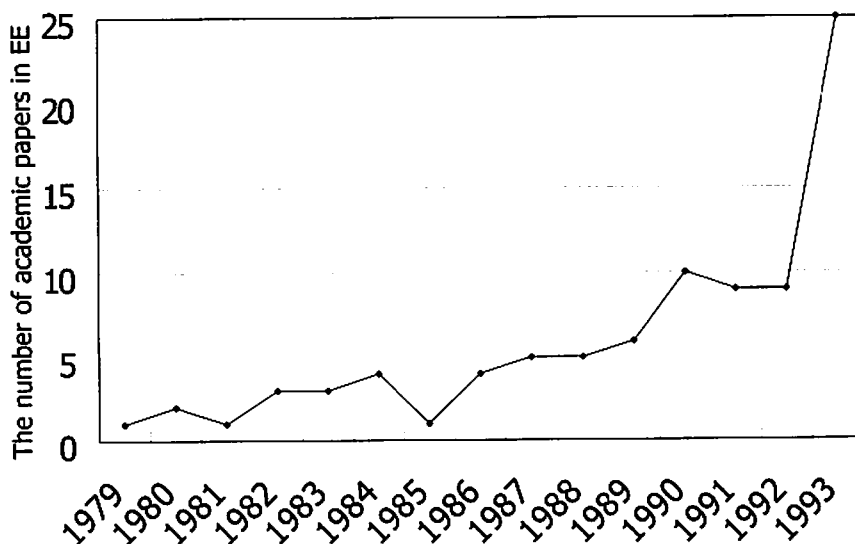

Figure 2. The number distribution of academic papers in EE during 1979-1993 in China

From 2000 to 2002 the number of academic paper in EE keeps stable (Figure 1). In this period people are more and more familiar with EE. The numbers of institute in EE and environmental NGOs began to keep stable. Most of researchers are in university or as schools teachers.

The number of papers increases in 2003 (Figure 1). The reasons are researchers' responses to both Sustainable Development Earth Summit in Johnsburg in 2002 and Chinese Ministry of Education enacting EE guideline and syllabus for schools.

From 2004 to 2005 the number of paper decreases. The reason is that some researchers begin to use "Education for Sustainable Development" instead of the word of EE. So the number of paper in EE decreases but the number of papers in ESD increases.

The Contents of Academic Papers in EE Analyzed in China

There are only 63 papers in EE before 1992. The contents of these papers include: the significance of EE, the strategy research in carrying out EE in schools (Xiangli JIANG, 1983) or experiences in EE practice sharing (Rukang FANG,1979;Jiabin WU, 1980;Xiangli JIANG,1983; Li ZHANG,1992), the trends of EE in other countries. Researching on the significance of EE emphasis values of EE in economic and in children's intelligence development at that time.

There are 468 papers in EE during 1993-1996. The contents of these papers include: the significance of EE, the trends of EE in other countries, the research and experiences sharing in EE carried out in the subjects of Chemistry, Biology and Geography, research on carrying out EE in varied school levels (Nai-an, REN, 1993;). Research on the significance of EE emphasis the values of EE in quality education for students (Ren DA, 1994; Weiqiang WANG, 1994; Lanqing LI, 1994; Lanqing LI, 1995).

There are 817 papers in EE during 1997-1999. The contents of these papers include: the significance of EE, the trends of EE in other countries, the method and way of permeating EE in varied subjects and out class activities, the investigation of EE situation in schools, the strategy and way of carrying out EE in varied school systems. Research on the significance of EE includes the values of EE in quality education for students, the ethic value of EE, the significance of EE in stewardship and sustainable development (Linkui LIU, 1997; Wenhu YE, 1998; Zhiyue GU, 1997).

There are 2483 papers in EE during 2000-2005. The contents of these papers include: the significance of EE, the trends of EE in other countries, the relationship between EE and Sustainable Development, the method and way of permeating EE in varied subjects. Greenschool, the achievements of varied EE project sharing, EE in varied education levels or fields like in formal education/in community/in minority nationality area/in mountain area/in western China/in university, the strategy of resolving the problems about EE facing in formal education system, the evaluation of EE, the investigation of EE situation in schools, the strategy and way of carrying out EE in varied school systems. Research on the significance of EE emphasis EE as one of the ways to develop citizen awareness (Xiangrong LIU, 2002; Yi ZOU, 2005), emphasis the relationship between EE and Sustainable Development, concerning about environmental equity and justice (Ranran XU, 2005; Qiyan SONG, 2005) and the cultural values of EE (Liuming LU, 2005; Minghai WU, 2005).

The research of EE reflected from research contents is transforming to concern about issues in social dimension like environmental equity, environmental justice and promoting social sustainable development.

The Author Analyzed and Research Method Mentioned
in the Academic Papers Analyzed in EE in China

In the papers from 1979 there are more theory researches than practices researches.

The method of theory research is only metaphysics in most of these papers. Positivism research method and humanistic quality research method were insufficient. The reason for this is that

research fund is always shortage in EE in China. This also results in the number of researchers unstable. The statistic shows that more than 95% authors in these papers are the first time to publish paper in EE and never publish paper in EE again. Not more than 5% authors show that there is fund to support their research. Most of the researchers have to support the research themselves. The reason for research fund shortage is because EE belongs to interdiscipline in China. Both environmental science and education area denies and ignores it together. There is no space either in environmental science or education area. Shortage in research fund and unstable number of researchers restrains the development of the academic level in EE. So the research level of EE in China is still low now.

The research methods mentioned in these academic papers in EE include: inquire-based learning (Chenghan XU, 2005), field trip (Zuqiang WU, 2001), action research (Chengmu LIN, 2005). The ways for carrying out EE mentioned in papers include: out class activity, permeating EE in multi-discipline, theme researching (Kemin LIU, 2003), comprehensive practice activity (Hongyan WANG, 2004; Zhonghui XU, 2003) and community service (Chengjin LI, 2005; Guangyou XU, 2005; Jianhua LIU, 2003).

Looking from the methods and ways for EE carried out, which are mentioned in these papers, that EE is sensitive to response to the mainstream educational method can be concluded.

Conclusion and Research Trend of EE in the Future

According to the paper number of ESD increasing and the paper number of EE decreasing from 2004 to 2005 the trend of EE transforming to the direction of ESD is clearly.

Looking from the research content in these papers the themes like environmental equity and justice relate more closely with social dimension. So EE transforming to ESD is more clearly.

Looking from the methods and ways for EE carried out, which are mentioned in these papers, that EE is sensitive to response to the mainstream educational method. That means it is ready for EE to transform to the direction of ESD in methodology.

So it is the inevitably trend for EE to transforming to the direction of ESD in China. But about how to transform there are still huge gap between theory and practice and many uncertainties for researchers in EE to face in the future.

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"Verbatim Record Data Base of Academic Journal in China" is the biggest Chinese electric data base in the world. There are verbatim record academic papers from 1979. It will be update everyday. In this paper the time for searching is 10:30 AM-13:30 PM on January 15, 2006.

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Reflecting and Rethinking Environmental Education Research in Korea

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ABSTRACT

It is said that those who do not know history are condemned to repeat it. The purpose of this paper is to reflect the environmental education and environmental education researches in Korea from the past till the present and to make a vision for the future based on the reflection and rethinking on it. Environmental education in Korea can be classified as three periods: the quickening period before 1980, the developing period of 1981-1991 and the stabilization period from 1992 till the present. The environmental education researches of each period were carried out, started at the late 1970s' Korea Educational Development Institute and led to Korean Society for Environmental Education. Based on the reflection, issues related to environmental education research were raised and discussed for improving the practices as well as the researches in environmental education, including the issues of research methodology, research themes and contents, relevance to local community coupled with consideration of context, the importance of participatory action research for sustainability.

Key words: Environmental Education Research, research methodology, research themes and contents, relevance to local community, participatory action research for sustainability

Introduction

The concept of sustainable development is based on the discussion about the environmental limit of the earth's system and the equity among various stakeholders. However, when we talk about the concept of sustainable development, we mention the harmony among three perspectives such as social sustainability, economic sustainability and environmental sustainability. To embrace such perspectives, we emphasize the cultural aspects (UNESCO, 2005). However, without securing environmental sustainability, any type of development is impossible, because it's deeply related to our survival in this planet. Therefore, the importance of environmental sustainability and the role of environmental education are far bigger than other areas.

In such a context, Fortner (2001) saw the environment as a bridge that connected the present and the future, and emphasizes environmental education and environmental education research as a foundation to support the bridge. That environment is being shaped each day by the human understanding (or misunderstanding) of science, by applications of technology (or mis-applications), and by the way young people are taught to connect, apply, and deal with the effects of that science and technology. Focusing on the "systems" aspects of these forces, and relating them to the school setting and responsibilities, provides environmental educators a strong rationale and methods for teaching a subject that is also a preparation for living. As educators, our responsibility is to help learners prepare for their future, and in so doing, we configure our own future as well.

This paper is for reflecting what environmental education research has done in Korea, what does in Korea and what will have to do in Korea. First of all, I'd like to reflect past and the present of environmental education in Korea briefly and discuss several issues which should be considered in

environmental education and environmental education research for the future.

Overview of Environmental Education Research in Korea

Environmental education in Korea can be classified as three period: the quickening period before 1980, the developing period of 1981-1991 and the stabilization period from 1992 till the present[1]. The environmental education researches of each period were carried out, started at the late 1970s' Korea Educational Development Institute (KEDI) and led to Korean Society for Environmental Education (KOSEE).

Quickening Period: Before 1980s

In the 1970s, starting from the IUCN conference, there were many international efforts which can be milestones in the history of environmental education of the world. In Korea, some scholars began to mention environmental education. However, the national policy of Korea at that time was focused on the economic development and income growth. So, the environmental education was not differentiated from natural environment protection and it was not much different from general public relations work. Moreover it was not equipped with the system that can induce or persuade common recognition from the people.

During this time, environmental education researches were conducted by the researchers in the field of Social Studies and Science in KEDI. The research included 'Research on Population Growth and Environmental Management (1976)', Workshop on Environmental Education (1977), Basic Research on Educational Curriculum Development for Environmental Education (1977), Research on Environmental Education Model Development (1979) etc.

Developing Period: 1981 – 1991

During this period, environmental right was stipulated in the constitution of Korea and Korean Environmental Administration was promoted as Office of Environment in 1990. Since 1985, the Environment Conservation Model School initiative was operated and supported by Ministry of Environment[2] to promote environmental education in schools. Also during this period, the 4th and 5th national curriculum included or emphasized environmental education in the guideline of the introduction[3]. Therefore, the dispersed environmental education started in each curriculum. At the same time, the environmental education activities by non governmental organizations were being implemented in the society.

These kinds of results are closely related to the activities of environmental education research groups, which actively operated during this period including KEDI and KOSEE. KEDI established the Division of Environmental Education to support school environmental education in 1991. The major researches and developments by KEDI include research on 'Strengthening Measures for Environmental Education (1987)', 'TV Program Development for Improving Environmental Education (1989)', 'Development of Education Materials for Elementary, Middle and High Schools (1988 – 1990)', 'U.K. & Korea Environmental Education Seminar (1991)', 'An Investigation on Environmental Awareness of Students and Teachers (1991)', 'Research for the 6th National Curriculum Development (1991)', etc.

KOSEE is the specialized environmental education organization, which was established by key members in primary, middle and high schools, NGOs, environment-related agencies and research institutes that participated in Germany & Korea Environmental Education Seminars sponsored by

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[1] The summary of environmental education history is based on the contents of Nam (1995), Choi (2000).
[2] Environmental Administration at that time
[3] For the detailed contents of the 4th – 5th national curriculum in Korea, please refer to the other paper 'ESD through EE' presented by the same presenter.

KEDI in September 1989. This seminar later created a momentum that connected school teachers and educational administrators for the discussion of environmental education through international seminars and annual academic seminars. In 1991, KOSEE submitted "A Recommendation on School Environmental Education Improvement" to the Ministry of Education.

Stabilizing Period (1992)

Various activities were carried out in social environmental education and school environmental education during this period, which was the continuum of research, development and implementation of the developing period. The government announced the national declaration for environmental conservation to celebrate the 20th World Environment Day in June 1992. The environmental education was institutionalized within the school educational system, thereby causing active researches and developments by the Ministry of Education and other researchers. 'Environmental education series for elementary schools' and 'guidebooks for teachers (1992-1993)' coupled with 'the research & development for middle school environmental textbooks & guidebooks (1993-1994)' were developed or conducted. Also the research on teaching & learning middle school environmental textbooks and the evaluation methods was carried out in 1994.

The most important progress in this period is the establishment of 'environment' subjects in school curriculum. "Environment" in middle schools and "Environmental science" in high schools were introduced as an independent selective course to expand the opportunities for students' systematic environmental education. This continues today, even with the 7th national curriculum is being implemented. Also for primary school students, environmental education can be implemented in discretional activities since the 6th national curriculum[1].

The activities of KOSEE are more specialized and active in environmental education research. Each year, the annual conferences are provided and journals published (Table 1). Based on these professional activities in environmental education research, the theoretical researches in the beginning which emphasize the need or importance of environmental education evolved into various research areas such as awareness survey, development & evaluation of educational materials, teacher education, and research on learners.

Issues of Environmental Education Research in Korea

What is environmental education?

Before discussing environmental education research, defining environmental education is needed, which is not easy. Environmental education is composed of various lower areas based on various traditions because each environmental education emphasizes various interpretations and traditions (Kim, 2002).

When the term, "environmental education" was first used in the beginning of the 1970s, the concept was closely connected to natural environment and nature protection. Also it followed the tradition of ecology and field trip (Goodson, 1993). Such influence still remains and many people think that the knowledge and understanding of the principles and concept of natural environment are important in environmental education. However many recent researches on environmental education expand its area. As a result, problem solving, decision making, the development of skill and attitude, moral and ethics are being emphasized. This coincides with education for sustainable development, which emphasizes critical thinking and decision making ability in various local contexts.

In Korea, many researchers in the past put an emphasis on responsible environmental behavior

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[1] Also for the detailed explanation regarding 'Environment' subject in the 6th – 7th national curriculum, please see the other paper 'ESD through EE' presented by the same presenter.

Table 1. Professional Activities of Korean Society for Environmental Education

Year	Annual Conference	Theme	EE Journal	No. of Paper
1990	1st	Strategies and Practices of EE in Korea	Vol. 1	18
1991	2nd	Implementing EE	Vol. 2	9
1992	3rd	EE in Korea and North-East Asia : EE in Schools	Vol. 3	18
1993	4th	Awareness and Action in EE	Vol. 4, 5	22
1994	5th	EE in Schools, Private Sectors and Local Community	Vol. 6, 7	22
1995	6th	Strengthening EE in Schools for 21C	Vol. 8	9
1996	7th	Information and Globalization of EE for 21C	Vol. 9	6
1997	8th	Development of EE in Schools and Society	Vol. 10(1,2)	31
1998	9th 10th	Education for Recycling and Renewing Exploring EE for Youth	Vol. 11(1,2)	37
1999	1st 2nd	Strengthening EE for the 7th National Curriculum 10years with KOSEE and Development of EE in Korea	Vol. 12(1, 2)	42
2000	1st 2nd	Leadership for EE Innovation Development of EE materials	Vol. 13(1, 2)	23
2001	1st 2nd	Informal EE and experiential EE Improvement of EE materials	Vol. 14(1, 2)	24
2002	1st 2nd	Affective Domain in EE Sustainable Development and EE	Vol. 15(1, 2)	17
2003	1st 2nd	Status and Vision of EE in Other Countries Partnership in formal EE and informal EE	Vol. 16(1, 2)	13
2004	1st 2nd	Leadership for EE Past, Present and Future of EE in Korea	Vol. 17(1, 2)	24
2005	1st 2nd	Sustainable Development and EE Earth Crisis and EE	Vol. 18(1, 2, 3)	27

based on the understanding of the principles & concept of natural environment rather than critical thinking or problem solving ability. It was also used in judging the effect of environmental education programs. However, recently researchers who object to the environmental education that tries to induce the desirable environmental behavior (Lee, 2002) or show interest in decision making or problem solving (Yun & Lee, 2005) emerged.

How can research help environmental education?

If the environment is the bridge that connects the present with the future, the supporting power is environmental education. In other words, it helps support the bridge effectively. It includes developing and evaluating various resources for instruction, relevant teaching and research (Fortner, 2001). Research is very important in all of these. People who lead the education world should develop the curriculum and reflect the most recent research results in the process of teaching teachers. Without a need assessment, a new program can't be developed. When a new program is applied, the evaluation should be followed to get the best results. We have to check the changes that the program was intended, and it's very important that the results should be informed to other people for future use. It's also important in understanding learners & the course of learning, integrating the environmental issues in curriculum, and developing systematic curriculum.

The issue of research methodology: Quantitative research and Qualitative research

Unlike the U.S and other countries which are equipped with a 30-year history of environmental education, Korea has a short history of environmental education research and the results are not much. The most frequently pointed out issue in analyzing and criticizing the trend of environmental

education research is the research methodology (Mrazek, 1990; Robottom & Hart, 1993; Palmer, 1998; Hart & Nolan, 1999). Namely they say that environmental education research should pursue qualitative research that focuses on how the participation in the specific education program or experiences in one's life are being understood and interpreted, and how the learner or a participant understands the environment, rather than pursue quantitative research that tries to measure changes men's behavior through education to achieve the objective of "cultivating citizens equipped with responsible environmental behavior."

Since 2000, the interpretive inquiry method such as case study, participatory observation, semi-structured interview, discourse analysis to answer research questions have been being tried in Korea (Kim, 2002; Kim et al., 2005; Joo, 2005). These kinds of efforts are being increased as time goes by. As Kim (2002) pointed out, it's very desirable considering the features of environmental education which values affective domain such as attitudes or beliefs, deals with environmental issues, emphasizes critical thinking and interaction between knowledge and participation, and focuses on the changes of learners' inside.

The issue of research contents: Understanding learners

Learner's knowledge, learner's attitude & behavior, and learner's learning outcomes related to participations in the specific education programs are handled frequently in environmental education research (Rickinson, 2003), which is closely related to the instrumental characteristics of environmental education. However, the concept on 'learners as active constructors' is being emphasized, so researches on learner's perception on nature and learning experience are emerging. Also, they focus on the process of learning rather than the outcome.

Recently a group of young researchers in Korea are focusing on researches that understand the changes in the learning process of teachers and learners, who are the subjects of participating environmental education, or changes in perceptions and values, due to the influence of significant life experiences (SLE) researches (Chawla, 1980; Palmer, 1993; Chawla, 1998a/1998b, Parlmer et al., 1998). This is expected to help the qualitative improvement of environmental education researches free from nominal implementation of environmental education.

Relevance to local community: Coupled with consideration of context

Relevance to the local community in environmental education is another issue. Because environmental issue is closely related to complex social, cultural, economic and political aspect, the actual environmental issue is mostly based on the regional context. However, most of environmental education researches in Korea have been carried out to help the learning in schools than in societies or local communities, and various analysis and trials were conducted to promote it. Even in those researches in schools, people tend to examine effects of specific programs rather than consider the learners' contexts. Therefore although learners participated in different programs with different contexts and subjects, there were tendencies to check the general attitude or knowledge to verify the effects. Also, there were many programs that were not related to local communities or sense of place. In Korea, still, the research on school environmental education and general effect verification is the majority. But, also there are some researches connecting formal environmental education and informal environmental education, bringing up the leaders of social environmental education and understanding the context (Kang & Cho, 2004; Kim & Kim, 2004; Hwang & Kim, 2003; Ji & Kim, 2003).

Participatory action research for sustainability

The foundation of education for sustainable development and environmental education is action. In the past researches, the aspect of action was not emphasized, and action and research were considered as separate matters. Also, practical knowledge was ignored or undervalued. In reality, many environmental education researches have been carried out in universities and research

institutes like other education research areas, which mean that many programs based on foreign educational theory were developed and applied in schools and the effect was evaluated. The efforts to understand the subjects who try to carry out actions related to the environment or environmental education to improve the quality of them were very few. However it's never enough to emphasize the importance of participatory action research which carries out particular actions and reflects on actions or in actions in terms of environmental education towards sustainability. Therefore the interest in this area should be stimulated among Korean environmental education researchers.

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The Status of Sustainable Development Education in Taiwan

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ABSTRACT

The Taiwan Sustainable Campus Program and the Green School Partnership Program are two important endeavors supported by the Ministry of Education in Taiwan to promote education for sustainable development. The former encourages schools to transform their campuses into sustainable development in terms of alternative energy, water conservation, material recycling, and health, and the latter highlights a whole school approach which consists of administration, facilities, curriculum, and school life.

Key words: Taiwan Sustainable Campus Program, Green School Partnership Program

Introduction

World Commission on Environment and Development (WCED) issued the report "Our Common Future" in 1987, and then United Nations' Earth Summit proposed Agenda 21 action strategies in 1992. Obviously, sustainable development has been adopted as a guiding principle for nation and world development in the 21 century. Following this trend, Taiwan government established a Council for National Sustainable Development under the Executive Yuan in 1997 to plan and implement the affairs of environmental protection, ecological conservation, resource management and international environmental protection activities.

The Environmental Protection Council of Ministry of Education in Taiwan recognized the importance of education in the national endeavor to promote sustainable development, and proposed a master plan "Stepping into 21 century – an action strategy for sustainable development education of MOE". Three goals were highlighted: 1. stickking to the fundamental education law to practice sustainable development education for environmental protection, ecological conservation, and resources management; 2. educating citizens aware of environmental problems, understanding and caring the mutual relationships between resources and living quality, and taking actions to maintain ecological balance and environmental quality; 3. culturing citizens with environmental literacy and ethics, knowledge, attitudes, skills, and values of environmental conservation.

The concept "sustainable development" has different interpretations, however, the most frequently quoted definitions are that human's consumption of natural resources should not exceed the carry capacity of the earth and human's pursuing of their life quality should not decrease future generations' capacity to pursue their own life quality. These definitions direct to the core concepts that natural resource is limited, and the earth is like a spaceship.

An Action Plan for Education for Sustainable Development

The government in Taiwan treated the issue of sustainable development education seriously. An action plan has been drawn to lead the endeavors toward sustainable development education. It includes three objectives as following.

1. Introduce and incorporate the concept of sustainable development into the school education and citizen's daily life
  · Clarifying the definition and contents of the concept of education for sustainable development
  · Passing the laws and setting up the institutions for implementing education for sustainable development
  · Infusing the visions and principles of sustainable development into school curriculum
  · Conducting sustainable development education workshop for in-service teachers
  · Encouraging research for sustainable development education

2. Coordinating the resources of governmental agencies, private sectors, business, and schools to implement education for sustainable development
  · Establishing learning centers for education for sustainable development
  · Encouraging related governmental and non-governmental institutions to hold activities of education for sustainable development
  · Empowering all groups (women, children, aboriginal people...) to participate in the education for sustainable development
  · Training governmental employees to ensure their policy making and implementing will be agreement with the principles of sustainable development

3. International cooperation of education for sustainable development
  · Inviting related international organizations to share the experiences of sustainable development education
  · Holding international conference and symposium of education for sustainable development
  · Encouraging scholars and graduate students to participate in international activities for sustainable development education
  · Supporting mutual visit and exchange programs of academic institutions

The Education for Sustainable Development (ESD) in Taiwan

In light of UN's declaration for the Decade of Education for Sustainable Development (2005-2014), the Division of Environmental Protection Education at the Ministry of Education in Taiwan, established in 1990 as a mission-oriented unit, has long recognized the important role of education in promoting sustainable development, and proposed a master plan, entitled "Stepping into 21 century – an action strategy for sustainable development education of MOE" in 1999. Three goals had been highlighted in this document: 1. abide the country's "Fundamental Education Law" to practice sustainable development education for environmental protection, ecological conservation, and resources management; 2. educate the citizens to be aware of environmental problems, understanding and caring about the mutual relationships between resources and living quality, and taking actions to maintain ecological balance and environmental quality; 3. culture the citizens to be with environmental literacy and ethics, knowledge, attitudes, skills, and values of environmental conservation. Since its publication, most of the programs and activities, either directly orchestrated or indirectly funded by the Ministry have been following the core values and principles of the above-mentioned strategies to promote the environmental education in Taiwan.

In addition, "Education for Sustainability" is now among the subject matters selected by the 8 working groups reporting periodically to Taiwan's Premier for its progress, and the Ministry of Education (MOE) is the responsible agency to ensure that the "Action Plan" is properly executed, and to coordinate activities among other governmental departments in the regard. The 3 main objectives designated to examine such an endeavor are as following:

· Introduce and incorporate the concept of sustainable development into the school education and citizen's daily life
· Coordinating the resources of governmental agencies, private sectors, business, and schools to implement education for sustainable development
· International cooperation of education for sustainable development

Several national projects have since then been conducted, in terms of the curriculum plan and development, renovation of hardware and infrastructure of campuses, and vigorous interactions between schools and communities to truly illustrate how the spirit of exemplifying sustainability in educational environment and life. While many teaching modules and activities have been invented surrounding the theme of "sustainability", "Taiwan Sustainable Campus Program" is considered the one national project that may have fundamentally changed the way how the school's design, operation, and renovation has meant to the contents of education, especially as far as "education for sustainability" is concerned.

The Sustainable Campus Program in Taiwan

"Taiwan Sustainable Campus Program", calling for a physical renovation and utility operation of campuses to demonstrate the concept, and meet the requirement, of sustainable development, is now officially a component project in Taiwan Government's "Challenge 2008-National Development Plan". In essence, the Program had aimed to ensure that the future campus, regardless of the scales in size, should, at least, be one that:

· can be participated by all members of interest during the design, construction, and future operation
· has ecological concerns during the construction and operation afterwards
· can respond to the changing needs in future curriculum consisting a wide array of activities
· can serve as a community center for life-long learning, culture-preservation, and shelters during emergency

A in-depth and detailed proposal-review mechanism, executed by a Central Advisory Committee at MOE, including experts for architecture design, community development, energy and water conservation, and environmental education, was established to ensure the selected proposals could truly grasped the spirit of "sustainable campus" where discussion forums had been formed, natures of individual's campus had been reviewed, and a study module/program had been developed for every renovation item proposed, etc. During the past few years, the Program has successfully revitalized the interest of studying the land and life closest to our hearts in almost every corner of the country. People from within and outside of the campus, basically the adjacent community has come together to work directly on the land that is right underneath their feet, and to bind with the people that are their dearest neighbors whom may have been strangers before the program took place. More than 160 schools have been supported in the first phase of endeavor, and now the Program has further identified the goal to encourage joint project by collaborating with schools from nearby or other towns to create a sense of larger community in a rapidly globalized era. By the end of 2004, 93 schools, out of 564 applications, were successfully integrated, and resulted in 26 joint projects with different themes identified as their core values to establish a learning experience that has gone beyond their campus borders and enriched by the natural variations embedded between their individual schools.

Taiwan Green School Partnership Program

The Taiwan Green School Partnership Program is a system designed to assist Taiwan's schools to become Green Schools. Its focus is to provide Green School concepts, action plans, instructional materials, and government and private resources. After becoming a partner, the Green School center will present Leaves of Hope as encouragement and incentive to participate in related forums, exchange experiences and assist in developing the program.

The Green School emphasizes core development of ecological thought, humanistic concern and active learning in the following four areas.

1. Administration: Ideal Green School leaders have made environmental commitments and work toward planning departmental integration, environmental evaluation as well as implementing environmental improvement projects and encouraging spontaneous environmental actions.

2. Facilities:

As for special design, an ideal Green School's architecture and environmental management are in agreement with low pollution, ecology and education demands. Facilities are appropriately designed for local environmental conditions and provide opportunities for participation, planning and maintenance by both students and teachers.

3. Curriculum:

A Green School plans and designs its school's own environmental education instructional materials. EE planning emphasizes life, land and active education as well as encourages outdoor hands-on learning activities. Education on environmental issues is implemented by integrating many areas of study and exploring values.

4. School Life:

Teachers and students learn to appreciate and adopt lifestyles that are more in tune with nature, as well as foster responsible behavior to protect the environment. This includes energy conservation, pollution prevention, and efficient use of resources to benefit society, so as to create an atmosphere of mutual support for environmental conservation.

Conclusion

Education for sustainable development has become the important issue in Taiwan during the past several years. The MOE and EPA fully support the visions and principles of sustainable development education and also put it into effect on formal education settings, such as:
· Offering undergraduate courses on sustainable development.
· Developing teaching materials for SD at K-9 level.
· Conducting education for sustainable development in-service teaching training for elementary and secondary teachers.
· Networking with local NGOs on sustainable development issues.
· Establishing appropriate education demonstration facilities such as energy conservation, water conservation, wastewater treatment by man-made wetland, organic farming on rooftop, etc. for university students and community.
· Implementing and advising Green School system on campus environmental management, curriculum development, instruction development, and teacher's professional development.

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Think Globally Act Locally:
Environment Education Has Always Been Here

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ABSTRACT

EE is not new – it has always been here. The Japanese government has fully confirmed the importance to education's *'think globally and act locally'*, as a catalyst and driving force for human innovation and social transformation. It also maintains that the EE/ESD should include not only the teaching of a notion and a concrete image of what SD is, but the provision of norms of behavior in favor of the SD, and thereby urging people to transform their minds to acquire knowledge, skills, values, behavior and lifestyles in compliance with the SD. The evolution of the program EE – EPD – ESD is discussed in this paper, organized as follows: *I. The Historical Background; II. Major Constraints in EE Implementation; III. Agenda 21 Chapter 36 and EPD; IV. The UN Decade of Education for Sustainable Development: UNESCO's Role as a Lead Agency; V. The Current Thrusts for Environment Education.*

Key Words: Think Globally and Act Locally, Agenda 21 Chapter 36, catalyst and driving force for human innovation and social transformation, comprehensive and holistic environmental education, . building human capacities, equitable distribution of wealth, participation by the population in the process of decision-making, protection of environment, preservation of the cultural identity of the community, re-orienting the goal of education to Sustainable Development, UN Decade of Education for Sustainable Development

Historical Background

Environment and nature have always been a center of the life of people since the Stone Age where men and women have always lived symbiotically. Ancient religions have been based on nature – humans worshiped the sun, stars, trees, rivers, mountains, etc. Mountains and rivers were made sacred and reverenced as Gods, thus protected from human exploitation. It is significant that valuing natural phenomena also brought about respect to the environment. Without labeling it as environmental education, people have been made aware that it is important to respect and protect the environment.

It was in 1972, during the Stockholm Conference where major problems of the human environment. was discussed. It was recommended that UNESCO and other agencies establish an international interdisciplinary programme in environmental education, targeting all levels of education, in and out of school. In October 1975, in Belgrade, the International Environmental Education Programme (IEEP) led by both UNESCO and UNEP was launched. The Belgrade charter spelled out the framework and objectives of environmental education. IEEP was to impart knowledge concerning nature. Follow-up regional workshops were organized. Asia held a regional workshop in Bangkok in 1976.[1] 15 recommendations were proposed under four programme areas:

environment education, personnel training, non-formal environmental education, and the development of teaching-learning materials for environmental education. It was in 1977,[2] at the Tbilisi Conference when environmental education was truly recognized "as a learning process that increases people's knowledge and awareness about the environment and associated challenges, that develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible actions". The Conference focused on environmental education, introduction of legislation to protect the social and physical environment.

In 1980, Asian countries, during the regional follow-up in Bangkok made specific recommendations for implementing EE. IEEP immediately made a follow-up during 1981 and 1982, wherein a global survey was conducted to identify the needs and priorities of member states with regard to EE and training. Results of the survey indicated that almost all the countries need training in all education levels (primary to tertiary), in-school and out-of-school, especially in dealing with the curriculum, research and experimentation. Environmental training was also required in the following areas: conservation of resources, pollution, nutrition and health, urban and disaster management. Subsequently, IEEP sourcebooks were produced for formal and non-formal environment education, prototype modules for school education and teacher training guides for EE methodologies and multi-media packages among others. The materials were presented in the UNESCO-UNEP International Congress in 1987 – with 300 specialists from 100 countries with the participation of the World Conservation Union (IUCN), and other international organizations.

IEEP a global programme managed by both UNESCO and UNEP, accessed the information available (CONNECT as a publication – which up to this time is still being published by UNESCO Headquarters, Paris); undertook research and experimentation; developed educational programmes and teaching materials; trained education personnel; promoted technical and vocational education; educated and informed the public; supported general higher education; organized special training; and set-up international and regional co-operation programs. During that time, it was proposed to designate 1990-2000 as the "World Decade for Environmental Education," with emphasis on interrelationships between people and the biosphere in their full range of economic, social, political and ecological dimensions.

Major Constraints in EE Implementation

Environment Education has dealt with many problems and issues, focusing on the need for change, for sustainability, for awareness etc. using different modes of delivery. A whole range of organizations in the public, private and 'popular' sectors are involved, using different messages to target different audiences. Examples include - local and national governments, private sector, academia, NGOs, professional bodies, research, organizations, donor agencies, UN and international organizations, community and citizens groups, media etc. The target is usually the man-on-the-street, the ordinary citizen, but has also included policy and decision makers, business and industry etc. depending on the scale of EE.

There were major constraints met in the implementation of EE. These were the : (1) difficulty in including innovations in the school programme because of the rigid centralized bureaucracy and traditional teacher training curriculum; (2) complex interdisciplinary nature of EE and its integration in various subject disciplines and consequent changes in the teacher training programs which often

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[1] UNESCO Bangkok Publication, 1976.
[2] UNESCO, Tbilisi Declaration, 1978.

conflicted with traditional beliefs and approaches; (3) inadequate training of teachers especially in handling/integrating EE in their classroom transactions; (4) difficulty in undertaking field-based and participatory activities due to the traditional teacher-centered, and examination-based teaching and the lack of resource persons to conduct the teacher training; (5) lack of authentic updated materials/information regarding the environment and associated problems; (6) non-availability of tools to assess impact of training programmes; (7) lack of research in the field of EE methodologies and competencies; and (8) resistance to change on the part of the teacher. It was also a challenge to renovate the initial EE concepts which were concentrated on nature, overlooking the socio-cultural, economic and political dimensions of environmental protection.

Agenda 21, Chapter 36 and EPD

Environment, Population and Human Development (EPD) was adopted by over 170 countries during the 27th session of the UNESCO General Conference, 25 October to 16 November 1993, in Paris. It was singled out by the former Director General Federico Mayor as one of UNESCO's immediate priorities, taking into account the recommendations of UNCED (Agenda 21 Chapter 36) and ICPED (the first International Congress on Population Education and Development, Istanbul 1993). It was meant to focus on: (1) sustainable development taking into account the importance of human dignity in improving the quality of life and of the environment, while promoting a culture of peace, solidarity and international understanding; (2) the diversity of life and the balance between reasonable human activities and the need to preserve natural ecosystems; (3) a global and local perspective with regard to the impact of global environment and population change; (4) building human capacities, promoting people participation and cooperation among people and institutions; and (5) re-orienting and improving the quality of education and the means to disseminate knowledge on aspects of human sustainable development.

Three principles were made the basis for the implementation strategies of EPD: These were: (1) refinement of the knowledge-base and development of action frameworks; (2) development of new or re-oriented education training and information programmes and materials and strengthening of capacities of member states; and (3) mobilization of the support of decision-makers and opinion leaders at international, regional and national leaders in favor of project actions, with cooperation of major news agencies. The target audiences would involve those which would produce multiplier effects, in a wide range of environments and involving as many individuals and partners as possible. Many actions and pilot projects were undertaken in the region following the framework adopted, including support to "Model Building: Community Empowerment" Projects.

The UN Decade of Education for Sustainable Development:

UNESCO's Role as a Lead Agency

The World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa 2002 focused on ESD (Education for Sustainable Development). A declaration was adopted celebrating 2005-2014 as the Decade of ESD and UNESCO designated as the 'lead agency' for the celebration. ESD calls for a process to reorient educational policies, programs and practices so that education plays its part in building capacities of all members of society to work together to build a sustainable future. ESD came about from a broad understanding of development which includes: (1) equitable distribution of wealth; (2) participation by the population in the process of decision-making; (3) protection of environment; and (4) preservation of the cultural identity of the community. Later revision also added a global dimension, aimed at correcting the imbalance and inequality in the international distribution of the benefits of the global process, thus conceived as a process of societal

change, and it has become a normative, rather than a descriptive, concept which stipulates how things ought to be, not how they really are. With the shift of development models from 'all for economic growth' to 'equitable and sustainable people-centered development' in the late 20th century, the concept of development has considerably evolved and broadly redefined, which transcends economics to encompass its social, ethical, cultural and ecological dimensions as well.

The Japanese National Commission for UNESCO proposed the International Implementation Scheme on ESD in 2003 considering the diversity of developments in Asia and the Pacific.[3] The proposal approved during the 112th UN General Assembly on July 29, 2003, identified seven items applicable to Asia and the Pacific, based on the concept "Think Globally, Act Locally." These are: (1) implementing ESD in conjunction with the MDGs which include poverty eradication, promoting universal primary education, equality of gender, reducing infant mortality, improving reproductive health, preventing contagious diseases and realizing a sustainable society in harmony with the environment, for each nation to achieve by 2015; (2) developing various educational programs, which meet the needs of local conditions in developing countries; (3) making developed countries aware that ESD is their own issue to deal with; (4) valuing the bonds of local communities; (5) improving the quality of education based on ESD; (6) taking measures to improve the quality of teachers in view of the importance of teachers' roles in ESD; and (7) realizing ESD in partnerships with concerned organizations and individuals. These proposals have been categorized in three dimensions, (a) common understanding; (b) policy changes, and (c) curriculum rearrangement. The proposal stressed the critical role of teachers in ESD.

UNESCO as the lead agency, has responsibilities in re-orienting the goal of education to SD; improving the relevance and quality of education; providing professional and technical support to Member States; promoting system wise reform of education within the framework of EFA, UNLD and MDGs; and coordinating stakeholder activities and strengthening partnership at local, national, regional and international levels. UNESCO advocates a new vision of education as 'the primary agent of transformation towards sustainable development', increasing people's capacities to transform their visions for society into reality, and links the new vision with other international priorities.[4] Education could contribute to social cohesion and sustainable development in many ways. Education has been placed at the core of the value order, and values as the sustaining force in education. In serving the development needs of the people, both education and culture becomes a means to and an end of development[5]

The Current Thrusts for EE

Governments have accepted the notion that EE should be a part of all education that environmental problems are interdisciplinary, and direct experience in the natural world is an essential part of EE. The way education happens is as important as content learned.

Much of the current thrusts are for a comprehensive and holistic environmental education. This has been derived from Chapter 36 of Agenda 21 "promoting education, public awareness and training." Raising of public awareness and training are linked to virtually all environment issues and even more closely to meeting basic needs, capacity-building, data and information, science, and the role of partners. The Declaration and Recommendations of the Tbilisi Intergovernmental Conference on Environmental Education organized by UNESCO and UNEP in 1977 have provided the

[3] Paper of Prof. Shuichi Nakayama during the NIER Seminar on ESD, 2004.
[4] UNESCO's ESD Strategy, Paris, 2004
[5] Zhou Nanzhao, Paper presented at the NIER Workshop, 2003.

fundamental principles for what we call today as "Education for a Sustainable Development." As environment educators, we are faced with a major challenge in promoting a sustainable future.

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Acronyms: EE: Environmental Education, EPD: Environment Population and Human Development, ESD: Education for Sustainable Development, EFA: Education For All, IEEP:International Environment Education Programme, MDG: Millenium Development Goals, SD: Sustainable Development, UNLD: United Nations Literacy Decade, UNEP: United Nations Environment Program, UNESCO: United Nations Educational Scientific and Cultural Organization

EE/ES Research Trends in the United States

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If I had to summarize contemporary EE research mandates and foci within the U.S. in one word it would be "accountability." In the formal education arena (schools, universities, training programs), accountability is tied to standardized, high-stakes testing and productivity. In federal agencies, land-management agencies and organizations, not-for-profits, and all the free-choice learning settings (e.g. parks, zoos and aquariums, nature centers, museums – see Falk, 2005), accountability takes on a slightly different meaning. For agencies, accountability is the degree to which education directly contributes to the reduction in pollution or the increase in positive indicators of environmental health. For the educational organizations or NGOs, accountability is tied with education leading to continued or increased support for missions, implementation of desired outcome behaviors, or contributing to the mission of the organization beyond its borders. In all three views of accountability, research and evaluation studies are driven in a dramatically different direction than some of the basic research would dictate. Ultimately, we are seeing a major shift in EE from an internal view of contexts, risk, and reflection (i.e. from the perspective of what happens to the learner or individual in the process) to one of EE as a means of mediating change in others leading toward achieving the goals of the organization (O'Donoghue and Russo, 2004). What follows are descriptions of some of the many areas of current inquiry in the EE community of the U.S. and to a smaller degree, North America. These statements are not comprehensive nor do they reveal what current research is finding. These ideas are presented in the context of understanding the study of how our programs lead toward outcomes desired by dominant stakeholders – government, schools, communities, agencies, and NGOs – through studying what programs are, how they are constructed, how they work, how they affect the learner, how they affect society, and how they lead to change.

Formal Education

Within the formal education system, environmental education must demonstrate how it contributes to student growth and maturation and more importantly how it directly supports the goals and test scores of the educational system. To this end, much of the current research in formal education ties environmental education programs generally to science education standards and outcomes. Although environmental science does draw together the different science branches, it does not necessarily focus on the critical thinking, humanities, and arts components also important to EE (Taskin, 2003). The danger of seeing this as EE is that it limits EE's purpose to meeting science goals to justify its existence in formal school systems (Levermann, 1992). Gruenewald (2004) cautions that institutionalizing EE within the general education system works against the field's own socially and ecologically transformative goals. Many aspects of formal EE studies in the U.S. are providing important insights into learning, teaching and the exchange. Following are some of the broad areas that might not be as easily recognized in traditional classroom-based research.

- Action Research. Action research places EE in the context of education and social change (Stapp, 1996). Although not for all teachers (Menter, 1996), action research can provide a framework for environmental education's goals in schools (Lewis, 2004; Mordock and Krasny,

2001). Research on action research is increasingly being conducted in EE to explore deeper connections of individuals to their learning, communities, and other school subjects.

• Cultural Relevance. EE can reveal, sustain, and celebrate the varied cultural traditions and connections of learners to their environment (Grass, 1994). Some researchers are interested in understanding how environmental problems or issues are tied to the cultures from which they emanate (Marouli, 2002; Saul, 2000). Others are looking for factors that influence racial diversity in the field (e.g. James, 1996; Hilton, 1999; Rivers, 2003) and in those engaged in EE programming (Armstrong, 1997; Hilton, 2003; Jacobs and Reyhner, 2002; Lewis and James, 1995). An entire area of study related to ecofeminism emerged in the 1970s and remains an important contributor to understanding learning about the environment as it provides a framework for studying the intersect between human and environmental factors (Henderson, 1997).

• Experiential Education. A strong intersect exists between the practice of environmental education and the field of experiential education (Luckmann, 1996). Experiential education allows us to teach environmental education within specific contexts related to the learners (Smith and McGinnes, 1995) to help them understand complex environmental issues and increase impacts on pro-environmental behavior (Ewart, 1996). Adults as well as youth prefer experience and task centered learning (Wright, 2000) which is a goal of experiential – as well as environmental – education. Regardless of age, learning has an active side that changes the objective conditions for the experience creating learning as a transaction between the individual and their environment (Kraft and Kielsmier, 1995).

• Place-based education. One consistent desire in environmental education is to provide meaningful, contextual experiences in both natural and constructed environments so learners become both academic achievers and good citizens (Leo-Nyquist and Theobald, 1997; Loveland, 2003; Woodhouse and Knapp, 2000). How it is possible to use the local environment as a forum for fieldwork, research, service projects, and entrepreneurial enterprises is an important aspect of place-based education research (Null, 2001). Place-based education (or sense of place education) uses natural and cultural history (Orion Society, 1999) to help generate emotional connectedness in the learners (Sobel, 1997).

• An important movement in research and educational institutions is the "greening campus" effort led by organizations such as Second Nature. David Orr and others (e.g. Berheim, 2003; Browning, 2003; Carroll, 1999) examine how to better educate students in sustainability through making the systems in which they study sustainable. Green buildings, purchasing, cleaning, and campus programs are all part of the applied research focus.

Non-formal/informal

The vast majority of an individual's life is spent not in school, university, or formal training (Heimlich, 2005) and, as humans are by nature a learning being (Bloom, 1976), one of the growing areas of study in EE in the U.S. is that of the free-choice or informal/nonformal) learning.

• Free-choice learning. Most of what a person learns throughout life is self-motivated and guided by the needs and interests of the learner. People engage in free-choice learning through the use of museums, libraries, parks, television, newspapers and books, when conversing with friends and family, and increasingly, through the Internet. (Falk and Dierking, 2002) This important type of learning is undervalued and poorly understood, especially in terms of EE (Falk, 2005). The basic human drive to know and understand that which is around them is a factor in free-choice

environmental learning (Meyers, 2005) and by far the majority of what a person believes, knows, or thinks about the environment is shaped by free-choice rather than formal learning (Heimlich, 2005).

• Adult Environmental Learning. In many cases, there is a disconnect between what we claim environmental education to be and what many adults understand as 1) "education" and 2) environmental education versus nature study or environmentalism. The perceptual dilemma for some was generated by the dominant approach to learning as defined by formal educational systems (Sears and Kessen, 1964). On the other side of the teaching/learning exchange, Mathews (2002) suggests that incidental and even informal learning is not of interest to many educational professionals who are more interested in examining instruction-learning process including selection, arrangement, and delivery of information in an appropriate setting and the way the learner interacts with the environment. The vast majority of adult publics perceive environmental education as a body of knowledge and absolutes based on their prior experiences as preadults (Heimlich, 2005) so adult EE has a primary focus on improving quality of life – whether through use of environment for literacy, empowerment, transformative learning, or application to daily life and sustainable living (Daudi, 2000; Hautecoeur, 2002). Joyce and Weil (1980) suggest learning should be structured to aid individuals in achieving a fully functioning state where the ideal and the real selves meet – the learner's capacity to deal constructively with life is respected and developed. Adult education can address both the natural and the human-caused issues of the environment as a learning priority with the "complexity of environment becoming the text to be continually reread and interpreted, constantly helping people to build and rebuild themselves (Orefice, 2002).

• Citizen-science. One of the growing movements, and therefore areas of inquiry in terms of efficacy, is that of citizen science. In the classroom, citizen science is often teachers conducting their own research and then using the data to improve their classroom performance (Shepardson et al. 2003). More generally, citizen science is the continuous, integrated, and sequential programming of engaging individuals in gathering meaningful data used for scientific inquiry and relies on its accountability (and the focus of much of the research) in the development of the data gathering rigor (Vacoob, Brantly and Whiteford, 1996)

• Community-based Education. As much of non-school learning is based on what people need to live their lives, there is a significant transformative purpose in community-based educational programs (Clover et al, 2000; Boyer and Michael-Roth, 2005). Community-based education occurs in a variety of settings with a wide variety of foci (Bruening, 1994). One of the most exciting aspects of true community-based EE is that is it intergenerational (Gallagher and Hogan, 2000) and leads us to needing to create and study models of what works, where, why, and how. In the political system of the U.S., participatory citizenship is important, and environmental responsibility is a part of citizenship that often must be taught (Peters, 1993). Ultimately, community-based education grows from the needs of those in the community (often driven by health, safety, and family concerns) and is therefore instantly relevant and meaningful (Enos, 1999).

Environmental education research in the U.S. and indeed in North America is not a neat, tightly related body of study. My simple attempt to illustrate the breadth of EE related to themes of educational research is, I hope, a means by which to reveal the tremendous variety of topics, efforts, and intents in the research community. Every element of the examples above can be, and in many cases is being, examined from an array of perspectives using a large arsenal of research tools and strategies. There is no paradigm of research dominating in the U.S. today. Rather, the need to

know the efficacy of that which we do, the cultural and social constructs in which these educational programs occur, and the real and deep impacts of our programs on the lives of people drive the research that we do. And we continually discover that where we are grows out of where we came from – but that change is possible.

As long as we are held accountable.

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Environmental Education in Japan: The Role of The Japanese Society of Environmental Education in Linking Theories and Practices

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ABSTRACT

This study examines the trend of environmental education in Japan that has lead to the Environmental Education Promotion Act of 2003. Then, the problems resulting from the theories and practices of environmental education in Japan are clarified. Also examined is the directionality which the Japanese Society of Environmental Education promotes Environmental Education and Education for Sustainable Development, and the frame that ties to both theory and practice.

Key words: Environmental Education Promotion Act, education and study model, promotion indicator, collaboration & cooperation, diversity, approach

New Beginning of Environmental Education in Japan

Environmental education in Japan, which has started from educating people about pollution, has changed greatly with the content and the method in both school education and social education which reflects an international trend. It is possible to consider five terms in searching for the trend of environmental education in Japan.

From the 1950's to the beginning of the 1970's
Nature conservation activity and the protection movement were carried out by the local populace in various places in the 1950's, and the realities of industrial pollution and the destruction of nature were clarified. The Environment Agency was set up, and the Nationwide Elementary and Junior High School Society of Anti-pollution Measures started. Pollution education and nature education were individually done in each region.

From the latter half of the 1970's to the first half of the 1980's
International approaches proposed in conferences such as the International Workshop on Environmental Education in 1975 and the Tbilisi Intergovernmental Conference on Environmental Education in 1977 were hardly shared in Japan, and they came to be paid attention in Japan only after 1990. In 1975 the Nationwide Elementary and Junior High School Society of Anti-pollution Measures changed its name to the Nationwide Elementary and Junior High School Society of Environmental Education. The environmental education society started at the university level in 1977. This was a time when pollution education, nature education, and environmental education began to cooperate, and the concept of education extended from pollution to environment.

From the latter half of the 1980's to the first half of the 1990's
This was a time when global environmental concerns came to the front. The Environmental

Education Panel, 'Better environment built by all.' was set up by the Environment Agency in 1988, and the idea of a partnership was shown. Environment Basic Law was promulgated and enforced in November, 1993, and "Environment and study concerning protection of the environment" was provided for by Article 25. On the other hand, the Japanese Society of Environmental Education was set up in 1990, and it was the basic organization of the cooperation of teachers, NGO members and researchers. The Ministry of Education issued 'Guidance Material for Environmental Education (for junior high school and high school)' in 1991. (The elementary school version was issued in 1992.) It proposed the target of environmental education and the concrete ability and the attitude to want to raise the standards of environmental education. It also showed the concept of environmental education as a cross curricular theme and a sprout element of the concept of sustainability. In addition, based on the "Surveillance study on the enhancement of environmental education to the child" (1991-93), "Junior Eco Club" began in 1995 where both children and adults learn about the environment in their region, and now about 80,000 children are participating in this activity.

From the latter half of the 1990's to 2000

The Central Environment Council proposed "Future environmental education and environmental studies: toward a sustainable society" in December 1999 and "Basic Environment Plan – Guidepost for the Environmental Century" in 2000, which identified environmental education as one of the 11 strategic environmental policies and made clear the direction "toward a sustainable society."

In the education administration, themes of environmental education, information education, international understanding education, and health and the welfare education, etc. became new educational themes for the "Period for integrated study" to be founded by the 15th stage Central Education Council first report (1996). It has been executed since April, 2002. Each school is developing the approach of various classes with the best use of "trait of the region and the school."

After 2001

In the century of the environment, The Environmental Education Promotion Law was enacted in July, 2003, and the basic policy was enacted in five related ministries. This is a new beginning of an event to promote environmental education of Japan. The cooperation and the partnership of various subjects are beginning in the context of the concept of sustainability. A new phase into which environmental preservation activity and environmental education are integrated is faced where the citizens begin to have a sense of values and ethics that integrate nature recognition, science recognition, and social recognition as a global citizen, and voluntarily behave responsibly and revolutionize their lifestyle, and independently participate in the creation of a sustainable society. And now the question of how the quality of environmental education can be improved is asked.

Ideas and the problem of environmental education in Japan

Human should solve the problems in the society and the region that those humans made. Educating people who can construct and maintain a sustainable social economic system is the ultimate purpose of environmental education. We have to concentrate wisdom to educate citizens who not only are able to "preserve" the environment but also to "independently participate in activities which create a better environment, and have a responsible attitude and behavior towards the environment."

The following objectives are set in The School Guideline Material: "To foster the attitude by which awareness and knowledge on the environment and environmental problems are maintained, based on a comprehensive understanding and recognition of the relationship between human activities and the environment, while at the same time acquiring the skills, thinking ability and judgment which will help to facilitate individuals to adopt desirable approaches taking environmental conservation into consideration, and to make proactive participation in creative activities to improve

the environment, and take responsible actions on behalf of the environment." Though the Guideline was formulated in 1991, the objectives are still valid today, and it is necessary to make the best use of them for the integration of theory and practice. The following are the principles of promotion of environmental education based on the principle of the Tbilisi declaration (Ministry of the Environment).

1) Since environmental problems are closely related to a diverse range of areas, a comprehensive viewpoint, which enables issues to be considered from a mutually linked and multilateral perspective, is indispensable.

2) It is necessary to do environmental education with the cooperation of all generations in various places.

3) Clarify a concrete target to act, and do not make the activity the self-target.

4) Do not be satisfied with only understanding the current state and the cause of environmental problems as knowledge:tie them to the actual actions.

5) Since learners need to develop the abilities of the problem discovery, the analysis, and the information gathering and use, the process should include the learner's experience, feeling, and understanding.

6) Dig up and use resources of various materials, talents, and networks in daily life in the region. It is necessary to make use of the traditional culture, the history, and predecessors' wisdom in the region in environmental education.

The following contents should be covered systematically and sequentially (Environmental Agency).

1) Mechanisms of nature (natural ecosystems, natural resources and their management)

2) The impact of human activities on the environment (alteration of natural mechanisms by human beings)

3) Relation between human beings and the environment (roles, responsibilities and culture of human beings in relation to the environment)

4) Culture and history of the relation between human beings and the environment

On the other hand, there is no absolute correct solution in the discussion about the ideal society. The way of environmental education is the process that everyone thinks of as sustainable society and it is important to discuss the ways to achieve it. The content that environmental education handles should spread to an extremely wide field including not only nature but also the society and economy, etc.

Learners need to look at environmental problems and the related phenomena scientifically, objectively, and fairly. These include not just an appreciation of the immediate benefits conferred by the ecosystem but also the capacity to see fully the spiritual, material, and academic benefits and to value these endowments. It is necessary to bring up receptivity to the environment for children and adults who begin to sympathize with the variety and beauty of the environment around them, and to know humans live as one of the living things in the mechanism of nature. It is also an important aspect of environmental education and environmental learning to foster a rich sensibility and to establish a foundation for the imagination and creativity through the experience of interacting with a rich natural environment.

Environmental education, study model and guideline of environmental education promotion

To put it simply, environmental education is a form of learning that endeavors to find out "how to live". That is to say, learning how to integrate "learning" and "living" is environmental education. In practical terms, this is achieved by establishing daily goals in life and dealing with real problems in the community, considering the measures needed to resolve those problems, and by learning proactively from the "relations" and "linkages." It is "learning for the future" by creating sustainable society.

Environmental education has been done by <problem → teaching approach> in pollution education and <observation → giving lessons approach> in nature conservation education (Kazuhiro Nitta). Now it is expected to become an educational approach which values the process and the thinking process where the learners find some problem from their familiar region, struggle with the

problem, and find the strategy for the solution. Therefore it is necessary to develop a program which encourages learner's "awareness": leads to the next step "examine" (motivation and judgment skill); leads to "search" and "think" (thinking skill) about the background of the event and the structure of the problem, devise an alternative plan for the solution and derive the answer by themselves (critical thinking and problem-solving skill); leads to activities that cooperate mutually and consider the meaning of the partnership between various subjects and practice some activities (Learner's sense of values and attitude face social participation.)

Learners begin with questions of "Why?" and "For what?" and use the "findings (find)" as a springboard to the next steps of "Deepen understanding (research)" and "thinking and judgment (think)" and continue to "practicing and participation (change and shift)." The process with feedback moves spirally. That is called 'action research' by Roger Hart (Roger A. Hart). Learners can develop their problem-solving skill by experience-based education with activities such as research, questioning, think deeply, talk, bring ideas, create, explain, or take action.

A holistic approach (John P. Miller) and reflective thinking (John Fien) is lacking in the study model of the environmental education in Japan. In the approach, "the learners seem like they are talking with the study problem mutually and they construct their constant perception in the process of learning." Since the problem of the environment is in the interdependence relation among the environment, economy, and society, it is necessary to think about it with an interdisciplinary approach and find out alternative solutions.

In concrete terms, it will be necessary to adopt the following approaches for education for sustainable development: 1) interdisciplinary approaches, 2) systems thinking, 3) participation-type approaches that place emphasis on active involvement and practicality, 4) problem-solving-type approaches that place emphasis on a critical and multilateral approach, 5) approaches based on the perspectives of multicultural symbiosis, 6) integrated approaches that emphasize "involvement" and "association" (holistic approaches), 7) approaches based on linkages and collaboration among diverse social sectors.

Environmental problems have arisen from the multiple impacts inflicted on the environment by interrelated complex factors that are diverse in nature. Environmental problems are closely related to culture, history, dwellings, and furthermore, to politics, economics and spiritual aspects of human beings. Accordingly, learning venues should not be limited only to school programs with nature observation or research activities about community resources. Learning activities with the aspect of lifelong education which children can participate in and change their surrounding environment together with community members. Also topics in environmental education such as water, air, ecosystem, soil, food, energy, etc. should be "tied up" by the aspect of protecting "life."

As Mr. Roger Hart says, "The best way to social development is to foster citizens who are aware and understand environmental management, and participate in creating democratic community." environmental literacy as citizen's wisdom is fostered by both children and adults participating and learning in the process of cooperation.

The Japanese Society of Environmental Education has to develop cooperation of various sectors as a change agent, and has to take a role to set structure and guidelines for developing environmental education and education for sustainable development.

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Education for Sustainable Development through Environmental Education in Primary and Secondary Schools in Korea

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ABSTRACT

Environmental education in Korea started in early 1980's and is carried out mostly in two forms, formal environmental education and informal/non-formal environmental education. The importance of environmental education in these two areas has been emphasized starting in the late 1990's, and accordingly, the amount of it has largely increased. In this presentation, an overview of environmental education in primary and secondary schools in Korea is overviewed, which was followed by 4 quality cases of education for sustainable development through environmental education. Based on these introduction and exploration, issues were discussed in relation with implementation of environmental education and education for sustainable development in schools in Korea and the Asia-Pacific region.

Key Words: Environmental Education, Education for Sustainable Development,
Primary and Secondary Schools, Quality Cases.

Introduction

Environmental education in Korea started in early 1980's when environmental pollution arose as a result of rapid economic development and the awareness and demand for high quality of living and environment increased. Korean environmental education is carried out mostly in two forms, as in other countries: formal environmental education and informal/non-formal environmental education. The importance of environmental education in these two areas has been emphasized starting in the late 1990's, and accordingly, the amount of it has largely increased.

In schools, environmental curriculum focuses on enabling students to behave at home and in the society based on environmental knowledge that they have newly acquired. The course on environment is taught in middle and high schools as one of the formal curriculums, and various environmental education programs are provided through extracurricular activities and discretional activities. In social level, NGOs, Local Agenda21, public agencies, local governments, and national government conduct different environmental education programs, for youth and various adult groups such as homemakers, military personnel, and environment guards, which has been established as one of the major areas of social education.

However, with a recent emphasis on education for sustainable development worldwide, and the start of UN Decade of Education for Sustainable Development (UNESCO, 2005), we need changes in the qualitative aspects of environmental education. In this presentation, I would like to give you an overview of environmental education in primary and secondary schools in Korea, and then to explore some quality cases of education for sustainable development through environmental education, which is in an attempt for providing implications for environmental education and/or education for sustainable development in Korea and the Asia-Pacific region.

Environmental Education in Elementary and Secondary Schools

Development of Environmental Education in Korean Schools

Educational activities in schools can be divided between curricular activities including subject-based education, extracurricular activities and discretional activities, and other educational activities. In Korea, textbook development and school education is done based on the national curriculum, and thus, environmental education in elementary and secondary schools are closely related to the curriculum. In other words, if it is not mentioned or emphasized in the curriculum in any way, it would be difficult for environmental education to be conducted in schools.

Environmental education was first mentioned in the guideline of the introduction in the 4th national curriculum, which stipulated that "In every aspect of school education, sufficient care shall be taken on health and hygiene, health promotion, enhancement of physical strength and safety, and education on nature preservation, environmental pollution and population is to be effectively taken.". In the guideline provided with the introduction of the 5th national curriculum, environmental education was further emphasized as compared with the simple reference made in the 4th curriculum, in the statement, "National moral education, unification and defense education, economic education, safety education, environmental education, career education, population education, and sex education should be conducted throughout all aspects of curriculum, and special emphasis should be made in relevant courses." (Nam, 1995). As a result, contents on environmental pollution or environmental education came to be included in various courses.

During the enactment of the 6th national curriculum, environmental education became institutionalized in the school educational system, providing a significant turning point in the history of EE in Korea. In elementary schools, "discretional time" similar to the integrated period of learning in Japan was introduced, enabling environmental education to be conducted in subject-based activities, extracurricular activities and discretional time. In the 7th national curriculum, these courses have all been retained, and the course in environmental science in high schools has been renamed to "Ecology and Environment."

Status of Environmental Education in School Curriculum

As of January of 2006, with school education being conducted under the 7th national curriculum, environmental education in elementary school is conducted in relation to subjects such as 'Wise Life,' 'Ethics,' 'Social Studies,' and 'Science,' as well as during discretional activities (1st ~ 6th grades: 60-68 hours per year for each grade). In addition, in kindergarten, integrated education is carried out in five areas such as language, health, expression, inquiry, and social life, and EE is done with the focus on actual practice in four of these fields excluding language.

In middle schools, environmental education is conducted in various courses, including the independent subject of 'Environment'. As explained above, in middle schools, 'Environment' was introduced as an independent selective subject in 1995, when the 6th national curriculum was launched, and school principals are free to select the subject, within the class extent of 34 to 102 hours annually. As of the end of October 2004, 368 (12.9%) out of all 2,858 middle schools around the country selected 'Environment' among their subjects (Table 1).

Environmental education in high schools is also carried out in various courses, including the independent subject of "Ecology and Environment." The first independent course in this field was introduced in 1996 under "Ecological Science," as provided in the 6th national curriculum, leaving it to the discretion of principals to choose it among subjects. Under the 7th national curriculum which has been implemented since 2002[1], selective subjects in high schools were divided into general selective subjects and advanced selective subjects. "Ecology and Environment," which was renamed from 'Ecological Science' is included among general selective subjects that can be primarily

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[1] The 7th national curriculum started in 2001 for middle schools, and in 2002 for high schools.

Table 1. Number of Schools which Selected 'Environment' Subjects

	Middle School		High School	
	2003	2004	2003	2004
Seoul	15	14	24	43
Busan	158	128	10	16
Daegu	27	25	24	29
Incheon	4	8 ·	25	21
Kwangju	6	8	15	15
Daejon	14	9	22	25
Ulsan	3	2	12	16
Kyonggi	53	29	312	159
Kangwon	6	7	17	17
Chungbuk	76	67	28	28
Chungnam	13	8	38	39
Chonbuk	7	8	42	53
Chonnam	18	23	35	34
Kyeongbuk	10	10	32	36
Kyeongnam	18	17	27	25
Total	433	368**	672	565***

* Source: Ministry of Environment, 2005
** Total N= 2858, Ratio = 368/2858(12.9%)
*** Total N= 2071, Ratio = 565/2071(27.3%)

selected. broadening the subject's opportunity to be chosen. Among 2,071 high schools in the country, 565 (27.3%) were taking "Ecology and Environment" as one of their subjects, as of the end of October 2004.

The Ministry of Education and Human Resources Development authorizes the middle school textbooks on "Environment." The city and provincial offices of education approve the high school textbooks for "Ecology and Environment." Starting in 2001 school year, among four kinds of textbooks submitted for middle school textbook on environment. three textbooks that received the authorization of the Ministry of Education and HRD are being used (Choi, 2001).

In addition to the independent subject of environment. environment-related topics are being taught in other subjects including natural science, social science, ethics, and technology and home economics. In the natural science curriculum, the focus is put on the causes and countermeasures on environmental pollution, and in social science, the emphasis is given on the investigation of causes and solutions for environmental problem as a social problem. Also in subjects such as music and art, numerous educational activities are using environment as a topic. In addition, concerning extracurricular programs, various experiential activities related to the environment are carried out. in environment investigation clubs, bird watching clubs, native flowers cultivating clubs, and field trip clubs.

Education for Sustainable Development in Schools

As seen in the above, there are opportunities for getting environmental education in Korean elementary and secondary schools. However, environmental education in these schools remains at the level of ecological sensitivity or understanding of environment, rather than being expanded to sustainable development or sustainability. This fact has been reported in the recent study made by Lee *et al.* (2005a). In the process of developing national strategy for education for sustainable development for Korea, they conducted research on the education for sustainable development practices in Korean schools, and the teachers' awareness of sustainable development and education

for sustainable development. As a result, they found that teachers are not well aware of sustainable development and/or education for sustainable development in school educational system. For example, education for sustainable development in schools can be carried out through subject-based activities, extracurricular activities, discretional activities, etc.; and topics related to sustainable development such as human rights, peace, unification and environment are being suggested and taught as pan-curricular areas. However, teachings in these areas only focused on understanding and broader recognition of each issue and its background knowledge, and there is no emphasis on its linkage to the sustainable development of society and community, or the characteristics of education for sustainable development such as group efforts, holistic approach, critical thinking and problem solving.

Such a phenomenon is closely related to the awareness on sustainable development or education for sustainable development of teachers who conduct the education. In their research on teachers' awareness, Lee *et al.* (2005b) found that 68.2% (426) among 625 teachers surveyed had not heard the term 'sustainable development', and 21.1% defined it as "sustained economic development and increase of income," identifying sustainable development with economic development. Also, 40% of the teachers responded that they had experienced teaching topics related to sustainable development or sustainability including natural resources, gender equity, health, human rights, and climate changes, without proper knowledge of sustainable development or education for sustainable development. 64.2% of them answered that they dealt with them during regular classes. As the biggest obstacle to education for sustainable development, teachers pointed to lack of profession (50.5%), and suggested necessity of teacher training (30.2%), inclusion of sustainable development and education for sustainable development topics in the curriculum (29.2%), and the necessity of development and distribution of educational materials (25.5%).

Apart from the regular curriculum, education for sustainable development can be conducted by the efforts of the school as a whole, through a whole-school project, decision making in school or environmental management. For example, the environmental conservation model school initiatives being carried out since 1985 under the support of the Ministry of Environment, the school forest movement, UNESCO Associated Schools Project schools, and alternative schools present significant possibility for ESD because they aim at sustainable development of the schools, through the active participation of those who belong to the schools, quality learning and teaching, holistic approach, partnership with local community, etc. Therefore, it is necessary to discover quality cases among these examples and promote and spread them widely.

Quality Cases: ESD through EE

The following provides a few quality examples of how environmental education is being implemented in Korea as well as how they help in linking with ESD and contribute to the enhancement of sustainability or sustainable development of the school itself or the local community.

Dreaming a Sustainable School

Ms Lee, a teacher teaching "Ecology and Environment" in Kwonseon High School in Suwon, started a team project to examine the problems of the school and how to improve them in 2004. The goal of that project was to enhance students' decision-making ability related to environment. The project was conducted by first examining what environmental problems the school has, establishing goals for making the school eco-friendly, making a list of what can be done, and dreaming of what it will be like after the goals are realized and sharing with one another. Students' dreaming included constructing an ecological pond where a number of different creatures live, efficient usage of space, recycling program, a wider and more comfortable school store, school bag sharing project, and rest room project, and they enjoyed the process of carrying out the project and sharing of results. In this project, what the students' dreamed were not realized, but they actually came to be more

interested in school environment and its quality, which could enhance their skills for issue investigation and competency for decision making.

Investigating the Local Mountain Area

Students at Kwanyang High School in Anyang were instructed to investigate Mt. Gwanak nearby in the class of their teacher Ms. Seo. Five to six students made up one team, and each team selected one theme for investigation and examination of it using various methods. Themes and activities included investigation of trees in detail, survey of people's purposes of coming to the mountain, research on the quality of water from the mineral water spring in Mt. Gwanak, survey of participant reaction after conducting environmental education program on the mountain climbers, and investigation of wild flowers. During investigation activities, students were given assignments including development of investigation plans, taking photographs of activity results and presentation of them, and preparation of reports, and they had time of presenting them in front of others. As a result of the investigation, the students' issue investigation and problem solving skills were enhanced, and after those activities, they have visited and took walks around Mt. Gwanak area more often than they had done before.

Eco-Craft Program in Suwon Agricultural High School in Suwon

The Agricultural Life Science High School in Suwon is a technical school focusing on the cultivation of farm products and agriculture, in comparison to general high schools in which the goal is university entrance. Ms. Hwang, a teacher in this school, conducts eco-craft program with the students. First, they grow various herbs that become ingredients of cosmetics or bath products. Then they use them to make cosmetics or bath products such as skin lotion, lotion, soap, shampoo, and spa ball. Or they use the plants they cultivated as natural dyes for clothes and handkerchiefs. Through these interesting experiences, students gained deep understanding of the plant growing process and usage, while also enhancing their awareness of the environmental problems and their potential roles for solving these problems. In addition, these experiences help them in getting jobs or putting up their own businesses after graduation.

Whole-School Approaches through the School forest Movement: Learning Community in Incheon Kuwolseo Elementary School

Schoolforest movement in Korea started in 1991 with support for 10 model schools by Forest for Life, and now there are as many as 300 schoolforest model schools nationwide, with the Ministry of Education and Human Resources Development and local municipalities including Seoul City and Gyeonggi Province maintaining similar programs. The Guwolseo Elementary School in Incheon provides a quality example of students, teachers, local residents, environmental organizations, and research institutes cooperating to grow forest at the school and improve curriculum to become eco-friendly.

In this school, Mr. Oh, a teacher, formed a learning community immediately after deciding to grow a schoolforest, taking the principal, head teacher and other teachers to arboretums and to see good examples and learn about trees and forests. After that, students, teachers and local residents have been actively participating to enrich regular classes and discretional activities with topics related to improved environmental resources. In the newly formed forest, there are 109 different species of plants as of 2005, and birds are frequently seen.

Also, various activities including vegetable cultivation and black-faced spoonbill watching are carried out under partnerships with companies such as Pulmuwon and environmental organization including the Korean Federation for Environmental Movement. There are numerous activities going on under the themes of forest, grass, swamp, and vegetable field which include watching of pond creatures, sharing of fruits and vegetables, growing and harvesting of grains such as rice and indian mille. Through these activities being conducted closely linked to school curriculum, school children

living in a big city are discovering how much fun and exciting it is to live along with nature.

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Science-Centered And Fieldwork-Based Integrated Learning With Local Actions And Global Perspectives

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ABSTRACT

Masakazu GOTO who was a former science teacher and has been working as a researcher at NIER, developed the innovative curricula to show how interesting science learning was. He explains his practical experience as a science teacher and as a researcher of local nature and science education. He developed the innovative curricula (Goto, 1997a), the teaching materials (Kasai & Goto, 1988; 1998a; 1998b), the new assessment method (Masuda & Goto, 2002), and the educational system. The curricula were the student-centered, inquiry-based, fieldwork-based, integrated, collaborative and cooperative, and school-based. Science instruction is based on his idea to act locally and think globally. Therefore they think highly of real experiences including many fieldworks and hands-on activities. They were based on Earth Systems Education (Mayer, 1988) and Global Science Literacy (Mayer, 2002). He developed them into integrated learning by unifying the other subjects (Japanese, social studied, fine art and English, etc.) and established the network among the subjects and the partnership between school and local community. He worked as a teacher, a coordinator between school and museum, a facilitator to support student's study, a researcher of local nature, an instructor for the museum, and a volunteer for local society. His curricula were awarded the best science education prize of Toray corp.. (Goto, 1997a)

Key words: Integrated Learning, Integrated Curricula, Fieldwork, Earth Systems Education, Global Science Literacy

Introduction

The educational reform is happening all over the world. In the age of decentralization and information, teachers are requested to organize their own curricula dynamically considering their locality and globalization. Global Science Literacy (GSL) as a curriculum construct, seeks to broaden students understanding of the nature of science and include the objectives (fostering global views and understanding of different cultures, etc.) of the Global Education in the social study. It is based on Earth Systems Education (ESE). Its basic philosophy is based on the systems view and thinking. It is that science is the process that we as humans use to understand the world we live in and its environment in space (Mayer & Fortner, 1995). Therefore all science instruction should start with some aspect of the Earth systems (biosphere, solid earth, atmosphere and hydrosphere) which are local natural environments, and expand to the solar system, or the universe. As we live on Earth, the central and important subject for science teaching should be the Earth, particularly our familiar natural environments. Science teachers should teach science through not textbooks but real experiences. They should also teach science through the integrated ways and holistic approaches as much as possible in addition of the disciplined ways. It is the best way that children learn science in the life-related contexts (real experiences) because their learning is not based on disciplined but

integrated. Wherever possible we should start with fieldwork in familiar environments and expand our study from local natural environments to such wider areas as regional environments, national environments, global environments and at last, the universe. GSL & ESE focus on the science knowledge that will enable the world's citizens to understand the need for global efforts at environmentally sustainable economic and social development. It can also contribute to the Education for Sustainable Development (ESD) (UNESCO, 2004). Outdoor education and fieldwork provide an important basis for learning about the Earth Systems. Since the Earth systems must be the focus of science education for a sustainable future, outdoor education (fieldwork) must be a focus of science education efforts, not just something extra to be added-on to school curricula if convenient. It integrates children's learning because of its character. Therefore the fieldwork program will be central to efforts to accomplish the goals of the science education of the future and be necessary for the integrated learning in the age of decentralization of education in the 21st century.

General Description of the Integrated Curricula

As a science teacher in Minami-shitaura lower secondary school, one of the lower secondary schools of Miura City, Masakazu GOTO developed the curricula (Goto, 1997a) for the seventh and ninth grades of his school which addressed integrated learning centered on fieldwork (outdoor learning). Because his students' fieldwork was in their local area it provided practical integrated learning closely related to their daily lives. The collaborative study among students in fieldwork not only teaches them how to cooperate in scientific research but also facilitates their communication abilities.

Each student did five field related projects, each with a different purpose. The content of each project was organized to help the student to understand the local environment and to acquire the knowledge and skills needed to conduct the fieldwork through a range from introductory level to advanced level. In the last field project each student developed a proposal for his or her own fieldwork which was subject to my advice and approval. The students then conducted their study on their own time, after school and on weekends. Therefore they had ample time to complete their research. In their research they were often required to know content from subjects other than science. In this way their interests were broadened from science to other subjects. As their teacher, then, he organized the science-centered integrated curriculum (Fig.1) to include content from other subjects.

Relationships with Other Subjects

Japanese (Language): Students learned from an essay about the wild birds in Japan during their Japanese class. In cooperation with the Japanese teacher, science teachers took their students to observe and investigate the birds in their local place near the school. A local expert on bird-watching was invited as an instructor. They appreciated bird-watching guided by him much more after knowing about the birds through reading the essay in the Japanese lesson.

Homemaking: Students investigated flora and fauna in the fieldwork of the science lesson. After that, with assistance of the homemaking teachers, they cooked and ate some of the plants and animals such as fried vegetables with cone flour, grilled horsetail with sweet soy sauce flavor, dandelion coffee and fried fish and beetles. That experience made students familiar with the local environment.

English: Students wanted to make use of English and communicate with each other through English. The fieldwork was a nice opportunity for them to use English by interacting with real materials (flora and fauna) and each other in the outdoors. They enjoyed using English in their science lessons and became proud of their communication abilities in English. Even the students who didn't like the regular English lessons showed their interest in English communication by identifying their findings in nature. English teachers developed some English textbooks like Encyclopedia on the Miura Peninsula and Flora and Fauna on the Muira Peninsula in cooperation with science teachers. Science and English teacher-teams made the study of science and English interesting through experiments

and fieldwork conducted in English. The eighth grade students also made paintings of some plants and wrote a poem about them in English.

Fine art: The seventh grade students drew a sketch of a natural object found in the outdoors. The eighth grade students also carved a wood plate whose motif was the flora and fauna found in nature. The seventh grade students' knowledge, understanding and experience on nature in the science fieldwork were helpful for their drawing their sketch. The eighth grade students could also select the flora and fauna as a motif with some knowledge about the nature, in making their sculpture work. Science teachers helped fine art teachers to hold these lessons in the fine art class.

Social studies: Social studies are related to the fieldwork because students learned about their local community through investigating it. They became interested in the local history and the environments where plants grew. They also became acquainted with environmental issues such as nature conservation, contamination, and garbage problems. The fieldwork deepened the relationship between science and social study. In the third field project students collected many beverage cans thus cleaning up and beautifying their local area.

Other subjects: In the future such integrated learning can be expanded by including activities such as those related to music and technology (making musical instruments and playing them in a natural cave), and physical education (country trekking while appreciating the beauty of nature).
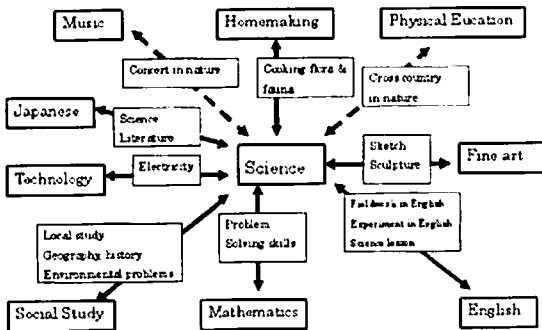

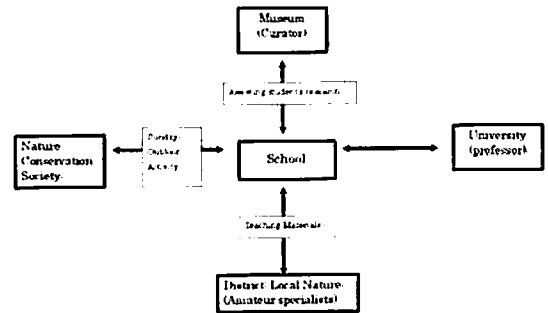Figure 1. Integrated curriculum network in school   Figure 2. School-centered network

The Learning Network (Goto, 2000a) Making use of public facilities and personnel:
Students found many plants and animals, and identified different geographical features in their local areas. Teachers could not respond to all of their findings and ideas. Therefore the students needed to make use of local specialists, such as museum curators, who could support and facilitate their learning. Therefore teachers established a learning network (Fig. 2) including school and out-of-school resources. Teachers not only taught science in the class but also coordinated such a learning network.

The museum: Students found many plants and animals. Subsequently, some students visited the museum on the Saturday afternoons or on Sundays so that curators might help identify their specimens. They had an opportunity to see how specialists identified and investigated flora and fauna. Some students interested in nature attended Sunday field excursions conducted by the museum staff.

The nature conservation society: The nature conservation society offers a field excursion once a month. Teachers often advised students interested in nature to join these trips. Some students joined such field excursions as bird-watching and nature walks. Science club students often participated in them during the three years they attended my school. They reported on their activities in club meetings and participated in science competitions. In 1996 several science club members were awarded the

governor's prize for their excellent work.

The integrated learning includes not only science but also homemaking, Japanese languages, fine art, social study, technology (its content related with science), mathematics (graphs and statistics), and English. he collaborated with several teachers of other subjects in order to coordinate and facilitate students learning the goals established in these subjects. In these curricula students deepened their understanding of science and got more interested in science through knowing the relationship between science and other subjects.

In order to improve his curricula he developed a plan to make use of such community resources as museums, universities and institutes and their personnel. For example, he invited specialists and local experts on bird-watching, geology and flora and fauna of the Miura Peninsula to visit his classes and instruct his students about their interests. He also took interested students to the museum for their study on Saturday afternoons and Sunday. After students had completed their research, he arranged to exhibit their results in the local community hall so that they would have an opportunity to communicate them to local citizens. Integral to his curriculum leads the learning network (fig.2). The learning network has many levels. For example, the network of school subjects, the network of students' communication, the network of school and community facilities.

His school is now linked to the Internet so the future students in the school will also be able to communicate their research to students in other schools and people out of school. This capability will further improve their in-school learning. Students will extend their learning from the school to their local community, from their school to the nation of Japan, and finally from their school to the world through the Internet. They will make use of various informations sharing networks and thus expand their learning organically. He call this method of fieldwork-centered and student-centered science learning, Expansive and Organic Learning (Goto, 1997b; 2002). It is based on the basic principles of Global Science Literacy.

Considering the real purpose of education at school, teachers should think more highly of improving students' various abilities in addition to the ability to answer questions and solve problems. Teachers must help students foster the ability, interest, attitude, and skills to continue to learn for the enrichment of their lives during and after their school years. Integrated curricula and student-centered instruction are good examples of instructional processes that can increase student interest in science. Learners, whether they are students or teachers, expand their worldview through learning. They find out about themselves and their local environments, and how to live and enjoy their lives through learning and care about their native place. This contributes to the education for a life-long learning society for sustainable development which is supported and can only be sustained by socially and scientifically literate people.

Teaching Method

The teaching methods he used were inquiry-based, student-centered and interactive approaches and include team-teaching. He included several kinds of fieldwork for different purposes. They include fieldwork where he decided the topic or objective and other fieldwork where the student made the decision. He also used individual to small and large group activities. As students develop and expand their learning from science to other subjects in these curricula, he cooperated with teachers of other subjects to plan. When students made use of community resources in their learning, he coordinated the teaching with the specialists.

Teacher's Role

In the fieldwork-centered curricula, a science teacher should correlate and integrate the classroom science lesson with the fieldwork. He should also show students how to apply their knowledge and

skills mastered in the classroom to the real natural world. Therefore he should carefully plan the daily classroom lesson as well as the fieldwork. He should also hold interesting lessons in the classroom in order to facilitate student's research in the outdoors. Also a science teacher should play a central leading role in coordinating and organizing the fieldwork-centered curricula with other subject teachers because science is focused as a central subject in these curricula. Finally, they should coordinate students' questions to the community specialists related to their discoveries and participate in the informal learning experiences that occur outside of the school with an aim to expanding students' studies if necessary. For the last ten years teachers developed many teaching materials to support and facilitate students study and investigation of the local nature.

Development of Teaching Materials

   Teachers developed the following teaching materials to support and facilitate students study and investigation of the local nature, society, history, economy etc.
   a.   *Our Native Place, Miura* (Kasai & Goto, 1988)
   b.   *Plants Encyclopedia on The Miura Peninsula* (Kasai, T. et al., 1988).
   c.   *Trees pictorial encyclopedia with real specimens like flowers and leaves* (Goto, 1986)
   d.   *Nature on the Miura Peninsula* (Miura City Board of Education, 2000)
   e.   *English Education in the New Grammatical Theory* (Kasai & Goto, 1998a)
   f.   *The 2nd English Education in the New Grammatical Theory* (Kasai & Goto, 1998b).
   g.   *Kou-chan's Adventure in the Wonderland of the Linguistic World* (Goto, 2000c).
   h.   *A Guide to Nature Observation* (Shibata,1999; Goto,1999)
Some of them would be explained shortly as follows:
Our Native Place Miura (English-language edition): It is an English-language edition of the side reader of the social study which explained a native place Miura. At present, training of communications skills in English education is one of the issues in Japanese English education. It devised so that a student could explain their native town in English easily about familiar nature and society, history, industry, or economy by using the side reader which can be studied in English about their native town in order to solve the issue This side reader does not only make students participate in English study very enthusiastically but it is used also for ordinary citizens by international exchange with those of Warrnambool, sister city in Australia.
Plants Encyclopedia on The Miura Peninsula: It is an encyclopedia which can be used for the cross curriculum of the science, English, and the fine-arts education published for the secondary education at the age of internationalization. After studying the plant of a hometown on the Miura Peninsula, students compare their local plants with those in Nagano Prefecture which goes by a camp school and moreover with those in Warrnammbool their sister city in Australia. The diversity of plants can be studied by comparing. "Act locally and think globally" education can be practiced through such field studies by using this encyclopedia. This is a collaborative work of the teachers of various subjects, students, and average citizens. The writers and drawers were a senior and an acquaintance. When investigating familiar plants, he sketched by having identified the plant, added explanation in English, and performed field study very enthusiastically.
Trees pictorial encyclopedia with real specimens like flowers and leaves: The trees of a school serve as good teaching materials. However, the student may be unable to identify trees correctly other than the time when the flower is in bloom. It was developed the pictorial book with real specimens, such as flowers and leaves, and 12 photographs thorough a year so that the familiar tree planted in school could be identified at any time all the year round. Since photographs was taken for a flower, a bark, a tree shape, a leaf, etc. which are the features of trees in the photograph every month, trees could be identified easily by every student.
Nature of Miura: It is a side reader which he can use when the first-year student in a junior high school in the Miura city performs flora and fauna observation and layer observation. The 200-page

book is published in the all colors with the photographs of 400 or more plants observable in the Miura city. Each photograph has intelligible brief description and the worksheet and the model observation route. In three courses for geology observation in the second half part students can observe the typical rocks and strata in the Miura city. The book also includes the description about a question, an experiment, etc. on each point for the courses, so that a student can do study by himself with the surroundings. Since the student can conduct research and natural investigation using this book, it can be used not only for science study but for integrated study.

English education by a new grammar theory: This is the book developed in order to create innovative English education in a junior high school using a new scientific language theory "generative transformational grammar," which was developed by Dr. Noam Chomsky at MIT. Although school grammar was shown by the traditional English education, using the generative transformational grammar theory gave students a concrete chance to learn scientifically about English education or language with the textbook of English for a junior high school. Since the contents were difficult, only description of an essential point could be performed. However, it was the first trial for teaching science and English in the same class, or making an opportunity to study language scientifically, and the student could catch a glimpse of the relation of science and a language theory. It became an interesting lesson especially for excellent students.

A guide to nature observation: It is broadcasted in NHK a program of a guide for children to do nature observation in 1999. These days, there are taken up problems with a child' s insufficient natural experience. This TV program was made for the student of a junior high school from the child of elementary school upper classes to play and investigate in nature during the summer vacation. The TV program for 15 minutes consists of ten, which covers all the familiar nature where children can perform observation, exploration, and research. The book tied up with the program was marketed. The book is made of 110 pages, including pictures, descriptions, worksheets, and introduction of the natural history museum etc. so that a child may watch a program and can actually perform natural investigation and research. The TV program was devised with synthetic contents so that children "Act locally and think globally".

Educational Effect

He thought there were many educational benefits of the field-centered, student-centered, inquiry-based and integrated science-centered curriculum. Some of them are:

(1) Students got more interested in their local environment, appreciated and loved their birthplace much more than before.

(2) Integrated learning could make students understand the relationship among different school subjects in studying real situations and appreciate fun of study in the integrated ways. A school-centered network was established by science teachers.

(3) More students became interested in science and the science lesson.

(4) Some students joined volunteer activities to conserve the local nature.

(5) Some students contributed to developing the teaching materials for science education

(6) Students and teachers cooperatively held a special exhibition in the city hall in order to show and exhibit their research results and other works related to fine art and Japanese language. This exhibition gave an opportunity for students and local people to communicate through their work. It contributed to civic understanding of school education. Parents also were proud of their children's work and understand school education much better.

(7) The Science Lab became a school museum where students' work was exhibited along with many teaching materials and tools.

(8) Some excellent students were awarded the governor prize of the Kanagawa Prefecture for their researches on local nature. Many students joined the science club because they were deeply impressed by the achievement of science club students and they were on TV after being

interviewed by TV staffs for their great achievement.

Summary and Conclusion

Japan introduced the New Course of Study (1998), so to speak, the Japanese National Curriculum in 2002. The objectives "Zest for Living" of the new Course of Study are to foster self-learning and self-thinking ability for life-long learning. The main themes of the New Course of Study are Introduction of Integrated Study, Five-day school system, and Inquiry-based Learning. Fostering a zest for living is to cultivate an ability to learn, think, judge and act on their own and to solve a problem. Teachers at each school are expected to design the time for Integrated Study on their own character and ingenuity for cultivating such an ability. They should collaborate with each other, make use of such resources as the out-of-school facilities and resource persons education for implementing the better Integrated Study and establish the partnership with local persons and the network with facilities to create the enriched quality school.

Science is human beings' common culture. Science instruction is education which enables common communication in the world beyond the diversity of all the language, culture, and society. The science instruction using the natural environment of the local area develops into integrated study reasonable, as shown above. Therefore, it is possible to use science instruction as the core of integrated study. Since Earth Systems Education relates with the systems of familiar nature or the earth the contents which a student learns, and since GSL contains the target of the global education which raises understanding of different cultures and thinking on the global perspectives, it gets used with the base of not only integrated science education but integrated learning.

The Education for Sustainable Development proposed by UNESCO is expected to be implemented in the time for the Integrated Study. ESD (UNESCO, 2004) is fundamentally about values, with respect at the center: respect for others, including those of present and future generations, for difference and diversity, for the environments, for the resources of the planet we inhabit. They are related with the objectives and instruction methods of Earth Systems Education (ESE). ESD mirrors the concern for education of high quality, demonstrating characterisitics, such as interdisciplinary and holistic, value-driven, critical thinking and problem-solving, multi-method, participatory decision-making and locally relevant. ESE emphasizes it, too. It calls for a re-orientation of educational approaches for its curriculum and content, pedagogy and examinations. The teacher needs to develop teaching materials, teaching tools, curricula, and methods considering the actual situations of his local area to carry it out.

The philosophy of Global Science Literacy and Earth Systems Education can provide a rationale and basis for integration of not only content from the disciplined sciences but also such different subjects as fine art and social studies. It agrees mostly at the objectives of ESD. It is very effective as an organizing philosophy for the total integrated curriculum as well as for the integrated science curriculum in the 21st century.

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Citynet/Awaree/2005 Framework for Action Plan for the Integrated Environmental Education in Hanoi City, Vietnam

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Goals

The project aims to improve awareness and enhance understanding on environmental issues of teachers and students in schools in Hanoi City.

Objectives

1. To assess real situation of environmental protection and education in schools in Hanoi City.
2. To improve awareness and build up capacity for educational administrators and teachers for better environmental education in schools.
3. To integrate and develop environmental protection and education through formal and non-formal education.
4. To learn, exchange and share experience between those cities that are helped to improve and enhance awareness on environmental education in schools by CITYNET.
5. To promote partnership on environmental education between Japan and other Asian Pacific countries.
6. To co-ordinate with other relevant departments in Hanoi on awareness enhancement and environmental education.

Expected Outputs

1. Hanoi will be able to come out with environmental education activities that are applied effectively in schools.
2. Primary, secondary and high school students have better understanding on environment and environmental protection. Positive change in awareness and behaviors of students and teachers on environmental protection.
3. Environmental education publicity documents are published and disseminated.
4. Integrate and develop environmental protection and education through formal and non-formal education.
5. Most of educational management officials and mainstay teachers in schools are trained and cultivated to have better understanding on environmental education.
6. Promote environmental education activities in Hanoi through close cooperation between AWAREE Plan joining cities.

Overall Action Plan for Each Year

First year 2005
    1.1 Investigate and assess real situation of environmental education in schools in Hanoi City.
    1.2 Compose and publish environmental education documents for all school levels.

1.3 Organize training classes for administrators and mainstay teachers.

Second year 2006

2.1 Start integrating environmental education activities in formal and non-formal classes.

2.2 Organize seminar on integrating and training.

2.3 Monitor activities at schools, find out the problems, assess the first-step results.

Third year 2007

3.1 Investigate, assess the progress of students and teachers

3.2 Assess training and teaching process. Assess the results obtained after two years conducting the project.

3.3 Organize seminars to draw out experiences.

3.4 Finalize and proceed to next steps of the project

The Practices of Education for Sustainable Development in National Taiwan Normal University

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ABSTRACT

Education for sustainable development (ESD) has been a research focus of the Graduate Institute of Environmental Education in National Taiwan Normal University (NTNU). The implementation of ESD in NTNU can be classified into three directions: conducting researches on ESD, offering general courses of ESD, and carrying out the Sustainable Campus Program to transform a old administration building into a learning center for ESD.

Key words: Education for Sustainable Development (ESD), Sustainable campus Program

Introduction

The Graduate Institute of Environmental Education (GIEE) of National Taiwan Normal University (NTNU) was the first established research institute for environmental education in Taiwan. Although five more EE research institutes have been set up since then, NTNU has always been a leading role in the development of EE in Taiwan. Recently, NTNU was funded by Ministry of Education and Ministry of Interior to build up a learning center of Education for Sustainable development to demonstrate both education innovations and infrastructure renovations of sustainable development in a university campus. The education innovation highlights developing teaching modules, teacher training workshops, and conducting research works for the sustainable campus program; the infrastructure renovations consist of green roof, constructed wetland, alternative energy equipment, and composts.

Conducting research on Education for Sustainable Development

A research team has been made up of researchers from the fields of social studies, geography, biology, health, and environmental education of NTNU to study the contents of ESD of national curriculum framework for primary and junior high schools and to investigate school teachers' understanding of and attitudes toward the concept of sustainable development. Based on these findings, a further study on teachers' skills and appropriate instruction strategies for ESD were proceeded, and then ESD teaching modules for junior high schools were developed and taught in schools by the way of action research to examine the teaching and learning of ESD in real education settings. A study on ESD for high schools has been launched soon after the previous research was finished. This research team intends to establish a comprehensive academic understanding of and application for ESD in Taiwan. Currently, the rational, educational goals, core concepts, instructional methods, curriculum designs, and working sheets of ESD for grade 1 to grade 9 has been developed.

Conducting research on Environmental Education Indicators for governmental sectors

Been an important role of improving EE in Taiwan, the GIEE in NTNU has a responsibility to push government forward. Therefore, a study on developing a set of Environmental Education Indicators to assess the government sectors' achievement on implementing EE in Taiwan has been implemented. Content analysis of national reports, interviews with coordinators of EE in governmental sectors, and surveys on EE researchers and educators were conducted to select and determine 11 EE indicators.

This study has gone through the process of conceptualizing, selecting, and giving operational definitions of environmental education indicators. Its research design includes two stages: the first is to apply document analysis, and interviews to develop the detailed components, evaluation criteria, data collection, and evaluation strategies; and the major focus of the second stage is to use Delphi techniques and questionnaire survey to confirm the validity and reliability of the indicators developed in the first stage.

The result suggests the national EE indicator system could consist of three categories: input, process, and output categories. The input indicators include human resources, material resources, and EE offices. The process category has the indicators of governmental operation, education and training, media & teaching materials, propaganda, research and international cooperation, and awards for EE. The output category contains the indicators of environmental literacy and environmental actions.

The Sustainable Campus Program in NTNU

"Taiwan Sustainable Campus Program", calling for a physical renovation and utility operation of campuses to demonstrate the concept, and meet the requirement, of sustainable development, is now officially a component project in Taiwan Government's "Challenge 2008-National Development Plan". In essence, the Program had aimed to ensure that the future campus, regardless of the scales in size, should, at least, be one that:
- can be participated by all members of interest during the design, construction, and future operation
- has ecological concerns during the construction and operation afterwards
- can respond to the changing needs in future curriculum consisting a wide array of activities
- can serve as a community center for life-long learning, culture-preservation, and shelters during emergency

Having been a leading role and consulting center of Sustainable Campus Program, NTNU decided to create a platform for first-hand teaching and learning experience for sustainability in its campus. A series of efforts have been launched to convert an old administration building and the adjacent school garden into a Sustainable Campus (SC) of NTNU. The major efforts include:

Rainwater Harvesting and Black Water Treatment and Recycling System (reducing drastically the amount of water used from the city water supplying system)
   a. **Constructed Wetland:** treating black water (sewerage) first by the septic tank and followed by a special designed constructed wetland, and the treated water was later used for watering the whole garden.
   b. **Rainwater Harvesting System:** collect the rainwater from the administration building and reuse it for the toilet flushing.

Increasing the Campus Biodiversity
  c. **Increasing and Diversifying the Surrounding Habitat:** establishing constructed wetland and aquatic pond, and the treated water then generated more terrestrial and aquatic habitat to attract more flora and fauna.
  d. **Green Roof (Rooftop Garden) System:** creating a vegetable garden at rooftop to demonstrate the methods of organic farming and the link with urban life while also reduce the building's consumption of electricity for air-conditioning during summer.

Energy Conservation System
  e. **Install Solar Voltaic Panel and Solar Hot-water System** on rooftop to generate electricity and hot water for the building and saving the energy consumption.
  f. **Design and Installed Special-designed Sun-shelf,** block the direct sunlight and reflect natural light into the rooms of the building, decreasing indoor's lighting energy demand.

Environmental Education and Interpretation System
  g. Open up the facilities to NTNU faculties cross all disciplines as the **platform** for their course teaching for demonstrating the possible ways of sustainable living.
  h. Developed and installed **interpretive media** (including 8 pieces of interpretive panels, one self-guided trail brochure, and a poster) for both the public and school users to improve the university and neighboring community's insight and interest on the site.
  i. An **educational packet** including 4 well designed ESD **teaching modules** by using the sustainable campus site as the base for teaching were developed for enhancing the ESD for students of the primary school level.

Offering ESD General Education Course

To promote university students' awareness of sustainable development, several general courses of environmental education have been offered. A well known course ("Environmental Ethics and Sustainable development") directly related to the concept of sustainable develop has been taught for the past four years. This course always attracts 70-80 students every semester, and hires several teaching assistants to facilitate students learning. The expense of hiring teaching assistants is funded by the Ministry of Education to encourage offering ESD general course.

A curriculum framework of sustainable development for college general education was developed as follows:

Goals for college sustainable development education
 · Educating students to be aware of and care about local and world environmental, social, and developmental issues.
 · Offering learning opportunities for students to learn awareness, knowledge, values, skills, and action experiences for sustainable development.
 · Developing a sustainable development behavior model for individuals and society.

Core concepts of college sustainable development education
 · Environmental ethic: the meaning of sustainable development, the development of the concepts of environmental conservation and sustainable development, the relationships between people and environment, the relationships among environment, society, and economics under sustainable development.
 · Sustainable environment: environmental changes, local and world environmental problems, the influences of environmental issues on human daily life, the development of local and world environmental conservation.
 · Sustainable economics: the changes and development of economical structures, the limitation of natural resources, the energy utilization and economical development, the economical development

and life quality.
· Sustainable society: the changes and development of societal structures, social issues such as poverty, gender, education, aboriginal people.... the development of city and rural areas, world responsibility.

Conclusion

Substantial changes result in phenomenal progress. Both educational innovations (research work and general education) and infrastructure renovations (green roof, wetland, wind and solar power...) have improved teachers and students awareness of, attitudes toward and even participation in the endeavor of ESD. Offering undergraduate courses on sustainable development, developing teaching materials for sustainable development at K-9 level, conducting ESD workshops for elementary and secondary teachers, networking with local NGOs on issues and activities related to sustainable development, and managing educational facilities for demonstration of energy and water conservation, wastewater treatment by man-made wetland, and organic farming on rooftop for students and community will be regular works of NTNU. The university sets her goal to be a sustainable university.

Education for Sustainability at a Japanese University Emphasizing Problem-Solving and Partnerships with Local Communities

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ABSTRACT

Environmental Education has evolved into Education for Sustainability (ES), with an emphasis on transformational change in values and behavior, from the individual to the global scale. While dealing with the important aspects of ES, this paper provides a framework for learning about sustainability based on a whole-university approach in Japan, and introduces two programs focusing on problem-solving and community partnerships. Lastly, it suggests what function universities should play in the field of ES.

Key words: ES, University Education, ISO, Problem Solving, Community Partnerships, Restoration Program

Introduction

In recent years Environmental Education (EE) has evolved to encompass the broader concept of Education for Sustainability (ES), which includes all dimensions of nature and human society. Although ES has evolved from the rich heritage of EE, there can be no more pressing goal than achieving a sustainable future. ES is a lifelong, transformation endeavor, which challenges individuals, institutions and societies. It demands a whole-institution approach, including innovative teaching and learning.

These are the three key elements of ES: 1) Promote holistic thinking to understand the links between environmental problems (e.g. biodiversity, population, poverty, health, food supply, democracy, human rights, equality) conventionally approached separately; 2) Develop critical thinking skills; 3) Foster students' problem solving ability.

In this paper, ES is framed as a goal of university education. The author will address the framework in place at the Musashi Institute of Technology (hereinafter "Mi-tech"), within its Faculty of Environmental and Information Studies, where the author is currently affiliated. In addition, it will outline two problem-solving based programs geared towards university students, and intimately linked with local communities in both Japan and abroad. Further, a proposal on the role universities should play in local communities, to further the cause of ES, will be discussed.

Implementing ES at Mi-tech

In 1995, our department was established in Yokohama, Japan's second largest city and home to 3.6 million people. When establishing our department, our visions were: 1) Grapple with the issues that face the earth in the 21st century, and empower students to assume responsibility for creating sustainable societies; 2) Create a university that fosters world citizens.

The three objectives necessary to achieve this are:
1) Promote awareness of ecological, social, economic and political interdependence that exists at the local, national and international level.
2) Provide opportunities to acquire the knowledge, values, attitudes, commitment, and skills necessary to conserve the environment and improve our ability to communicate.
3) Create a new pattern of behavior for individuals, groups and societies, to realize a sustainable future.

Our department adopted three approaches to tackle these objectives. The first is an interdisciplinary approach, with a framework that transcends the traditional distinction between the sciences and humanities. To realize this, we have organized a curriculum based on this philosophy.

The second is we were the first university in Japan to be certified ISO14001, and we have infused all educational activities with the Plan→Do→Check→Action (PDCA) cycle (Kobori 1999). Further, our students and faculty are key players in ISO14001, proactively improving campus life and extracurricular activities.

The third involves infusing the three aspects of EE ("*about, in* and *for* the environment") into university life. Education *about* the environment focuses on students' understanding of important facts, concepts and theories through lectures. Education *within* the environment involves students in direct contact with nature and communities (Kobori and Primack 2003). Lastly, education *for* the environment aims to conserve the environment through off-campus practical training, internships, and guided seminar activities.

ES Case Studies Emphasizing Problem Solving and Community Partnerships

Although all living creatures depend upon a healthy earth as the foundation of their existence, the human population explosion and growing burden of human society has impaired biodiversity and the functioning of ecosystems (Myers 1991). At Mi-tech, we work to understand these problems and carry out measures to help solve them. Lastly, we evaluate the results.

We also apply the ideas of Conservation Biology, a new field whose problem-solving and interdisciplinary facets help us confront the crisis facing biodiversity (Primack and Kobori 1997; WRI, UNEP and UNESCO 1992 ; Kobori 2005).

I will now offer two case studies where the fundamental approach of Conservation Biology was incorporated into ES:

Dragonfly Pond Restoration in Yokohama
In Yokohama City, 300 dragonfly ponds in elementary school yards and inner-city parks were created or restored to form ecological stepping-stones as part of a larger ecological network (Primack et al. 2000). However, many of these ponds degraded due to lack of maintenance. Solving the problems that arose in Karasuyama Park during the Dragonfly Pond Restoration became the basis of an ES program, which incorporated the following three viewpoints:
a) Encourage university students to confront community issues; b) Carry out an environmental improvement program through a partnership consisting of the local government, an NGO, our university, local citizens and a research institute; c) Include the eight steps fundamental to Environmental Education: ①Awareness and concern for an issue; ②Understanding current conditions; ③Learning the skills necessary to carry out surveys; ④Discover problems; ⑤ Search for problem-solving measures; ⑥Carry out those measures; ⑦Through monitoring, evaluate the validity and limitations of those measures; ⑧Information transmission both on-line and through meetings.

Over the course of a year and a half, surveys of artificial ponds and babbling brooks were carried out once a month, which included tests of 11 physicochemical properties related to water quality, and bioassessment. Results indicated five problem areas (Table 1). After deliberation, participants

Table 1 Implementation and Evaluation of Measures Taken in the Restoration of a pond in Karasuyama Park, Yokohama

Problem	Improvement Measure	Responsible Party	Evaluation
Eutrophication	1. Draining sediment out of pond	NGO, Citizen	△
	2.Purification of water using bamboo charcoal	University	×
	3. Purification using aquatic plants	University, Research Institute	△
Invasive Species (Crayfish)	Draining water	University, NGO, Citizen	△
Decrease in Water Volume due to Leak	Repairing of water ways	Local Government	O
Water Turbidity	Change water circulation pattern in pond	Local Government	O
Excessive Growth of Introduced Plant	Proper management of watercress	University	O

Evaluation Key   O: Effective more than 1-year;   △: Effective for several months;   ×: Not effective

proposed solutions and assigned responsibilities for the implementation stage, lastly evaluating the efficacy of those measures.

Australian Rainforest Restoration Program Geared towards University Students
This year marked the 6th year of a program developed in partnership with the Centre for Rainforest Studies (CRS), one campus of the School for Field Studies – an institute that promotes international field education (Kobori et al. 2003).

The program includes a 2 to 3 day orientation at Mi-tech, and two weeks during the summer at the CRS, located in the Atherton Tableland of Northeast Queensland. Each year, approximately 32 students participate, led by 7 faculty members and 4 TAs. Table 2 shows the educational goals and core elements of the program; the main goals are:
a) On-site Learning: Students experience first hand the wonders of the Australian rainforest, a World Heritage site. Through fieldwork, they learn about the rainforest's ecological and social characteristics.
b) Interdisciplinary Approach: Transcending the framework of conventional disciplines, students rethink this unique ecosystem using a diverse approach that emphasizes ecological, socioeconomic, and legal issues.
c) Encourage Problem-Solving: Students search for answers to problems arising from the complexity and conflicting interests within the rainforest.
d) Restoration Activities through Partnerships: Students plant trees to create a "green corridor" that links isolated rainforest fragments. This work is part of a partnership consisting of state government, citizens and NGOs. Students later evaluate the results.
e) Develop Communication Abilities: As the program is carried out in English, students' language skills increase greatly. Students also become versed in information management while creating web reports for Mi-tech's site.

After the program, through holding discussions and completing questionnaires, students and faculty evaluate the program. These evaluations are used to make improvements each year.

Future Challenges

Although there is no clear consensus on how to define and carry out ES, it goes without saying

Table 2 Goals and Core Elements of the Program

Program Goals		Core Elements
Practical Approach	Experiential Learning Field Trip	Lectures in English Field Trip
Interdisciplinary Approach	Theory to Practice Applied	Field Survey
Problem Solving Approach	Critical Thinking Action Oriented	Restoration and Maintenance of Tropical Forest
Partnership	Community Team Work Collaboration	Presentaion Creating Web Report
Improvement of Communication Skills	Cross-Cultural English Ability Information Management	Information Transmission On-line

that the university must: (1)Open its doors to the community, allowing access to the knowledge, human resources, and facilities within; (2)Gear more research and educational activities towards the needs of the community; (3)Teach research skills to interested citizens, NGOs, and businesses; help these parties participate in the long-term planning of their communities; (4)Promote links among different sectors of the community, by strengthening the university's role as an intermediary organization; (5)Support lifelong learning, informal and non-formal education, as well as interdisciplinary, practice-based educational activities...

...so each university, and networks of universities, can play a leading role in the transition to a sustainable future, by empowering all citizens of the world.

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The Problem and Challenge of Environmental Education Teacher Training in China

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ABSTRACT

Although the teacher training system in China is perfect, it is hard for EE teacher training with stable statue now. China didn't have a complete and effective EE teacher training system till now. Although there are both interdisciplinary method and cross-curriculum method can be used in teacher training, the master teachers who have the capacities to apply these methods freely are too shortage in China. EE capacity building needs proper EE training but there is still shortage of such formal educational system for EE talents development in high level. In long term, EE have to acquire legal position in education system in China. It still has a long way to run to make a rapid and remarkable progress on EE teacher training system in China.

Key words: Pre-service teacher training, In-service teacher training, Interdisciplinary method, Cross-curriculum method

Environmental Education (EE) in China has run its own way for 30 years since it emerged in early 1970s. Attendance in the Human Environment Conference held in Stockholm enlightened Chinese and promoted the convoking of China First National Environmental Protection Meeting in 1973, which was counted the inchoation of China's environmental protection and environmental education. However, in spite that Chinese government attended in many important international conferences on EE and agreed with the conceptions put forward in those conferences such as Stockholm (Sweden, 1972), Tibilisi (Georgia, 1977), Rio (Brazil, 1992), China's EE developed slowly and still stayed on a low level compare with that in some developed countries.

Since reforming in 1978, China opened its door to the world. Chinese could see EE in the world, and learnt so many things from the world. Impelled by external power, EE in China changed by inches but stably. Chinese researchers consider that presently, EE in China has been close to situation in other developed countries on ideas, but far away to those on practice. Hereby the prospect of China's EE mainly depends on how to handle the problems in practice. Improving teachers' EE capacity is a key issue hereinto. At present, EE training is provided in many educational fields in different ways in China.

EE Training for Middle School And Elementary School Teachers

There are two aspects of EE training for middle school and elementary school teachers. First is Pre-service training and second is in-service training.

Pre-service teacher training

In China, pre-service teacher training is mainly provided by teacher schools - training schools, teacher colleges and normal universities. EE training is also attached with general teacher training in such schools. Currently, there are two types for EE training in teacher schools. One is to open an

interdisciplinary course that is called interdisciplinary method: another is to penetrate EE into special courses, which is called **cross-curriculum** method.

Interdisciplinary method is applied in some teacher schools. Generally, the schools that use interdisciplinary method have departments on environmental sciences or environmental education – such as geography department, department of environmental sciences, and department of resources. The departments can open compulsory or selective EE courses for all students. For instance, Beijing Normal University (BNU) opened "Introduction on Environmental Protection" and "Environment and Development" by Institute of Environmental Sciences in 1986 and 1994 respectively. "Conservation Biology" by department of biology in 1998, "Environmental Education" by department of geography in 1998; Southwest Normal University opened a selective course "Environment and Development" in 1998 by Environmental Education Training Center; Guangzhou Normal College opened "Introduction on Environmental Ecology", "Biodiversity Conservation", "Environmental Pollution and Monitoring" since 1980s. It also opened EE course since 1990s. In addition, some teacher schools of middle level that elementary school teachers are trained there also apply interdisciplinary way to implement EE training. For example, Canal Teacher School of Middle Level (Jiangsu Province) has a course "Environmental Protection" for all students.

Cross-curriculum method is also an important method which many teacher schools use. "Future teachers" in different subjects who study EE by cross-curriculum way can recognize the "EE tendency" in their subject matters, teaching strategies and technologies. For example, Jinzhou Normal College (Liaoning province) opened a series of courses that have a general name "Environment Analysis", which included "Introduction on Environmental Protection", "Fundamental Ecology", "Environment and Human Health", "Pollutants and Standard Analysis", "Environmental Standards and Quality Control for Environment Monitoring" and "Environmental Management and Environmental laws"; Shandong Normal University (Shandong Province) put EE contents into its geography curriculum in geography department; Yantai Normal College (Shandong province) opened "environmental chemistry" in its chemistry department; Fuyang Normal College (Anhui province) opened "Environmental Engineering" and "Introduction of Law" in its chemistry department. In middle teacher schools in some areas, cross-curriculum method was also used. The representatives are Leizhou Teacher School (Guangdong province), Wuzhou Teacher School (Guangxi province), Songyang Teacher School (Jiangsu province) and Taihu Teacher School (Jiangsu province).

Although applied in many schools, cross-curriculum method sometimes is criticized as unorganized, unsystematic and separate. In "cross-curriculum" schools, EE usually was integrated into the subjects which has close relationship with environment, such as chemistry, geography, biology, and hardly seen in other subjects. On the other hand, traditional pre-service training for teachers usually concentrates on special study area, not EE. Such training makes difficulty for students to understand environment and environmental education by cross-curriculum learning. Some normal universities attempt to solve this problem by establishing comprehensive environmental department (center, institute). Northeast Normal University, East China University, Southwest Normal University and Beijing Normal University all have such institution. This is an important measure to build EE capacity of "future teachers". But another problem is that the comprehensive environmental department always was considered as "not teacher training purpose unit". Its graduates know a lot about environment, but a little about education. So it is difficult for them to be EE teachers.

Besides two major methods mention before, some place also link EE capacity with teacher certificate. For example, Changzhou City demanded all new teachers must accept training about environmental knowledge before they go to teach. The training is necessary for getting teacher

certificate. But it is not common in China.

In-service teacher training

China also put effort into in-service teacher training on EE. First of all, Chinese central and local governments carried out many training programs for in-service teachers. State Environmental Protection Administration (SEPA) held EE workshops for middle and elementary school teachers many times. And since 1993, SEPA and the Ministry of Education (MOE) jointly held EE training workshops at Beidaihe every summer for middle school head teachers all around the country; In Shanghai, Beijing and Wuhan, teachers on geography, biology and chemistry had to accept EE training since 1990s; In Acheng City, environmental protection bureau provided short-term workshops on environmental knowledge for teachers on chemistry, physics, biology and natural science in elementary schools before they go to teach EE in schools.

In-service teacher training on EE is provided by teacher training schools, too. Entrusted by governments or international organizations, normal colleges and universities usually provide such training. BNU plays an outstanding role in this work. Geography department of BNU has integrated EE contents into its post-graduate courses for in-service middle school geography teachers since 1990s; Environmental Education Center at BNU also opened post-graduate courses on "Environmental Education and Education for Sustainability" for in-service middle school teachers all over the country in 2001. Teachers in all subjects could take this course to improve their EE capacity. In addition, BNU also implemented in-service teacher training programs funded by UNEP, WWF or other organizations since late 1990s. Besides colleges and universities, teacher training schools also provided some EE training for teachers, for examples in Tianjin Teacher Training School and Beijing Teacher Training School.

Distant education is also an important way for in-service teacher training. China has a big teacher population, and the quality of teachers varies with regions. It has to rely on modern educational technology to provide EE training on a large scale. BNU developed a series of distant learning technology in 1997 and experimented in late years. China Ministry of Education has selected 45 colleges and universities as experimental schools for modern distant education. Some of these schools also put EE content into their distant learning courses. Some experts predict that distant education will have a big rise in near future. EE teacher training can benefit from that as well as.

In overview, China didn't build up a complete, normative EE teacher training system. There is no any normal school have students specialize on EE. Few teachers in school apply himself/herself to EE. Recently Chinese government take steps on develop EE teacher training projects with funding support from international organizations. For example, environmental education centers for teacher training and research have been established in 21 universities in China in cooperation with MOE, WWF and BP-Amoco. It is seen as an onward force for teacher training for EE in China.

EE training for college/university teachers

EE in colleges/universities can be divided into two parts: professional education and general education. So EE teachers can be also divided into two types: professional EE teacher and general EE teacher.

Teachers for Environmental Professional Education

Teachers for environmental professional education are usually trained in comprehensive universities. In most cases, many graduates from environmental departments of the universities, especially masters, doctors and post-doctors, will enter colleges/universities and become teachers for

environmental profession. Recently, China has build up a relatively good system to train professionals on environmental sciences. Peking University, Zhongshan University, Beijing Polytechnic University and Tongji University built departments on environmental sciences early or late in 1973-1978. Chinese national colleges/universities have set 16 bachelor level specialties, which involved with science study, arts study, agriculture study, forestry study, medicine study, teacher training and other research fields. And 200 master level specialties and about 50 doctoral level specialties were also set up. Some universities took up providing post-doctor positions on environment sciences from 1990s. In recent decade, Chinese colleges/universities recombined each other in nationwide scale – some disappeared and some merged others. So the number of colleges/universities drops to 1224. Up to year 2000, 10% national colleges/universities have set up bachelor level specialties on environmental sciences. More than 10 thousand students get bachelor or higher degree on environmental sciences from these specialties. Hence in general, China has enough EE teachers on environmental professional education, and has a complete system to training teachers on environmental professional education.

Teachers for General Environmental Education

General EE mainly is offered for the students who don't specialize on environmental sciences. There are two ways to provide general EE in colleges/universities. First way is to open selective courses that link the specialty with environmental sciences. For example, "Environmental Chemistry", "Environmental Chemical Engineering", "Pollutant Chemistry" for students major in general chemistry; "Pollution and Ecology", "Environment and Sanitation" for students major in biology; "Nature Conservation", "Resources Protection" for geography students; "Environment Management", "Environmental Law" for students in political sciences; "Environmental Literature", "Environmentally Writing" for students major in language and literature studies. On the other hand, some departments integrated environmental knowledge into the specialty courses. For example, teaching how to prevent and eliminate unwholesome ions in "Analytical Chemistry" course, the conservation measures of natural resources in "Physical Geography" course, how to write stories about environment in writing course.

General EE in colleges/universities also is provided through selective or compulsory cross-curriculum courses on environment science or environmental education. For example, Tsinghua University demanded all undergraduate students must have credits on "Environmental Protection and Sustainable Development". Selective courses "Environmental Sciences" and "Introduction for Sustainable Development" are also provided for graduate students.

To adapt to the conditions of general EE, the teachers for general EE in colleges/universities include teachers who penetrate EE in specialty teaching self-consciously and teachers who specialize in general EE courses. But no matter for any type, China still has not any special institution and program to train teachers for general EE.

EE as a major in universities

Few universities in China provide master degree titled "environmental education". The students who got such degree usually become teachers specialize on EE in middle school or EE researchers in universities. Since they accepted special training on EE, not only environmental sciences, they are expected to be more capable to implement EE in all level schools. But hardly any universities, except for Beijing Normal University and Capital normal university, have such degree.

Discussion and Conclusion

Teachers play a very important role in development process of EE. In 1975, the International

Environmental Education Program argued that teacher training is the point of the point for EE. Research also showed that lack of qualified EE teacher is the main constraint for EE in China. But it is regretful that China didn' t have a complete and effective EE teacher training system till now, except teachers for environmental professional education. Only few elementary and middle schoolteachers are doing EE – as a part-time job. Such situation is obviously not satisfied and cannot meet the demand for "improving all citizens' environmental awareness".

EE capacity is the basic for an EE teacher – either in elementary/middle school or in college/university. EE capacity building needs proper EE training – either pre-service or in-service. Generally, three aims must be considered in EE training: firstly, improve teachers' understanding and sensitivity for environment: secondly, upgrade teachers' values on environment: improve teachers' skills for EE. Current EE teacher training system cannot reach these aims. In such sense, the most important constraint for development of EE in China is that teachers lack EE capacity. In long term, EE have to acquire legal position in education system. Then EE teacher training system can have a stable base: in short term, to improve teachers' EE capacity and provide enough EE teachers, especially in elementary/middle schools, distant educational technologies should be applied actively, in-service training should be the keystone and pre-service training should be enhanced. It still has a long way to run to make a rapid and remarkable progress on EE teacher training system in China.

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Issues and Challenges of Teacher Training in Environmental Education in Japan

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ABSTRACT

To clarify the challenges in the training of Japanese environmental educators, I examined the quality of training courses for schoolteachers. In Japan in the 1990s, the teacher training courses held by MEXT (Ministry of Education, Culture, Sports, Science and Technology) and educational boards had the good effect of promoting environmental education and disseminating the Belgrade Charter's idea of environmental education as a universal concept. Moreover, it resulted in the propagation of instruction methods such as hands-on and field activities and workshops. However, there are some challenges for improvement of training courses, such as new ideas for environmental education including ESD, approaches for environmental education instruction, knowledge of environmental processes and systems and the evaluation of environmental education practices. To solve these issues, a link between training courses and school classrooms will be necessary, and the partnership between schools and other institutions, such as environmental sections of local governments, the NGO and universities will be essential.

Key words: teacher training, professional development

The Quality of Training Courses for Environmental Educators in Schools

Courses for Teacher Training in Environmental Education Held by MEXT

As the "Course for Teacher Training in Environmental Education" held by MEXT has had the great effect of shaping the course of teacher training in regions, the examination of programs in this course is very important. MEXT entrusts the plan and management of training courses to other organizations, examines the plan of training programs proposed by organizations and approves plans after examination and correction. Nowadays, because of the participation of 150 teachers and supervisors of educational boards, two branches of the National Children's Center are entrusted with this course. The programs of two courses, in 2000, in two National Children's Centers are examined in this report.

As a result, these training courses have made teachers and supervisors understand the necessity of environmental education. In the 1990s, the supervisors who participated in this training course planned and conducted courses in local areas to disseminate environmental education. The training course served the role of spreading the interdisciplinary and integrated concepts of environmental education as described in the Belgrade Charter.

Next, the quality of the programs offered in this training course is examined. In the training courses, hands on activities and field activities such as nature experiences and environmental surveys were introduced. I speculate that these activities led to the development of educational materials and methods on environmental education in the 1990s. Moreover, the social and cultural approaches of workshops and role-playing in these courses were adopted for recognition of the value differences concerning the environment. Besides, by having workshops, the chance to create educational materials with participants was offered in group work sessions, which would contribute

to the understanding of the developmental methods of educational materials.

But there are several challenges in these courses. One of them is the necessity for the reexamination of concepts on environmental education. Although these courses were planned based on the Guidelines for Environmental Education written by MEXT in 1991, its concept should be reexamined. The 1999 report on environmental education by the Central Council for Environment, organized by the Ministry of Environment, described environmental education as related to a sustainable society. Therefore, the planning officer in a training course should reexamine the concept of environmental education and understand new ideas related to education for sustainable development.

Second is the essential approach to environmental education instruction such as inquiry-learning or problem-based learning. Although examples of such educational methods as hands-on activities, experience learning and workshops were shown in training courses, complete understanding of the instruction methodologies of environmental education will be necessary in the training course.

Third is the teacher's ability and skill to conduct the learning approach of action research or problem based learning. As students inquire into the environment in local areas for a scientific or social survey, during community based action research, the teacher should understand the basic ideas and methods of regional and environmental surveys. Understanding the concept of action research while conducting activities on experiential learning and workshops lets teachers understand the importance of conducting fieldwork and environmental surveys over a long period in schools. It is difficult for participants to understand the whole framework and details of community based action research and inquiry method in short training courses, but they need to know and see its essence. By using the above knowledge, the learning in the Period of Integrated Study at school makes children develop cognition and have an interest in basic subjects. In the case of the community based action research and inquiry-method, long term learning could be necessary in schools, so a lecture on these methods in training courses should offer the process and key points of its long term learning.

Fourth is the infusion of environmental education into the subjects. There is a trend that the infusion of environmental education into subjects wouldn't be stressed in the current training courses in comparison with the courses in the 1990s. Considering that the Period of Integrated Study by new Course of Study in Japan started in primary and secondary schools from April 2002, it is understandable that the training courses have a greater consideration for training activities related to this new period. But, participants should also understand that acquiring basic knowledge in each subject is important for the accurate understanding of environmental problems. We have to understand that the learning in this new period in school is situated on the basic knowledge from each subject as science, social study, mathematic, language, etc. Therefore, I think that learning about the infusion of environment into each subject is also necessary in the training course.

Fifth is environmental literacy, especially knowledge of environmental processes and systems, and environmental issues/problems. Although environmental experts taught about environmental processes and environmental problems in the training course, there could be a limit on the coverage of these issues, because the knowledge of experts could cover one or two academic fields. There should be systematic knowledge on environmental processes and systems, and environmental problems as environmental literacy for teachers who conduct environmental education in school, and experts will have to examine it.

Understanding of evaluation of environmental education practices in the school classroom is very important. However, it is not clear whether lectures on evaluation were conducted in these training or not. At least, evaluation/assessment of environmental education was not conducted in the training in 1990s. However, after inducing the Period of Integrated Study to school education, a method of evaluation/assessment, portfolio method, has been paid attention, so the effect of this method has to be searched.

Teacher training courses held by educational board of governments
The 1997 survey by the National Institute for Educational Research showed that 51 educational boards or education centers of prefectural governments have the experience of carrying out training course prior to or during that year. (There are 58 prefectural governments in Japan.) Therefore, it is speculated that the training course in environmental education has expanded in prefectural governments. These training courses contribute to the dissemination of environmental education in schools. However, it is only 1 or 2 days long. Even though the length of term of the training course is short, adequate quality can be achieved by the careful selection of lectures and practices.

Teacher training courses held by other organization
In Japan, professional development also exists in other organizations. They are: the national and local workshops or conferences held by teachers unions, the national and local workshops by teachers associations of each subject, the workshops for education leaders by NGOs, the workshops by universities the advice by supervisors in school classes, and participation of pilot projects for environmental education. The chance for the professional development of environmental education has expanded, so the dissemination of information about various professional developments is necessary.

Essential Qualities in Training Courses of Environmental Education

Based on the above discussion, the essential qualities in the training course are proposed as follows:
· Objectives and goals of environmental education including a vision of the future as ESD
· Distinctive feature of environmental education as an interdisciplinary and integrated field
· Environmental issues, and environmental processes and systems
· Design and planning of curriculum and practice of environmental education including the relationship between subject and problem based leaning
· Approaches of instruction such as hands-on, inquiry, community based action research, etc.
· Evaluation/assessment
· Resource information regarding experts in the field, paper materials and web sites

The proposal on essential qualities in the training course requires a long-term course of learning. However, most Japanese teachers are too busy to have the time to upgrade their skills as educators. If all essential qualities can't be introduced only in the training course, there should be support systems for professional development. For example, the link between a training course and instruction in a school classroom could be very useful for the optimal development of the environmental educator. Therefore, the educational boards need to reexamine quality of training course for environmental educator and support for link between course and school class for professional development.
Moreover, for ability development of environmental educators, I would like to recommend support by other institutions such as universities, the environmental section of local governments and the NGO. They have a lot of information and resources regarding the local environment and community, as well as the international and global environment. Environmental sections of local governments, that are energetic in the sustainable local society, have promoted good policies for public awareness of the environment. For example, a city office, which received ISO14001, has influenced school education as an eco-school project. The partnership between school and other institutions will be essential for professional development.

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Teaching Methods & Program Development in EE

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Environmental education serves many purposes, and depending upon the context, does very different things. One of the primary purposes of EE must be helping learners, regardless of age or setting, to understand complex environmental issues and be able to then make critical decisions relevant to their context and culture (Daudi and Heimlich, 2002). Methods are the intersection of the elements of the teaching-learning exchange (Heimlich and Norland, 1994) and provide an important key to success or failure in effective transmission of the intended message to the intended learner.

Unfortunately, many instructors select methods based on their own experience, exposure, and prior models–often poor models at that (Barzun, 1991) – rather than on the needs of the learner, the learners, the content, the context, and their teaching abilities. People learn in what can be organized as three distinct patterns: as individuals, in collaborative groups, or in institutionalized patterns, e.g. schools (Seaman and Fellenz, 1989). Our role and goal is to reach individuals in whatever pattern using the strategies that will most likely facilitate learning success.

Building Programs and Program Theory

For many decades, the U.S. was driven by curriculum theory in formal education and program design models for non-formal and informal educational programs. Ryder (2006) notes the variety of prescriptive design models including Algo-heuristic theory, ADDIE, ARCS, Criterion-referenced, component display, ISD, 4C-ID and others and presents a comparison against postmodern theories of instruction focusing on constructivism, action research, activity theory, anchored instruction, andragogy and the like. This suggests that how we teach is now more grounded in learning than in design from the instructional point of view.

With the move toward accountability, the field of evaluation's use of program models using program theory became increasingly dominant (Rogers and Haski, 2001). Currently, most organizations and agencies are requiring planning using program models which link intended audiences and activities directly to the outcomes of the program or educational experience. For many educators and organizations, this shift in planning focus has changed instructional methods used in various programs. To be more effective, an examination of the desired outcomes with the audience, the context, and the activity force educators to reconsider how they are presenting and engaging learners in their learning: the methods and strategies used in instruction.

Jones et al (1995) reported the work of Means' identification of seven variables that, when present in the classroom, indicate effective teaching and learning. These classroom variables, which can transfer to any learning setting and across the life-span are:
· learners engaged in authentic and multidisciplinary tasks
· assessments (formal or informal) based on learners' performance of real tasks
· learners participate in interactive modes of instruction
· learners work collaboratively
· learners are grouped heterogeneously
· the teacher facilitates learning

· learners learn through exploration

Methods are the tools by which educators can construct these opportunities.

Using Methods to Link Program Goals with Learner Motivations

Some theorists note there is consistent confusion about words used to describe the teaching process: methods, strategies, techniques, tools, devices, products and others (Seaman and Fellenz, 1989). In the vernacular, most individuals use "method" to refer to specific instructional strategies, even though theorists use method in reference to larger approaches. There are numerous taxonomies of methods and teaching strategies, and the purpose for all is to create a framework for understanding theoretical connections among different tools, all aimed at providing effective vehicles for transmission (Stronge, 2002). An example of the range of strategy considerations is the continuum of instruction from information giving to inquiry for science learning (Cantrell, 2004) to experiential education structures (e.g. Kraft and Kielsmeier, 1995). For many educators, the more traditional structure for methods includes five categories:

Presentation Methods include traditional lecture, lecture with visual aids, lecture with supplements (e.g. sensory added), presentations with examples including live animals, theatre, monologues, presentation/lecture with question/answer session, and other approaches where. In all of these, the teacher holds the information and controls its release in a primarily didactic manner. The primary purpose of presentation methods is the efficient delivery of a large quantity of information with the role of the educator being to present the information clearly, simply, and concisely (Lovell, 1987). When done well, a presentation method is effective in supplying information to learners in a directed, teacher-to-learner manner.

Discussion Methods range from small group activities to full group discussions, brainstorming approaches, group voting, and a host of other strategies that engage learners with each other. Over 10 years ago, a colleague and I gathered descriptions and citations for over 120 different group discussion strategies for a workshop on group process. Discussion methods are used to share knowledge among learners, create synergy, elicit ideas and information, and solve problems. When done well, discussion methods help move learning to evaluative levels through constructed situations developed and managed by the educator.

Discovery Methods are often those used in conservation education, outdoor education, and experiential education. For some educators, discovery methods include experiential methods while in other taxonomies, experiential methods are presented as a distinct category. In other taxonomies, discussion methods are considered part of discovery. Regardless, discovery learning is based on the premise that learners already know or have the ability to know most things. Discovery learning can include games, experiments, and process activities. When done well, discovery methods appear effortless in instruction (though they take tremendous amounts of preparation time), engage the learners fully, and are often "fun" hands-on, minds-on activities.

Media. Increasingly, media are viewed as a distinct methodological approach to teaching. In part, the rapidity with which technology is improving is creating ways of using media to share experiences and sensory experiences with learners that the educator could not otherwise provide. When done well, the educator prepares the learners for the medium and the information that is relevant to the class, course, or program. Media can supplement an educational experience with opportunities for learners that would otherwise be impossible to see or hear – an electronic or film-based field trip; interviews with expert scientists; tangible documentation of another's experience and the like.

Teacher-absent/Distance learning. As with all clusters of methods, there are entire books and courses dedicated to concepts of individualized instruction, programmed learning, and distance education. In all of these, there is an educator – they may be in a different location; asynchronous in interaction; engaged more in the development than the transmission of the information; presenting 'on-demand' information via electronic media; or play some other role in shaping the learning that follows that differs from the teacher in front of the group. The intent of these methods is to provide information to the learner either when the learner needs or wants to gain the information, or to provide information widely to a contemporary group of learners. When done well, teacher-absent/distance learning methods provide rich and rewarding experiences for individualized learning.

The intent of instruction is to facilitate learning; within environmental education this includes applying the skills of critical thinking and decision-making. The tools available to us to facilitate this learning are many and we need to use as many of these strategies, techniques, products, or devices as necessary to satisfy the diverse needs of learners, and to match our strategies to the abilities, characteristics, and levels of our learners (Woolfolk, 1990). Studies over several decades continue to reveal that different approaches to teaching can all be equally effective or equally ineffective (Biehler and Snowman, 1986). Our role is to find what works and use the tools appropriately.

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Environment Education Pedagogy/Teaching Methods And Teaching-Learning Materials

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ABSTRACT

The introduction of this paper is about the goal, vision and objectives of the UN Decade of Education for Sustainable Development. It also talks about the balance between theory and practice, if ESD is to be achieved, with the teacher as the focal point for learning. It describes some strategies, and has adopted suggested criteria for creating environmental education materials. There are 6 brief parts as follows: 1. Introduction; 2. Quality Education for Sustainable Development; 3. Strategies for Promoting Quality ESD; 4. Increasing Awareness and Promoting Training; 5. Creating Environmental Education Materials; 6. Conclusion. A short list of references, key words and acronyms are found at the end.

Key words: Balance of theory and practice, Quality education for sustainable development, Environment, Economy, Society and Institutions, Public Awareness and Training, Creating Environment Education Materials

Introduction

The UN Decade on Education for Sustainable Development (DESD) has the following over-all goal: "to integrate the values inherent in sustainable development into all aspects of learning to encourage changes in behavior that allow for a more sustainable future and for positive social transformation."[1] Four objectives have been formulated to translate the basic vision, which is "a world where everyone has the opportunity to benefit from education and learn the values, behavior and lifestyles required for a sustainable future and for positive societal transformation." These objectives are: (1) to facilitate networking, linkages, exchange and interaction among stakeholders in ESD; (2) to foster an increased quality of teaching and learning in education for sustainable development; (3) to help countries make progress towards and attain Millennium Development Goals (MDGs) through ESD efforts; and (4) to provide countries with new opportunities to incorporate ESD into education reform efforts. It is argued that ESD is based on a strong understanding of environmental education. It is in the context of objective no. 2 that this paper is developed.

Quality Education for Sustainable Development

The chief element of ESD is to advance the quality of education at all levels, and which is primarily dependent on the quality of teachers. Teachers are responsible for utilizing the appropriate pedagogy and teaching strategies for the transaction of environmental education for sustainability.

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[1] UNESCO, 2006, Highlights on Progress to Date, Education for Sustainable Development, UN Decade 2005-2014.

However, having the process is not enough – there should be a balance of theory and practice. The essentials of EE for sustainability should be known to the teachers, to encompass *Environment, Economy, Economy, Society and Institutions.* Details of these essentials could be identified by students with guidance from teachers and experts.

UNESCO has responded to this call by linking the Millennium Development Goals, the United Nations Literacy Decade (UNLD), and Education for All (EFA) and the Decade of Education for Sustainable Development.

Strategies for Promoting Quality ESD

To promote quality ESD, a "multi-level and diverse strategy" could be utilized, involving different actors, technical, financial resources, programs and projects which would lead to concrete actions in reorienting education towards sustainable development; increasing public awareness; promoting training; and re-orienting education towards sustainable development.

The multi-level and diverse strategies would involve the teacher as a catalyst for change. Different scenarios need a unique strategy for taking action. For example, even in formal education, the actions should go beyond the classroom; rather, students need to have a deep understanding, coupled with experience and involvement in solving the challenges of the environment. There are some strategies which may already be known to the teachers. Some of these are:

· development of a logical framework (log frame) for students to follow;
· systematic plans for student exchanges for sharing experiences;
· innovations in curriculum, teaching-learning resources, and utilization of new information technologies/multi media materials;
· internship with institutions and organizations and community groups; and
· Continuing education activities through short-term training and workshops.

Increasing public awareness and Promoting Training

Having mentioned the trickling/ripple effects of ESD, some countries have adopted the devolution of authority, accountability and resources to the most appropriate level with preference given to local responsibility and control over awareness-building activities. There is a need to increase public sensitivity to environment and development problems and involvement in their solutions in order to foster a sense of personal environmental responsibility and greater motivation and commitment towards sustainable development.

To promote broad public awareness as an essential part of a global education effort to strengthen attitudes, values and actions and change behavior is one of the underlying themes that laid the foundation for a set of strategic actions and initiatives outlined in the report, "Education for Sustainability: An Agenda for Action" This report was produced at a meeting held in San Francisco, California, in 1994.

Creating Environment Education Materials

There are instances when multi-media packages have to be prepared for up-to-date delivery of educational innovations. Adequately trained teachers with partners prepare the teaching-learning packages integrating messages relevant to the learner. The design of the materials is guided by some criteria which students could respond and think about. Some of these are:

1. Identification of the Target Audience: who are the intended audience? How are they identified? Who identifies them?
2. The Message: what is the issue? How is it presented? How appropriate/useful is it to the target audience?
3. The Medium used: is it print? non-print/electronic? On-line and off-line?
4. The Resources: what financial and technical resources are required? How are the resources mobilized?
5. The Actions: when should it take place? What strategy will ensure that the messages are received? Are they relevant? Contextual? Needs-based?
6. Monitoring and Evaluation: what are the criteria for monitoring? Who are involved? Is there a built-in monitoring and evaluation component in the training materials developed? In the actions proposed?

The US Environmental Protection Agency has some guidelines and core themes to ensure excellence in the development of EE materials. I am including these guidelines in the body of this paper, acknowledging the contribution of the agency in promoting ESD, and in giving a concrete contribution to the Decade.

Environmental Education Materials: Guidelines for Excellence[2]

1. Fairness and Accuracy: EE materials should be fair and accurate in describing environmental problems, issues, and conditions, and in reflecting the diversity of perspectives on them.

1.1 Factual accuracy
1.2 Balanced presentations of differing viewpoints and theories.
1.3 Openness to inquiry
1.4 Reflection of diversity

2. Depth: EE materials should foster awareness of the natural and build environment, an understanding of environmental concepts, conditions, and issues, and an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues, as appropriate for different developmental levels.

2.1 Awareness
2.2 Focus on concepts
2.3 Concepts in context
2.4 Attention to different scales

3. Emphasis on skills building: EE materials should build lifelong skills that enable learners to prevent and address environmental issues.

3.1 Critical and creative thinking
3.2 Applying skills to issues
3.3 Action skills

4. Action orientation: EE materials should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for environmental problem solving and action.

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[2] The US Environmental Protection Agency

4.1 Sense of personal stake and responsibility
4.2 Self-efficacy

5. *Instructional soundness:* EE materials should rely on instructional techniques that create an effective learning environment.

5.1 Learner-centered instruction
5.2 Different ways of learning
5.3 Connection to learners' everyday lives
5.4 Expanded learning environment
5.5 Interdisciplinary
5.6 Goals and objectives
5.7 Appropriateness for specific learning settings
5.8 Assessment

6. *Usability:* EE materials should be well designed and easy to use.

6.1 Clarity and logic
6.2 Easy to use
6.3 Long-lived
6.4 Adaptable
6.5 Accompanied by instruction and support
6.6 Make substantiated claims
6.7 Fit with national, state or local requirements

Core Themes of EE

1. Lifelong learning: The potential for learning about sustainability throughout one's life exists both within formal and non formal educational settings.

2. Interdisciplinary approaches: Education for sustainability provides a unique theme to integrate content and issues across disciplines and curricula.

3. Systems thinking: Learning about sustainability offers an opportunity to develop and exercise integrated systems approaches.

4. Partnerships: Partnerships forged between educational institutions and the broader community is key to advancing education for sustainability.

5. Multicultural perspectives: Achieving sustainability is dependent upon an understanding of diverse cultural perspectives and approaches to problem solving.

6. Empowerment: Lifelong learning, interdisciplinary approaches, systems thinking, partnerships, and multicultural perspectives empower individuals and institutions to contribute to sustainability.

Conclusion

The most important results of the environmental actions are the change in behavior, especially at the local level. What the students learn in school would trickle down to the families and have a ripple effect on societies and their community. This way people are empowered and sustainable

development is achieved.

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Acronyms

EE	Environment Education
EFA	Education for All
ESD	Education for Sustainable Development
UNDESD	United Nations Decade of Education for Sustainable Development
UNLD	United Nations Literacy Decade

Japanese Trends on Implementation and Theorization of "Pedagogy" and "Program Development" in Environmental Education

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ABSTRACT

This manuscript aims to deepen the international discussions about the viewpoints instructors and educators should have toward the content and methods of procedures for environmental education in school education, adult and community education, and life-long learning. In Japan, different implementations have been unfolding to this day. There are categories such as (1) pollution education, (2) nature conservation and outdoor education, (3) environmental education through school curriculum, (4) environmental education for life (environmental friendly civic activities: recycling, human rights, critical consuming etc.) (5) environmental education for the earth (global issue education: development education, peace education, etc.) Each category deals with environmental issues in their unique field of interest and target, building original methods and contents. This manuscript shows three points for future investigation including the trends of "Pedagogy" and "Program Development", amassing of outcome, and positioning according to today's principles of environmental education.

Key words: pedagogy, program development, andragogy, learning through investigating local issues, experiential learning, workshop, facilitation, participatory learning, education for sustainable development, action promoting political policy

Introduction

Pedagogy or Pedagogics is derived from a Greek word "Paidagogike" referring to "the art and science of teaching children". The historical origin of the research on this technique can be traced back before the formation of the science of education. (Ichimura et.al. 2000) More attention is now being paid to the process of self-directed inquiry through individual learners learning about internal interests in the field of adult and community education/life-long learning. Since the 1970's, andragogy, "the art and science of helping adults learn", compared to pedagogy, has been evolving with America playing the central role. (Akao 2004) On the other hand, program/curriculum development for environmental education has been discussing the actual contents and process of implementation. Though pedagogy and program development are primarily discussed individually, this manuscript aims to deepen the international discussions about the viewpoints instructors and educators should have toward contents and methods of procedures for environmental education in school education, adult and community education, and life-long learning. It also looks from the standpoint connecting the implementation and theorization on Environmental Education.

"Pedagogy" and "Program Development" Developed in Several Categories of Environmental Education in Japan

In Japan, there are several categories of environmental education. One sphere evolved from "pollution education" considering social justice, and another evolved from "nature conservation education". Since around the time of the Rio Summit, there has been a trend aiming to place these categories in a global viewpoint. Today there are different implementations unfolding such as (1) pollution education, (2) nature conservation and outdoor education, (3) education through school curriculum, (4) environmental education for life (environmental friendly civic activities: recycling, human rights, critical consuming etc.) (5) environmental education for the earth (global issue education: development education, peace education etc.) Each category deals with environmental issues in their unique field of interest and target, building original methods and contents such as the following:

Pollution Education

Pollution education seeks to join with people in communities to study pollution problems and to recognize the importance of the teacher's role from the standpoint of 'Education as a human right' (Asaoka 2005) During pollution education toward a movement against petrol complexes in Mishima and Numazu cities, a teacher and students of Numazu City High School for Industry inspected the report by a government inquiry committee as well as held discussions among the local residents. The teacher and students pointed out the insufficiency of the report and collected accurate, detailed data by weather observation and investigating the air streams. (Fukushima 1993) "Learning through investigating local issues" is a method where "citizens investigate local issues and confirm the information by themselves". A women's class in the Tobata area of Kita-kyushu City studied and then demanded to create air pollution regulations. It is evolving to allow communities to plan development projects restoring polluted areas.

Nature Conservation and Outdoor Education

Nature conservation education is focused on leading people to become aware of and to understand ecology and the conservation of biodiversity, and leading them to take action. Words like "communing with nature", "know about nature", "protect nature" show that focus, and techniques like nature observation and nature interpretation have been adopted as methodology. In outdoor education, "zest for living" is especially focused in response to the issues among children as they have become more serious since the late 1990s. Experiential activities like "experience in nature" or "experience in actual life" were introduced in school curriculums and youth education. The theory of experiential learning substantiated the experiential activities. Experiential learning is a theory that the learners reflects their own learning process in the nature, and by improving the process, it aims to lead people to take action on a daily basis. (Hoshino 2001) Instead of a teacher leading the learner in a one-way pattern, it lets the educator and learner inspire and learn from each other. It not only altered the method of teaching by introducing "critique" and "sharing", but it also enabled teachers to be aware of some learning processes that had not been considered so far. Packaged programs such as Sharing Nature, Project Wild, and Project Adventure have been introduced since the 1980s.

Education through School Curriculum

The Ministry of Education has established the principles of environmental education in school curriculums through the publication of "The Courses of Study" in 1989, "The Environmental Education Guideline for Secondary Schools" in 1991, "The Environmental Education Guideline for Primary Schools" in 1992, and "Case Studies" in 1995. Furthermore, "The Periods for Integrated Study" was added to "The Courses of Study" in 2002 as a new field. It aims to "foster the ability to find a theme, learn, think, judge, and solve a problem on their own". And also "nurture in

students the ability to build up their own way of learning and thinking, to foster an attitude to challenge problem-solving and to identify topics with creativity and autonomy, to think about their present and future life deeply". With these objectives, each school has the freedom to decide on the details. It is a new effort and case reports include international understanding, information, welfare and environment as subjects to learn about. Diverse learning methods like experiential learning, problem-solving, and group learning are used. Schools are getting the local residents to cooperate, and are initiating using local materials to teach.

Environmental Education for life (environmental friendly civic activities: recycling, human rights, critical consuming etc.)

The Basic Environment Law established in 1993 has a provision such as "Education and Learning on Environmental Conservation" (Article 25). Recycling, human rights, education for critical consuming, etc., have been evolving since the establishment of the Law to Promote Specified Nonprofit Activities in 1998. How to promote citizen participation, and how to reach a general consensus, are things which were considered most important. "Workshops", which is "a style of learning and creating in which participants initiate joining and experience learning something in a cooperative way, not like a lecture which is a one-way transmission of knowledge" (Nakano 2001), and "Facilitation", which is a technique to create the atmosphere for participatory learning, are evolving in various places.

Environmental Education for the earth (global issue education: development education, peace education etc.)

With the Earth Summit held in 1992 as a turning point, issues on the environment, development, population, human rights and gender are generally considered global issues. This made a connection between development education and environmental education. Education dealing with global issues tries to let the participants feel that the issues are close to themselves by participatory learning. They strive to develop teaching materials and curriculum to connect the world and each community. A theory entitled "Children's Participation" by Roger Hart was introduced as a learning methodology adopting "participation" to "community development". In this theory, they have eight levels for "the ladder of children's participation", and they let the children find an issue related to lifestyles within one square kilometer of their neighborhood. By letting the children try to solve those problems, they were expected to become adults who can find the solutions to environmental issues. As the actual method for solving problems, a methodology named "Action Research" was introduced. It lets children research the local area, discover and identify the actual problems, investigate them, and make a plan to solve them, and then take action. (Tanaka 2003)

The contents and methods used in each category mentioned above are also aggressively adopted in other fields. Also, I would like to mention that there is an investigation on the "Significant Life Experience" evolving as research on "life history learning" (Furihata et.al. 2006) as a new learning method.

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**Placement of the "Pedagogy" and "Program Development"
within Today's Guideline of Environmental Education**

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Let us confirm the placement of the "Pedagogy" and "Program Development" in the international guideline of Environmental Education.

United Nation Decade of Education for Sustainable Development

The United Nations Decade of Education for Sustainable Development has established "The International Implementation Scheme (IIS) for the Decade" which states that the overall goal of the

DESD is to "integrate the principles, values, and practices of sustainable development into aspects of education and learning" (.A.) It also mentions the importance of "the challenges in all forms of educational provision to adopt practices and approaches which foster the values of Sustainable Development" related to the "pedagogical process". Furthermore, it introduces "educational programs" such as the "ESD Toolkit", which was established for communities to develop their own ESD programs based on their culture, and "Teaching and Learning for a Sustainable Future" (UNESCO 2002). (V.A.5) With the recognition that "simply increasing the volume of education will not construct a sustainable future" : IIS claims the direction of existing education needs to be reconsidered with clear goals and values "aiming toward sustainable development".

"Basic Policy for Environmental Education Promotion Act"
On the other hand, the Japanese "Basic Policy for Environmental Education Promotion Act", established in 2004, has stated the following expressions as some methodologies for implementing environmental education. (1) By "fostering the ability to solve problems", encourage people to take "concrete action", and create a flow aiming toward a solution of the problems. (2) In order to connect the knowledge and understanding with action, it is important to let children experience activities in nature and in daily life, having practical experiences, the core of environmental education. Also it is important to have the viewpoint that children learn through playing.

Points to Pay Attention to Regarding the Future Research on "Pedagogy" and "Program Development"

Currently, a movement for the "UN Decade of Education for Sustainable Development" is getting organized in Japan with an aim to shaping it by March, 2006. Up to now, the following five ministries have been controlling the promotion of environmental education: Ministry of Education, Culture, Sports, Science and Technology: Ministry of Environment: Ministry of Land Infrastructure and Transport: Ministry of Agriculture, Forestry and Fisheries: and Ministry of Economy, Trade and Industry. Adding to these five, four more ministries joined to investigate a movement with the whole government involved, with the guidance of the Cabinet. The ministries are: Ministry of Foreign Affairs (ODA, etc.): Ministry of Justice (education on human rights): Ministry of Internal Affairs and Communications (community promotion): Ministry of Health, Labor and Welfare (HIV/AIDS, employment, welfare). While environmental education is entering a new expansion toward "Education for Sustainable Development" (ESD), I would like to clarify the following three points from the viewpoint of "Pedagogy" and "Program Development". The first two points are mainly about the contents, and the third point is about methodology.
First, let us think about the issue which the concept "sustainable" as in "sustainable development" has. There are questions about the vagueness of what to sustain. J. Fien and others, who were involved in establishing IIS, stated the importance of having a holistic or systemic view to see the process of change rather than having two opposite points such as "sustainable economic growth" or "sustainable human development". (Fien et. al. 2002)
Secondly, we need to find out how to include the issues caused by the society and economy. These points were not fully concerned in environmental education as a content theory up to now. Yoshinobu Kanda views the environmental problems as issues of awareness on reformation of the production system and public order. (Kanda 2002) A theory including the system of present-day society and economy which are producing problems, not only focusing on the awareness of such issues, is needed for the development of education.
Thirdly, the goal concept of the current environmental education, "promoting attitudes and values of individuals" is being transformed by the Education for Sustainable Development to a concept such as "change in social, economical, and political structures and in lifestyles". We need to find a way to correspond the methodology to this change. The Education for Sustainable Development in

Japan (ESD-J) has a mission "to play a role as a counterpart to the Japanese government by advocating policy proposals and collaborating in policy implementation aimed to encourage citizens and NGOs to form partnerships with the government, local authorities, international organizations and educational institutions in order to realize substantive ESD in Japan and overseas". ESD-J has been working to promote political policy decisions including the submission of a "Statement on the establishment of a structure to promote DESD" to Prime Minister Junichiro Koizumi. This has never happened with former organizations for environmental education. These actions promoting political policy enable us to be aware of how education is regulated by the structure of the society and lifestyles, and also enables us to directly take action to change the structure of our current society. The educational method organizing and planning, uniting the ongoing learning and policy proposals could be applied in every field. I think this could be considered a new learning methodology called "Action promoting political policy".

Acknowledgements

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Monitoring and Evaluation in the Context of UNDESD

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ABSTRACT

This paper summarizes one of strategy for the implementation of UNDESD, i.e. monitoring and evaluation, and introduces the ESD Indicator Project initiated by UNESCO Asia and Pacific Bureau of Education (UNESCO Bangkok) and the Commission on Education and Communication (CEC) of the World Conservation Union (IUCN). Then some points are discussed for the implementation of monitoring and evaluation activities based on the evolving process of the concept of Environmental Education (EE) to Environment and Population and Information for Human Development (EPD) and Education for Sustainable Development (ESD).

International Implementation Scheme (IIS) and UNESCO-IUCN CEC DESD Indicators Project

According to the UNDESD International Implementation Scheme (IIS)[1], seven strategies need to be considered for the implementation of the UNDESD: (1) vision building; (2) consultation and ownership; (3) partnership and networks; (4) capacity-building and training; (5) research and innovation; (6) use of information and communication technologies (ICTs); and (7) monitoring and evaluation. In particular, with regard to the "monitoring and evaluation", it is stated that:

> *"Monitoring and evaluation will become key strategies to ascertain the changes and impact of the Decade. An initiative as long and as complex as a Decade must benefit from adequate process of monitoring and evaluation from the start. [...] A key aspect of monitoring and evaluation will be the identification of suitable and relevant indicators at every level – local, national, regional and international – and for each initiative and programme.*
>
> *[...] As the Decade puts major emphasis on cooperation through the integration of ESD concerns into existing networks and alliances, each grouping should set up its own objectives, outcomes and indicators within the Decade framework. [...] Thus monitoring and evaluation will take place at many levels. [...] and will be an integral part of new initiatives and directions, which the Decade may stimulate. Both qualitative and quantitative evaluation methods will be necessary to track the DESD as well as longitudinal and community-wide studies.. "*

(UNESCO, 2005a)

For the put of the strategy on monitoring and evaluation into practice, the following points were recommended: (1) develop indicators to assess the impact of the DESD; (2) gather baseline data and set up longitudinal studies; (3) use data from international educational initiatives, e.g. Education for All (EFA), to track the progress.

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[1] UNESCO (2005a) United Nations Decade of Education for Sustainable Development, *International Implementation Scheme*, UNESCO Paris, France

Under the situation, UNESCO Bangkok and the Commission on Education and Communication (CEC) of the World Conservation Union (IUCN), in conjunction with Macquarie University (MU), are undertaking "DESD Indicators Project" that will assist with the task of monitoring progress and achievements of the Decade in the Asia-Pacific. During the first stage of the project, members of the "Expert Team" will work together through the E-list to assist in the preparation of a set of Guidelines for developing ESD Indicators at the national level. This group will act as an advisory group for sharing experiences with the "Guidelines Development Team", to be adapted at the national level.

<div align="center">ESD as the evolution from EE and EPD</div>

As a member of the Expert Team, the author emphasises the importance of consideration of its evolution process from "Environmental Education (EE)" to "Environment and Population and Information for Human Development (EPD)" and "Education for Sustainable Development (ESD)." By referring to main documents discussed at international level, there are some changes of the concept thorough the historical development of EE to EPD and ESD in terms of: (1) thematic point of view; and (2) approach point of view.

Historical Development – Thematic Areas

In focusing on thematic areas covered by EE, EPD and ESD, it can be seen some historical changes (see Figure 1). EE focuses on the improvement of environment and its quality, then EPD focuses on the three aspects: (1) environment (quality and quantity); (2) development (economic, education, social services, and capacity building); and (3) population (size, growth, distribution, and structure). ESD expanded further, according to draft Implementation Scheme (UNESCO, 2005b[2]), it includes three
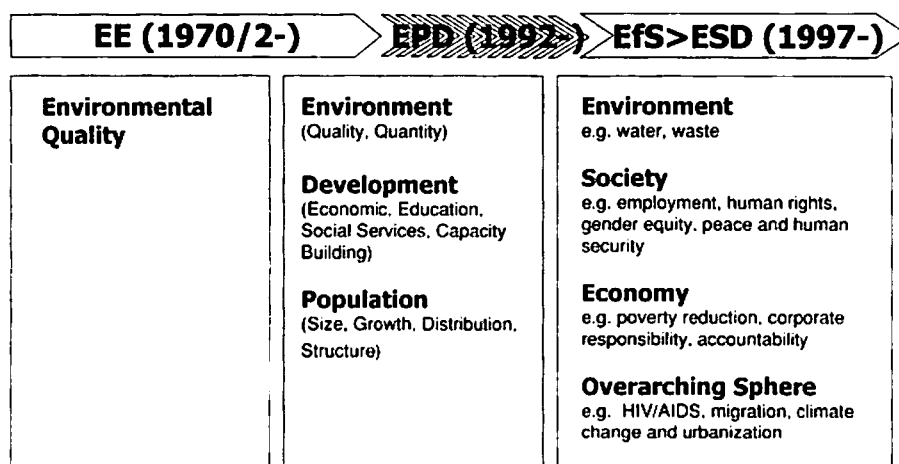
Evolution from EE, EPD, EfS to ESD

EE (1970/2-)	EPD (1992-)	EfS>ESD (1997-)
Environmental Quality	**Environment** (Quality, Quantity) **Development** (Economic, Education, Social Services, Capacity Building) **Population** (Size, Growth, Distribution, Structure)	**Environment** e.g. water, waste **Society** e.g. employment, human rights, gender equity, peace and human security **Economy** e.g. poverty reduction, corporate responsibility, accountability **Overarching Sphere** e.g. HIV/AIDS, migration, climate change and urbanization

<div align="center">Figure 1: Historical Changes—Thematic Areas Covered</div>

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[2] UNESCO. (2005b) United Nations Decade of Education for Sustainable Development 2005-2014. *Draft International Implementation Scheme*. UNESCO, Paris, France

perspectives with diversified thematic areas: (1) environment[3], e.g. natural resources, climate change, rural development, sustainable urbanisation, and disaster prevention and mitigation; (2) socio-culture[4], e.g. human rights, peace and human security, gender equality, cultural diversity and inter cultural understanding, health, HIV/AIDS, and governance; and (3) economy[5], e.g. poverty reduction, corporate responsibility and accountability, and market economy. However, International Implementation Scheme (IIS) categories three "spheres" (environment, society and economy) and an overarching sphere which includes HIV/AIDS, migration, climate change and urbanization (UNESCO, 2005a). It can be said that the thematic areas of ESD are comparatively diversified than the conventional thematic areas of EE.

Historical Development – Approaches

With regard to the approaches employed, Figure 2 shows the historical development. Special focus for EE was given to top down approach for solving environmental issues, quantity focused, knowledge transfer, formal education (FE) as major focus, cause-effect relationship and problem solving, which were emphasised under the theory of RDDA (Research, Development, Dissemination, Adoption). The RDDA approach is characterised by a managerial-hierarchical system, technocracy,
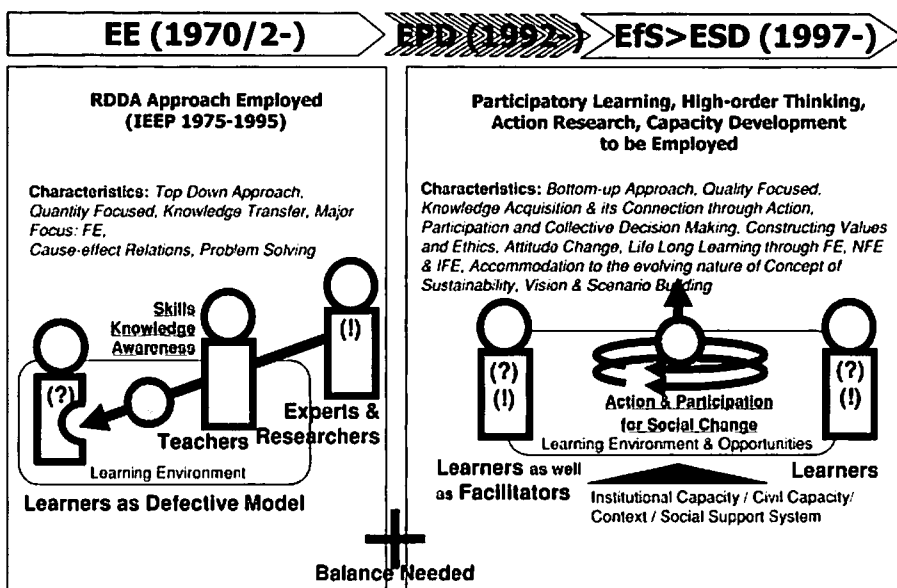

Figure 2: Historical Changes — Approaches Employed

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[3] **Environmental Perspective**: an awareness of the resources and fragility of the physical environment and the affects on it of human activity and decisions, with a commitment to factoring environmental concerns into social and economic policy development (UNESCO, 2005b).
[4] **Socio-Cultural Perspective**: an understanding of social institutions and their role in change and development, as well as the democratic and participatory systems which give opportunity for the expression of opinion, the selection of governments, the forgoing of consensus and the resolution of differences (UNESCO, 2005b).
[5] **Economical Perspective**: a sensitivity to the limits and potential of economic growth and their impact on society and on the environment, with a commitment to assess personal and societal levels of consumption out of concern for the environment and for social justice (UNESCO, 2005b).

and positivistic epistemology, that learners were regarded as defective model, that experts and researchers take a role of knowledge/skills/awareness providers (see Figure 2).

While, in case of ESD, special focus is given to participatory learning, high-order thinking and action research which enable to promote bottom-up approach, quality focused, knowledge acquisition and its connection, construction of values and ethics, attitude change, life long learning through formal education (FE), non-formal education (NFE) and in-formal education (IFE). It also respects the accommodation to the evolving nature of concept of sustainability.

By implementing with participatory learning, high-order thinking and action research, "teachers" (school teachers, non-formal mobile teachers, NGO facilitators, etc.) are able to take initiative in organising and improving their educational activities. Further, the "teachers" are expected to be learners as well as facilitators, and to share the learning opportunities and implement collective actions and decision making. In this approach, (1) individual capacity (value, ethics, cognition, high-order thinking, attitude), (2) institutional capacity (project management, institutional arrangement, e.g. partnership, networking and inter-linkages), (3) civil capacity (participation and collective decision making), (4) participatory teaching/learning methods and its process, (5) decision making process and (6) social support system, are the points to be considered for the promotion of quality education. The points described above need to be inter-linked to the conventional points which encompass: educational content, teaching/learning methods and well balanced and its process, teachers' capacity, learning environment and its access.

Consideration for the Implementation of Monitoring and Evaluation

In this connection, it is important to consider the implication of "Monitoring and Evaluation". The follows are some points to be considered for the implementation of monitoring and evaluation in the context of ESD.

Why evaluate?
· Promotes ownership and commitment
· Makes understand knowledge-action gap
· Makes understand current situation-vision gap
· Improves individual system thinking and management skills
· Improves the quality of an educational activities through constant feedback and real-time understanding
· Improves the skills of the staff facilitating or managing the project through a continual process of self-testing and refining.
· Improves the strategic focus of the educational activities, increasing impact and effectiveness of an educational activity
· Improves accountability
· Documents the vale of investing in an educational activities
· Promotes identity of the individuals, institutions and/or communities

What evaluate?
· Quality and Quantity
· Individual (cognition, skills, behaviour, thinking, value and ethics, etc.)
· Project Management (effectiveness, efficiency, social impact, project sustainability, project relevance, etc.)
· Institutional Capacity (institutional arrangements, incentives, learning environment, decision making etc.)

- Civil Capacity
- Social support system
- Consideration of the context
- Process (decision making, communication, etc.)

How evaluate?
- Qualitative and Quantitative manner
- Evaluation Methods (self evaluation, external evaluation, joint evaluation, participatory evaluation, etc.)

When evaluate?
- Evaluation Type (diagnostic evaluation, formative evaluation, summative evaluation, follow-up evaluation, etc.)

Evaluation, as a Part of Learning Cycle.

Evaluation is often viewed as providing "success" or "failure" about an educational activity. While, it can be considered a threat or disruption to the successful implementation of an educational activity. However, the approach to evaluation is changing rapidly. Rather than final judgement (summative evaluation), it provides the needs identification & feasibility studies (diagnostic evaluation), process documentation and improvement (formative evaluation), dialogue and collective decision-making. According to the UNDESD International Implementation Scheme (IIS), it is described as one of characteristics of ESD that ESD accommodates the evolving nature of the concept of sustainability. This implies that it needs to be linked between changing approach of evaluation and educational activities based on evolving nature of the concept of sustainability. Further, evaluation needs to be used as a tool for learning as well as management and decision-making in the day-to-day running of the educational activities. Therefore, it needs to be regarded as a part of learning cycle. It can still have the character of final judgement (formative evaluation), but if incorporated in the educational activities and planned, evalution makes for better learning and decisions as well as better educational practices.

Review of Evaluation of Environmental Education in Japan

Osamu ABE*, Ikuko YABUNAMI**, Keiko TAKAHASHI**, Toshiya KODAMA**,
Hideya CHODA**, Eihaku ITOOKA**, Naoko MATSUMURA**, Akane SATO**,
Yoshihiro NISHIDA**, Miki KANNDA**

Rikkyo Graduate School*, Rikkyo Graduate School Environmental Research Group**

ABSTRACT

The aim of this manuscript is to review the evaluation of environmental education in Japan. It shows in systematic order, the purposes of evaluation, evaluator, the object of evaluation, evaluation methodology, and indicators in Japan. Also, we want to examine the current challenges for evaluation activities of environmental education. We would like to come up with new ways of thinking about an evaluation of environmental education including ESD (Education for Sustainable Development).

Key words: environmental education, ESD (Education for Sustainable Development), evaluation, educational evaluation, program evaluation, participatory evaluation, empowerment evaluation

Currently, environmental education is recognized as an important issue all over the world. In Japan, Environment Basic Law was promulgated and enforced in 1993 and Article 25 provided for "Environment and study concerning protection of the environment." We could almost say that we have brought about quantitative expansion of environmental education. We must also think about qualitative repletion. To achieve effective progress toward environmental education, we have to improve both our curricula and environmental education programs. Evaluation activities play a significant role in improving the curricula and programs, also it gives students and learners a self-determining ability.

Experts and educators of environmental education have tried to evaluate curricula and programs of EE: however, they haven't systematized the methods of evaluation of EE yet. This is because there is diversification of the purposes of EE.

We would like to review the following:
1) What kind of evaluation activities have been done? The purposes of the evaluation, evaluator, the object of evaluation, evaluation methodology, and indicators.
2) What is the current challenge for the evaluation of EE activities? And would like to approach to the following issues:
3) If we evaluate ESD, we need a different viewpoint. What is it?

Annex

ACCU International Exchange Programme under the UNESCO
Japan Funds-in-Trust for the Promotion of International Cooperation and Mutual Understanding

JSEE/ACCU Asia-Pacific Conference/Workshop for EE Research Professionals: Past, Present, and Future - Reorientation of Environmental Education Practices towards ESD in the Asia-Pacific

Program Schedule

DAY1 Mon 27 Feb	International Participants: Arrival & Registration	
DAY2 Tue 28 Feb Moderator: Hiromi Kobori, The Mosashi Institute of Technology (Languages: English/ Japanese) Venue: National Olympics Memorial Youth Center (NYC), Yoyogi, Tokyo	9:30-9:40	Opening Remarks by Prof. Kimiko Kozawa, President of the Japanese Society of Environmental Education (JSEE)
	9:40-12:40	**Plenary Session I: Analysis Report on the Past and Present of Environmental Education Research in the Asia-Pacific** Moderater: Osamu Abe, Rikkyo University Assistant: Herbert Donovan, Rikkyo University • China: Tian Qing, Beijing Normal University • South Korea: Sun-kyung Lee, Cheongju National University of Education • Taiwan: Tzuchau Chang, National Taiwan Normal University Q & A Coffee Break • Philippines: Lucile C. Gregorio, Philippine National Commission for UNESCO • US: Joseph Heimlich, Ohio State University, NAAEE • Japan: Kimiko Kozawa, JSEE Q & A
	13:00-14:00	Lunch
	14:00-18:00	**Group Discussion I & II: Learning from Environmental Education Practices** (After seven presentations (15min each), participants will be divided under two topics for group discussion)
	14:05-14:50	Presentation from Group I: Primary & Secondary Education · Sun-kyung Lee, Cheongju National University of Education · Masakazu Goto, National Institute for Educational Policy Research · Ryoji Izumi, Yokohama City Board of Education
	14:50-15:50	Presentation from Group II: Higher Education & Educator Training · Tzuchau Chang, National Taiwan Normal University · Hiromi Kobori, The Musashi Institute of Technology · Tian Qing, Beijing Normal University · Toshihiko Higuchi, Tokyo Gakugei University

	15:50-16:05	· Coffee Break
	16:05-18:00	· Group Discussion I: Primary & Secondary Education · Moderator: Sun-Kyung Lee & Toshihiko Ando · Rapporteur: Yasuo Ikari · Participants: Masakazu Goto, Ryoji Izumi, Osamu Shiose · Group Discussion II: Higher Education & Educator Training · Moderator: Tzuchau Chang & Toshihiko Higuchi · Rapporteur: Herbert Donovan · Participants: Hiromi Kobori
	18:30-20:00	Reception hosted by JSEE President MC: Yukihiko Asaoka, Tokyo University of Agriculture and Technology
DAY3 Wed 1 Mar Moderator: Osamu Abe, Rikkyo University (Languages: English/Japanese) Venue: National Olympics Memorial Youth Center (NYC), Yoyogi, Tokyo	9:00-12:30	**Group Discussion III & IV: Connecting Environmental Education Practices and Theories** · (After five presentations (15min each), participants will be divided under two topics for group discussion)
	9:00-9:05	· Address by Moderator: Osamu Abe, Rikkyo University
	9:05-9:50	Presentation from Group III: Pedagogy/ Teaching Methods & Program Development · Joseph Heimlich, Ohio State University · Lucile C. Gregorio, Philippine National Commission for UNESCO · Shinichi Furihata, Japan Nature Game Association
	9:50-10:20	Presentation from Group Discussion IV: Monitoring and Evaluation · Masahisa Sato, Asia/Pacific Cultural Centre for UNESCO/ Daniela Tilbury, Macquire University · Ikuko Yabunami, Rikkyo Graduate School Environmental Research Group
	10:20-10:35	· Coffee Break
	10:35-12:30	Group Discussion III: Pedagogy/ Teaching Methods & Program Development · Moderator: Lucile C. Gregorio & Kazuyuki Mikami · Rapporteur: Yasuo Ikari · Participants: Joseph Heimlich, Shinichi Furihata, Mitsuharu Mizuyama Group Discussion IV: Monitoring and Evaluation · Moderator: Masahisa Sato · Rapporteur: Yuko Oguri and Tai Harada · Participants: Osamu Abe, Yuko Oguri, Ikuko Yabunami, Sachi Ninomiya-Lim
	12:30-13:30	Lunch
	13:30-17:00	**Plenary Session II: System Thinking and Holistic Approach/ Future Direction** Moderater: Lucile C. Gregorio, Kimiko Kozawa, and Masahisa Sato Rapporteur: Rie Imoto

DAY4 Thu 2 Mar Stay in Kyoto	Field Trip (Arranged and attended by Kousuke Toda and Akira Ogihara)	
	AM	Departure from Tokyo to Kyoto
	PM	Lake Biwa Museum
DAY5 Fri 3 Mar Back to Tokyo	AM	City of Nishinomiya/ Learning and Ecological Activities Foundation for Children
	PM	Departure from Shin-Osaka to Tokyo
DAY6 Sat 4 Mar Moderator: Fumiaki Taniguchi, Konan University (English/Japanese - Simultaneous Interpretation) Venue: Rikkyo University or JICA International Conference Hall	Open Forum: Reorienting EE towards ESD in the Asia-Pacific	
	10:00	Address by Prof. Kimiko Kozawa, President of JSEE
	10:20-10:30	Overview of the JSEE Asia-Pacific EE/ESD Conference: Prof. Hiromi Kobori, Chairperson of JSEE International Conference Committee
	10:30-12:30	**Analysis Report on the Past and Present of Environmental Education Research in the Asia-Pacific** • China: Tian Qing, Beijing Normal U niversity • South Korea: Sun-kyung Lee, Cheongju National University of Education • Taiwan: Tzuchau Chang, National Taiwan Normal University • Philippines: Lucile C. Gregorio, Philippine National Commission for UNESCO • US: Joseph Heimlich, Ohio State University, NAAEE • Japan: Kimiko Kozawa, JSEE
	12:30-14:00	Lunch
	14:00-16:45	**Panel Discussion** Moderators: Fumiaki Taniguchi and Masahisa Sato Panelists: From Group I – Lee/Ando From Group II – Chang /Higuchi From Group III – Gregorio/Mikami From Group IV – Oguri
	16:45-17:00	Closing Remarks: Osamu Abe, Rikkyo University
DAY7 Sun 5 Mar	Follow-up	Drawing up Conference Minutes & Reports (Group moderators and rapporteurs)
DAY8 Mon 6 Mar	International Participants: Departure	

Welcome Remarks

Kimiko KOZAWA

President of The Japanese Society of Environmental Education

Professor at Tokyo Gakugei University

It is my great pleasure to extend to all the participants a hearty greeting on behalf of The Japanese Society of Environmental Education at the JSEE International Conference/Workshop for EE Research Professionals. I thank ACCU (Asia/Pacific Cultural Center for UNESCO) who co-organized this conference. And I also thank MEXT (Ministry of Education, Culture, Sports, Science and Technology) and Ministry of the Environment who is supporting this conference.

First of all, I would like to express my warmest welcome to all participants and particularly overseas guests from the Asia and Pacific Region.

The theme of this seminar, "Past, Present, and Future – Reorientation of Environmental Education Practices towards ESD," is very important for the promotion of environmental education in Asia and the Pacific region.

I hope this conference will be an exceptional opportunity for exchanging and creating many good ideas and insights on environmental education.

During the breaks between sessions, a reception and field trip has been arranged, so that it will be possible for all participants to get to know one another. I am sure our exchange of information and experiences will contribute greatly to the international understanding we all so earnestly wish for.

Finally, let me once again extend a warm welcome to all participants and express the wish that our deliberations during this week may be meaningful.

Program Objectives and Expected Results

Hiromi KOBORI

Chairperson of Steering Committee

Objectives of the Program

The United Nations Conference on the Human Environment in Stockholm (1972) marked the start of an international movement to develop Environmental Education (EE). Since then, the international community has increasingly recognised EE as a critical challenge. EE continues to evolve today: notably, the concept of "Sustainable Development" became prominent after the publication of "Our Common Future," the report of the World Commission on Environment and Development in 1987. More recently, the World Summit on Sustainable Development (Earth Summit) in 1992, and the International Conference on Environment and Society held in Thessaloniki in 1997, reaffirmed the importance of EE for realising a sustainable future.

In September 2002, the World Summit for Sustainable Development in Johannesburg endorsed a UN Decade of Education for Sustainable Development (DESD), and three months later the UN General Assembly made the decision to implement it. The Draft International Implementation Scheme for the DESD, submitted by UNESCO to the UN General Assembly at the end of 2004,

states: "In order to identify and further delineate the key research issues, regional conferences of research institutions should be held during the first year of the Decade. This should serve also to set up cooperative research partnerships across countries and regions."

This conference, entitled "Past, Present, and Future: Reorientation of Environmental Education Practices towards ESD in the Asia-Pacific," was organized by the Japanese Society of Environmental Education (JSEE) and the Asia/Pacific Cultural Center for UNESCO (ACCU). It is a reply to UNESCO's call to implement an international conference in the Asia-Pacific region, to discuss ESD from the joint perspectives of EE research and practice. The program aims to fulfil the following three objectives:

1. Review of EE Research Developments and Achievements in the Asia-Pacific
   a. To share information regarding the history and present status of EE research throughout the Asia-Pacific region. Also, to clarify research trends and achievements in EE:
   − *Analysis Report on the Past and Present of Environmental Education Research in the Asia −*
      Pacific (Plenary Session I)

2. Consideration of Measures to Integrate EE Research and Practice
   a. To share and learn from examples of current EE practices in the areas of:
   − *Primary & Secondary Education (Group Discussion I)*
   − *Higher Education/Educator Training (G.D. II)*
   b. To consider and propose measures to integrate EE research and practice, also aware of the need to integrate EE practice and theory, under the themes:
   − *Pedagogy/Teaching Methods & Program Development (G.D. III)*
   − *Monitoring and Evaluation (G.D. IV)*

3. Reorientation of EE towards ESD
   a. To review and reassess conventional EE practices from the viewpoint of 'ESD,' or education that contributes to the realisation of a sustainable society. To discuss and propose measures to effectively integrate prior research achievements into practices in diverse fields, such as specialist training, partnership, and practice evaluation, and realise an improved implementation of EE for a sustainable future. Moreover, to identify the priorities for the next 9-years of EE research:
   − *System Thinking and Holistic Approach/Future Direction (Plenary Session II)*

Expected Results of the Program
   This program aims to promote international research cooperation based on "Education for a Sustainable Future," which UNESCO recognises as one of its most important target areas. These are the expected results:
i. Realization of one of the "Regional Conferences of Research Institutions," to "identify and further delineate the key research issues;" the Draft International Implementation Scheme for the DESD states such conferences, "should be held during the first year of the Decade." Our conference will directly contribute to the realisation of this proposal.
ii. An academic exchange on significant EE research achievements from past to present, among Asia-Pacific EE researchers and professionals. After the program, participants will return to their respective localities, to share the experiences and information acquired during the program with their colleagues.
iii. The priorities of EE research for the next decade will be clarified from the viewpoint of ESD. Such clarification will enable EE researchers and professionals from diverse localities to implement meaningful research and practices to effectively promote EE/ESD development.
iv. Measures will be proposed to integrate EE research achievements into practice, helping to advance EE as "action oriented" rather than simply a theory. Specifically, results of this program will be used to build a foothold for researchers working on ESD in such areas as professional development, partnership, and practice evaluation.

List of Participants

1. Participants from aboard
Tzuchau CHANG (National Taiwan Normal University) *
Lucille C. GREGORIO (UNESCO NATIONAL COMMISSION OF THE PHILIPPINES)*
Joe E. HEIMLICH (Ohio State University)*
Sun-kyung LEE (Cheongju National University of Education, Korea)*
(*funded by ACCU)

2. Participants of Japan
Masakazu GOTO (National Institute for Educational Policy Research of Japan)
Yasuo IKARI (Dynax Urban Environmental Research Inst., Inc.
Ryoji IZUMI (Board of Education Secretariat, City of Yokohama)
Fumiaki TANIGUCHI (Konan University)
Ikuko YABUNAMI (Rikkyo University)

3. Steering Committee (also Participants)
Hiromi KOBORI (The Musashi Institute of Technology) – Chairperson of the Committee
Kimiko KOZAWA (Tokyo Gakugei University) – President of JSEE
(by alphabetical order)
Osamu ABE (Rikkyo University)
Toshihiko ANDO(Saitama University)
Yukihiko ASAOKA(Tokyo University of Agriculture and Technology)
Herbert DONOVAN (Rikkyo University)
Shinichi FURIHATA (Japan Nature Game Association)
Go HAGIWARA (Rikkyo University)
Tai HARADA(National Institute of Advanced Industrial Science and Technology)
Toshihiko HIGUCHI (Tokyo Gakugei University)
Makoto HONJO(Mamigaoka Higashi Primary School)
Rie IMOTO (Fukuoka Institute of Technology) – Executive Office
Masaaki KODERA
Kazuyuki MIKAMI (Miyagi University of Education)
Shusaku MINATO(Yamane Musium)
Sachi Ninomiya-Lim (Japan Council on the UN Decade of Education for SustainableDevelopment) –
Executive Office
Akira OGIHARA (Mie University)
Yuko OGURI(Kagoshima University)
Masahisa SATO(Asia/Pacific Cultural Centre for UNESCO)
Michiko SENO (Tokyo Gakugei University) – Executive Office
Osamu SHIOSE (Jiyunomori Gakuen High School)
Kosuke TODA(Learning and Ecological Activities Foundation for Children)

4. Participants on Open Forum
42 people