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	○
Water Turbidity	Change water circulation pattern in pond	Local Government	○
Excessive Growth of Introduced Plant	Proper management of watercress	University	○

Evaluation Key ○: 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: ①Open its doors to the community, allowing access to the knowledge, human resources, and facilities within; ②Gear more research and educational activities towards the needs of the community; ③Teach research skills to interested citizens, NGOs, and businesses; help these parties participate in the long-term planning of their communities; ④Promote links among different sectors of the community, by strengthening the university's role as an intermediary organization; ⑤Support 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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