

Environmental Education at Sakado Senior High School, University of Tsukuba

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Sakado Senior High School, University of Tsukuba (UTSS) is an integrated curriculum high school. The educational goal is to provide students with a comprehensive general and specialized education so that they become life-long learners who are able to adapt and continue making contributions in an ever-changing society. As one means of achieving this goal, UTSS offers several environmental education activities, including in-school programs, cooperative activities with other institutions, and international educational opportunities. Students can study useful animal and plants and acquire knowledge and skills for utilizing them, while also learning how to conserve and protect nature, wildlife, and the environment. A wide range of agricultural and environmental activities are carried out at the school's large operational farm. Many students raise and harvest vegetables for the first time in the required class Industrial Society and Human Beings. UTSS students also participate in cooperative activities with other institutions. For example, students can conduct field work in cooperation with the Agriculture and Forestry Research Center at the University of Tsukuba. UTSS also works with various non-profit organizations, national institutes, and local communities to provide a broad range of educational experiences to UTSS students. Every year, students have the opportunity to interact with visitors from foreign countries (e.g., Thailand, Indonesia, the United States, and Afghanistan). Some students do research projects on international issues and receive financial support from the Education Bureau of Laboratory Schools at the University of Tsukuba. UTSS teaching staff also is offered the opportunity to work in developing countries through the Japan International Cooperation Agency.

Key words: Environmental Education, ESD, Integrated course school, JICA volunteer, Realistic Experience

Introduction

Sakado Senior High School, University of Tsukuba (UTSS) was originally established in 1946 as the Sakado Business School and the Sakado Women's Business School in a consolidated school district that included Sakado and neighboring towns and villages. In 1953, UTSS became a national high school as a laboratory school, which was part of the Tokyo University of Education. In 1978, the school's name was changed to its current name, Sakado Senior High School, University of Tsukuba. In 1994, UTSS was further recognized as an "integrated course school." In this course, students can choose subjects which they want to learn. As the Ministry of Education's prototype for promoting

education reform, it was established as Japan's first high school with an integrated science program.

UTSS's integrated science program is characterized by its respect for the individual and an emphasis on career guidance. The program is designed to open the way for independent learning to suit each individual student and his or her career choice. To achieve this goal, UTSS offers a variety of elective courses that are based on the school's academic goals and a systematic course of study. Examples of programs include Biological Resources and Environmental Science, Engineering Systems and Information Science, Life and Human Sciences, and Humanities/Social Science and Communication.

In an integrated course school, it is important for

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students to approach their studies with an independent awareness of their own goals, which are matched to their individual aptitudes and other attributes. While considering their own futures and career paths, students are encouraged to develop their own styles of learning and to independently choose the course electives necessary to fulfill their goals. The course Industry and Humanity is taken by all first-year students, and the goal is to help them define and achieve their aims. Students are encouraged to examine industry from various perspectives as well as to make connections between different aspects of industry. At the same time, students are able to more deeply consider the relationship between themselves and industrial society in the first-year course Understanding Industry, which encourages self-discovery and independent problem solving. In the second-year course Fundamental Entrepreneurship, students are encouraged to develop an entrepreneurial spirit by thinking about activities such as planning potential contributions to society and the provision of services. These courses are core elements of the school's approach to career-based education.

The educational goal of UTSS is to provide students with a comprehensive general and specialized education so that they are able to be life-long learners who are able to adapt and continue making contributions in an ever-changing society. This goal is in line with the goals of education for sustainable development (ESD).

An integrated curriculum high school like UTSS can play an important role in advancing the ESD concept in both secondary and higher education. In this paper, I describe this role, with a focus on the environmental education program at UTSS, which includes in-school programs, cooperative activities with other institutions, and international educational experiences.

Educational Activities in the Classroom and at the School Farm

UTSS offers classes in biological resources and environmental science. In this series of classes, students study useful animals and plants and acquire the knowledge and skills for correctly controlling and using them. Students also learn to understand appropriate environments where these living beings can grow and develop. One of the

aims is to help students develop the ability to contribute to the development, utilization, and protection of the biomass. In courses such as Environmental Creation, Environmental Sciences on the Farm, Human Life and the Environment, and Global Environment, the school has implemented practical experiments on biodiversity, global warming, energy resources, food, water resources, forest resources, desertification, and other topics.

The school's farm is 22,230 square meters (Fig. 1). A wide range of activities are available, and both agricultural and environmental studies are carried out at the farm. Many students raise and harvest vegetables for the first time in the required 10th-grade class Industrial Society and Human Beings.

A project entitled Making a Forest at School was started in 2001 in cooperation with the Silviculture and Nature Conservation Laboratory at the University of Tsukuba. Each student raised a young *Quercus serrata* plant from an acorn. These trees have now grown into a forest similar to those found in the Musashino district (Fig. 2).



Fig. 1. UTSS school farm.



Fig. 2. School forest in (a) 2001 and (b) 2010.

Cooperative Activities with Other Institutions

Cooperation between the University of Tsukuba and UTSS

In cooperation with the Agricultural and Forestry Research Center (AFRC) at the University of Tsukuba, about 30 freshmen engage in field work in forestry, agriculture, and conservation in the university forest in Yatsugatake during summer vacation each year (Fig. 3). In addition, about 30 students in the 11th grade raise stock and grow fruits and vegetables at AFRC each August. Students also learn about the ISO14001 environmental management system in AFRC from AFRC staff for making good environmental management standards in their school.

Science Partnership Project (SPP) Lecture

The Science Partnership Project (SPP) was implemented by the Japan Science and Technology Agency for “the expansion of science and mathematics education to the human resources who will play important roles in the next generation.” The purpose of the project is to nurture intellectually curious young people with interests in the fields of science, technology, and mathematics. UTSS has participated in this project since 2007, incorporating special lectures by university staff and forestry experts, in cooperation with the Forest and Forest Products Research Institute (FFPRI).

University faculty members also give special lec-



Fig. 3. Students conducting field work in the University of Tsukuba forest.

tures at UTSS on topics such as “Water Circulation on Grasslands” and “Global Warming and Agromomics—Tackling Desertification.”

Students also conduct experiments in FFPRI’s forests and learn about local forest and environmental conditions through field work in forest management and tree measurement.

Interactions with Local Elementary and Junior High Schools

UTSS began to support the *syokuiku* (food education) program of Sakado City South Elementary School as part of its Periods for Integrated Study in 2010. At about the same time, UTSS also began to supply vegetables grown on the school farm to Sakado City Junior High School for its school lunch program, in part to teach the *Chisan Chisho* concept (local production for local consumption) to students from UTSS and the junior high school.

International Environmental Education Activities

Support for Research on International Issues

Every year, UTSS students have the opportunity to interact with visitors from foreign countries (e. g., Thailand, Indonesia, the United States, and Afghanistan). Students are required to do a thesis for graduation, and some students choose to study international issues. Students who conduct their graduation research on international issues can receive financial support from the Education Bureau of Laboratory Schools at the University of Tsukuba. For example, one student visited the Philippines in 2008 to research international understanding and wrote a thesis stating that direct exchange is the most important aspect in cross-cultural understanding. In 2009, two students received financial support. One went to Shanxi, China, and visited the Environment Forest Center and alkaline dessert in Datong. He then wrote a thesis on developing water conservation technology for cultivating alkali grass. The other student visited Kasetsart University in Thailand to conduct research on using bioethanol as a countermeasure against global warming. This student is now a senior and is still conducting research on this topic.

International Cooperation Initiative

In 2008, as one of the projects administered by

the Ministry of Education, Culture, Sports, Science and Technology (MEXT), AFRC and UTSS cooperated in promoting the development of an energy and environmental education model suitable for use in developing countries by taking advantage of the knowledge and experience gained through the comprehensive programs of UTSS.

UTSS selected Kornita Senior High School, Bogor Agricultural University (Indonesia) as a target school for developing an energy and environmental education model. The focus was on bamboo, a common native material that has deep cultural roots in Indonesia, and developed a course of study using the comprehensive programs at UTSS as a model. During our first visit, we implemented the educational cooperation model and developed a shared understanding of bamboo as a material for energy production and environmental education. During our second visit, we presented a draft of the curriculum and lecture contents, provided a model lecture that introduced the multiple functions of bamboo, and demonstrated charcoal production and use. We created teaching materials that were written in English and combined instructional objectives with theories from multiple scientific disciplines and our hands-on experience. This activity promises to develop an excellent and unique energy production and environmental education model to promote sustainable development based on the utilization of an alternative biomass material while simultaneously promoting environmental preservation.

Teacher Dispatch Program

The Japan International Cooperation Agency has a program that sends Japanese teachers to developing countries as volunteers. I went to Indonesia for 2 years under this program and worked at



Fig. 4. Environmental education activity in an Indonesian elementary school conducted by a staff member of Gunung Gede Pangrango National Park.

Gunung Gede Pangrango National Park, Cianjur, West Java, Indonesia as environmental education expert. My responsibilities included going to local elementary and junior high schools with national park staff to conduct environmental education activities (Fig. 4.). I also promoted eco-tourism for Japanese people visiting Jakarta. This program is a meaningful way for teachers to bring ESD concepts to students and educators in developing countries and to gain a better understanding of ESD for their own schools.

Conclusion

For ESD activities and concepts to progress in schools, cooperation between secondary and higher education institutions is required. Laboratory schools, such as UTSS, and universities have to create a new model of cooperation, and laboratory school teachers need to act as a bridge connecting educators and institutions of secondary and higher education.