

THE ANALYSIS ON CHINA'S HIGHER ENVIRONMENTAL EDUCATION (*Analisis Pendidikan Tinggi Lingkungan Cina*)

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Abstrak

Makalah ini menganalisis pendidikan tinggi lingkungan hidup secara sistematis, menelaah strukturnya, menilai kekurangannya, dengan menggunakan Universitas Tsinghua sebagai kajian kasus dan memperkenalkan proses penghijauan kampus di sana.

Abstract

This paper analyses China's higher environmental education systematically, reviews its structure, evaluates its shortcomings, takes Tsinghua University as a case study and introduces the process of greening the campus in Tsinghua University.

Key words: sustainable development; higher environmental education; professional environmental education; non-professional environmental education; adult higher environmental education.

Since the United Nation's Conference on the Environment and Development in Rio de Janeiro, Brazil, in 1991 the importance of environmental protection and sustainable development has been realized by many leaders and become a significant component of the global perpetual concern of peace and development. Now, in China, as a fundamental strategy, environment protection is well known. Facing environmental degradation and sharp economic competition, the Chinese government put forward two strategies: sustainable development and as "thriving country"- through science, technology and education. It is necessary to analyze the present situation of China's higher environmental education, to identify the problems and improve it to a high level.

A. The Structure of China's Higher Environmental Education

China's higher environmental education began in the 1970s with the suggestion of Premier Zhou Enlai. With practice of almost 30 years, China's higher environmental education has come into being.

B. The Professional Environmental Education in China

At the beginning of 1996, there were 106 colleges, 193 universities and 39 institutes which established different level of environmental programs. Among these colleges, universities and institutes, there were 189 Master programs with 26 majors (a list of program titles would help the

- "Thriving country" is a Chinese concept of developing national wealth.

alternatives in environmental studies) and 143 teaching and research programs, 48 Ph.D. programs with 16 majors and 41 teaching and research programs and 8 post-doctoral stations with 5 majors and 8 teaching and research programs.

1. The analysis of China's professional environmental education

During 10 years from 1985 to 1995, there were 8.5 thousand undergraduates, graduates and Ph.D. graduates from colleges, universities and academic institutes. They became the main power of environmental protection in China. At the beginning of 1996, there were 28,756 students majoring in environmental science in colleges, universities and institutes. Among the 28,756 students, 5,256 college students accounted for 18.28% of the total, 21,545 undergraduate university students accounted for 74.92% of the total and 1,955 graduate students accounted for 6.8% of the total.

These statistics reflect two problems. On one hand there are not enough graduate students and the society needs more graduate students urgently. On the other hand the knowledge level of China's professional environmental education is low. So, the percentage of college students, undergraduate students and graduate students should be adjusted. The proper percentage among them should be studied further, but it is a fact that there were not enough graduate students. That is to say, there is not enough high-qualified human resources in China's environmental protection. To implement the sustainable development strategy, China should train more graduate students in environmental science.

2. The program distribution in China's professional environmental education

The system of China's professional environmental education provided human resources to China's environmental

protection, but the distribution among them was not balanced. Most of the environmental programs were distributed among science, engineering and agriculture. At the university undergraduate level departments such as law, economics, and philosophy, the environmental education was only in a beginning phase. That is to say, there were fewer environmental law majors, environmental economic majors, environmental ethics majors and environmental philosophy majors in China's professional environmental education than those of western's. For example, there were fewer colleges and universities studying the relationship between environmental protection and justice, the relationship between environmental protection and economic development, the medical value of nature and the aesthetic significance of nature.

3. The analysis of courses in China's professional environmental education

Before the 1970s, there were some environmental courses in ecology, zoology and botany departments. However, these departments did not take environmental education as their main task. In 1970 the environmental programs were established. Due to a lack of experience there were some problems in the environmental programs.

First, in China, the traditional science was divided into two parts: natural science and social science. Respectively, there was a Chinese Academy of Sciences and a Chinese Academy of Social Sciences and this condition still exists today. Consequently, science developed on two parallel lines: natural science and social science, each having particular methodologies, tasks and principles. Natural science studies the law of nature and social science studies the law of society. In fact, the world is a unity of society and nature at any time. The isolated study of the human and natural sciences undermines the tasks of environmental education. For example, on one hand, many

engineering students lack of knowledge on environmental ethics and environmental philosophy; while on the other hand many social science students lack of basic knowledge on plants and animals.

Second, Chinese traditional methodology restricts its present environmental education. China's higher environmental education is related closely to Chinese traditional culture which is different from Canadian industrial culture. For thousands of years Chinese have attempted to set up the harmonious relationship among Tian (which means heaven), Di (which means earth) and Ren (which means human being). So, Chinese traditional culture advocated to compromise nature and human being into one unit. Consequently, the Yin and Yang theory insisted the negative and positive factors affect each other and support the ecological system; Zhong Yong theory emphasize anything should not go to their extremes, but keeps a moderate attitude; Fengshui (wind and water) theory is a kind of architecture science which requires chooses the location, position, keeps harmony with nature, uses the natural resources efficiently and properly, and reduces the damage to the environment. Among these theories, the holism, symbiosis, circulation were reconciled with Chinese traditional culture, and form the characteristics of China's higher environmental education. For example, most of students know sustainable development strategy, a very general concept; but a lot of social science department students have no basic knowledge about rare animals and plants.

Third, most of the environmental programs were derived from traditional programs such as ecology, zoology and botany. Consequently, most of the present environmental programs were shaped by adding or deleting courses and still bear the characteristic of their original programs.

Fourth, the content of environmental education is rather old and lacks the

foresight on environmental problems as well as neglecting an integrative study of natural science and social science. It is urgent to add some courses such as, environmental ethics, environmental law and environmental economy to every environmental department of all colleges and universities:

C. The Analysis of Adult Higher Environmental Education

The task of adult higher environmental education is different from the task of professional higher environmental education. It is comprised of on-the-job training, continuous education and an academic certificate.

For the on-the-job training and continuous education to adults, colleges and universities formulated course plans according to the knowledge level of trainees and the requirements of training. For the academic certificate education of adults, colleges and universities granted degrees after successful completion of courses similar to the professional environmental education.

Prior to 1996, colleges had established 40 environmental education programs and 14 majors for adult higher environmental education. At the same time some universities also established environmental programs for adult higher education such as Beijing University, Nanjing University, Wuhan University and Jilin University. Now there are many shortcomings in China's adult higher environmental education such as unsteady majors, unbalanced knowledge levels of trainees and less qualified teachers.

The Chinese Institute of Environmental Management, which was established by China's Environmental Protection Bureau in 1981, is the most excellent training base among the adults higher environmental education. It has systematic course offerings and textbook, and is equipped with advanced teaching technology. Since it was established, it has trained 5700 students who came from every leading levels and played

an important role in China's adult higher environmental education.

Following the reform of politics and the economic system, the task of training all levels of leaders in the adult higher environmental education will be complex and extensive. Extending the adult higher environmental education is very important for implementing sustainable development.

D. Non-professional Environmental Education

Non-professional environmental education has emphasized popularized environmental awareness, improving environmental knowledge and inducing more people to participate in environmental protection. According to the arrangement by the Chinese Ministry of Education, environmental education courses are not compulsory in non-professional environmental programs such as physics and chemistry. Therefore, non-professional environmental education lacks curriculum standards. Some colleges and universities with environmental departments provide optional environmental courses to the non-professional environmental programs. These courses last 20 to 60 hours every semester. Some colleges and universities without environmental departments also provide some optional environmental courses.

Colleges and universities train the decision-makers and government administrators for society. If students have not received enough environmental education, lack environmental awareness, or neglect environmental protection, they cannot carry out the sustainable development strategy effectively. So, the higher environmental education is very important.

E. A Case Study of Tsinghua University about Constructing a Green University

During the Fifteenth National Congress of the Communist Party of China, Chairman Jiang Zemin pointed out the importance of

both the strategies of sustainable development as well as thriving country through science, technology and education. *The United Nations' Agenda 21* pointed out that education is the key point to promote sustainable development and improve human abilities of solving environment and sustainable problems. (The United Nations Environment and Development Conference edited: 21st Agenda, China, Environment and Science Press, 1993.p.297.)

Tsinghua University is a comprehensive and State key university having disciplines of science, engineering, management and social sciences with engineering as its main focus. As one of the important national bases for higher learning and for scientific research and technological development, Tsinghua University shoulders great responsibility of educating high-level talents for the country and promoting the national economic construction. At present, Tsinghua University consists of 6 schools, 31 departments, 44 research institutes, 9 engineering research centres and 163 laboratories including 15 national key laboratories. The university offers 37 Bachelor's degree programs as majors, 107 Master's degree programs and 64 Ph.D. degree programs for graduate students. There are 16 post-doctoral research centres for post-doctorate researchers.

In recent years, some famous universities in Europe and North America carried out activities at different levels, such as the Green University of George Washington University and the Environmental Agenda of Edinburgh in the UK and the Greening Campus Action of Waterloo University in Canada. In China, owing to the proposal of Zhu Qingshi, the president of Chinese Science and Technology University, Professor Zhu Qingshi personally established a green-chemistry course at Chinese Science and Technology University. The students of Beijing Forestry University proposed not to use throwaway chopsticks in the campus

dining-hall. Although environmental education has grown in scale in Chinese universities, there is less accomplished than that in western universities.

China's environmental degradation necessitates environmental education. Under such international and domestic situation, Tsinghua University proposed a project of constructing green universities.

1. The contents of constructing a green university in Tsinghua University

Constructing a green university takes environmental protection and sustainable development as basic principles for the curriculum and daily operating activities. There are three main strategies in the process of constructing a green university.

a. Improving green education

Train highly qualified students with an awareness of environmental protection and sustainable development. After graduating, these students will become the backbone of sustainable development and bring environmental awareness to every province of China. There are three measures for implementing green education.

First, restructure the undergraduate curriculum with compulsory courses in environmental protection and sustainable development. Allow graduate students optional courses in environmental protection and sustainable development as well as the other environmental sciences and ecology courses; make sure that all students graduated from Tsinghua University have enough environmental education for enhanced abilities in dealing with environmental issues and decision-making.

Second, develop extracurricular activities and research on green education among students. Support activities of the Green Association; launch activities among different sections of society to make people realize the importance of environmental awareness; train graduate students inter-disciplinarily; improve teaching system for

high level environmental science and engineering specialists.

Third, launch the Training Centre of Environmental Protection, train environmental managers for every level of government, industry and companies and provide environmental science specialists to society.

b. Conducting research and development of green technology

Apply environmental protection and sustainable development strategy to scientific research; give priority to developing ecological technologies. There are three measures for implementing green technology.

First, design and implement green technology; develop scientific research on controlling environmental pollution and improving environmental quality; develop advanced technology for multiple functions; provide green technology options for decision-makers of sustainable development.

Second, include pollution analysis as a prerequisite for sanctioning a project; apply green awareness to projects; evaluate project with environmental criteria after completion.

Third, translate green technology into products. Establish links between research, industry and corporations.

c. Constructing green campus

Comprehensively utilize and implement advanced domestic and foreign technology to construct ecological campus. Provide a beautiful environment for faculty, staff and students while making everyone realize the necessity and importance of environmental protection and sustainable development. There are three measures for implementing the greening of the campus.

First, improve the landscape design of Tsinghua campus; design campus gardens and architecture by ecological principles in accordance with its history, culture and architecture.

Second, add four pieces of green land, ten green gardens and ten parks according to ecological design with ecological theories; improve the bio-diversity and the green percentage, turning the campus into a classroom exhibiting natural knowledge and protecting bio-diversity.

Third, control the pollution on campus with advanced technology for recycling wastewater, managing waste disposal, controlling air pollution, generating solar power, utilising an integrated water and heat supply system. Extend these technologies in more than 30 projects.

In summary, greening Tsinghua campus requires plans and an implementation scheme. In addition, appropriate indicators and appraisals are required for the green university. The faculty, staff and students work hard in an integrated approach to meet the objective of greening the campus.

2. The advantage of constructing green university in Tsinghua University

In China, Tsinghua University is the first university to establish the Environmental Engineering Department in 1977. In 1981, by utilizing the advantages of multiple disciplines, Tsinghua University established the first Institute of Environmental Engineering which combined several departments. In 1993, it expanded to the Design and Research Institute of Environmental Engineering, which included Environmental Engineering Department, Chemical Engineering Department, the Institute of Nuclear Energy Technology, the Chemistry Department, the Thermal Energy Department, the Hydraulic Engineering Department, the Engineering Physics Department and the Automobile Engineering Department.

With the development of Chinese environmental protection, Tsinghua University founded the Soft Science Research Centre, the Research Centre of Coal Combustion Engineering, the Research

Centre of Residential Environment, the Research Centre of the 21st century, the Asian-Pacific Technology Training and Transfer Centre of the Poisonous and Pernicious Waste Treatment and Disposal, Beijing Technological Development and Training Centre for Saving Water, the Sino-US Energy and Environment Research Centre, and so on. They undertake many important research projects from the state, province and ministry.

At the same time, Tsinghua University also established some fundamental research labs including the Environment Simulation and Pollution Control State Key Laboratory, the High Efficiency and Low Pollution Coal Combustion State Key Laboratory, the Automobile Safety and Energy Saving State Key Laboratory, and so on.

With more than 20 accumulated years in environmental science, combining several departments and institutes formed the environmentally oriented groups. These training programs, scientific research centers and high-technology centers have become an indispensable part in the field of Chinese environmental protection. They have trained a large number of environmental specialists for the state, assumed many national projects and international joint projects relating directly or indirectly with environmental protection, and a part of them have received the national and ministry awards for their achievement in environmental protection.

3. The society response to constructing green university

At the press briefing conference on July 27th, 1999, the greening of campus project was responded to, and confirmed immediately, by the State Environmental Protection Bureau. This drew the attention of various social associations and companies such as the Education Ministry, the Science and Technology Ministry and the leaders of Beijing Municipality. On the news briefing conference of the greening

campus on July 27th, 1999, Qu Geping, the head of Environment and Resource Committee delivered a speech entitled "Spring Wind Greens the Tsinghua Campus". Xie Zhenhua, the head of State Environmental Protection Bureau, gave a speech. Deng Nan, deputy Minister of Science and Technology and other leaders gave speeches showing their great support and placed high expectation on the project.

The greening of campus project got much attention and support from industrial circles. Some businesses called to Tsinghua University and expressed their willingness to subsidize facilities and to commit the engineering.

Some famous Hong Kong industrialists have shown their deep interest and are willing to support the greening of campus

project. In addition, some Japanese organizations also showed their support and expressed interests of co-operation.

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