

Education and Sustainable Development

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Education alone is not enough – Induce environmentally-friendly behavior using economic incentives

1. Taiwan's efforts in environmental education

Over the past several decades, Taiwan has overcome a shortage of natural resources and the immense difficulties encountered in re-building the island following the Second World War. The result is that it indeed has had some impressive economic achievements. However, in the 1980s, the value attached by society to the rapid growth of the economy in these early stages began to be strongly challenged by the heightening of environmental awareness, especially in regard to environmental protection and sustainable development. The reasons for this shift in values came about as a result of hard lessons learned through successive environmental crises, both natural and man-made. As an island nation with limited natural resources and at the same time having the world's second-highest population density among countries with a population of above 10 million, resources have needed to be used efficiently not just for economic reasons, but because they play a crucial role in the long-term development of the nation.

As a result, environmental education has been introduced into school curricula in Taiwan since 1990, and covers a wide range of topics including basic concepts of ecology, environmental issues (such as global warming, landslides, energy, water pollution, nuclear waste disposal, and air pollution, etc.) including the ways in which they have influenced the development of society (that is, sustainable development), as well as environmental opportunities and activities in everyday life (such as resource conservation, recycling, the adoption of a simple lifestyle, eco-design, green consumption, etc.). From 1997 onward, the focus of environmental education has shifted from pollution control to sustainable development due to the changes taking place in the environment in Taiwan *per se*. Environmental education also follows the principle of lifelong learning, course integration, active participation in problem solving, achieving a balance between global and local perspectives, sustainable development and international co-operation.

The core objective of the above-mentioned courses is to enhance environmental awareness within school children, including that in relation to environmental concepts, values and knowledge, to build up intrinsic motivations (that is, a public spirit and civic duty), and last but not least to induce environmentally-friendly behavior.

Similar to Japan, France and Australia, Taiwan has adopted the “whole school approach” in delivering environmental education. This relates to the multi-disciplinary nature of environmental education. Environmental courses are taught in the areas of the social sciences, the arts and humanities, languages, the natural sciences, health and sports.

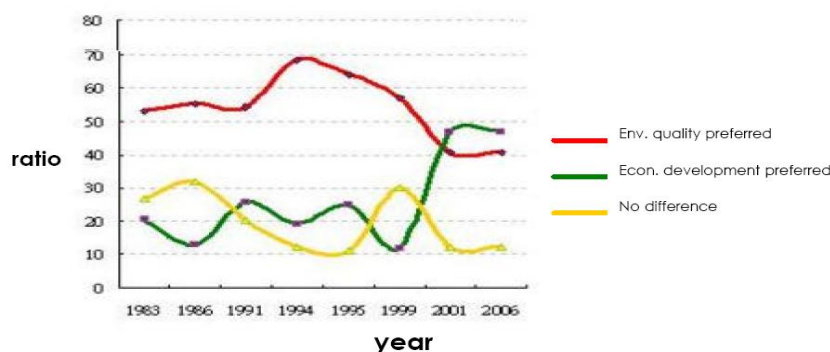
The efforts put into environmental education in Taiwan have had many demonstrable results. For example, the results of the 2006 Taiwan environmental awareness survey represent a huge improvement in environmental knowledge and awareness among the general public compared with the results obtained from the 1986 survey.

2. Environmental education does not guarantee environmental behavior

However, enhancing environmental perception, awareness and knowledge through education alone does not guarantee environmentally- friendly behavior. Two observations can be provided as evidence of this.

First, quite a few Taiwan college students who have learned a great deal about environmental protection and sustainable development during their 12-years of pre-college education do not behave in an environmentally- friendly manner. For example, it is commonly found that many college students who live in dormitories and pay fixed fees do not turn off lights, air conditioning or personal computers when these facilities are not in use. However, they are more likely to save energy by turning off those appliances when not in use if they have to pay for the electricity and water they use when at home or in their dormitories. This example suggests that the long-term environmental education does not guarantee the establishment of intrinsic motivations (that is, a public spirit and civic duty) in regard to environmentally-friendly behavior, and the establishment of intrinsic motivations in itself is simply insufficient to lead to conservation actions.

Secondly, surveys investigating which of economic development or environmental protection is more important to the general public have been conducted annually in Taiwan. The surveys show that more than 50% of the general public attach a higher weight to environmental protection than economic growth before the year 2000 with a peak being reached in 1994 (see the graph below). However, a sudden decline took place after 1999 as economic development took over as the more important issue. This is likely due to the financial crisis in Asia in 1997 and the economic recession in Taiwan after 2001, which suggests that the choice between environmental protection and economic development fundamentally depends on the overall economic status.



3. Reliance on environmental education supplemented by economic incentives is the path to inducing environmentally-friendly behavior

An individual's decision-making often depends on both internal/intrinsic factors, e.g., knowledge and attitudes, as well as external/extrinsic factors, e.g., incentives built into an institutional design. According to attitude theory, the behavior of people is dependent upon many variables such as perception, awareness and knowledge, affects and values, a sense of civic duty and a public spirit, social trust, social pressure, economic incentives, and social economic status variables (such as education and income). These attitude components can be classified as either extrinsic or intrinsic motivations for human behavior. Affects and values, and a sense of civic duty and a public spirit are intrinsic motivations which can be reduced or increased by many extrinsic components. On the one hand, environmental education may enhance environmental perception, awareness and knowledge which in turn build s up environmental affects and values, as well as a sense of civic duty and a public spirit in relation to the environment and sustainable development. In the end, environmentally- friendly behavior may be induced. On the other hand, economic incentives, if properly designed, are able to strongly enhance behavior compatible with environmental protection and sustainable development, too.

Thus, both education and economic incentives are needed to increase the adoption of environmentally- friendly behavior.

It is important to know how these attitude components can be designed to increase the adoption of environmentally- friendly behavior and to propose an effective strategy for formulating and implementing future environmental protection and sustainable development policies and strategies.

A successful example for Taiwan can be given to show the importance of combining both education and economic incentives for sustainable development and environmental protection. In 2006, Taiwan achieved a daily per capita garbage volume of 0.6 kg, down from 1.1 kg per capita in 1997, an amount that is less than one-third of the average waste among U.S. urbanites (2.1 kg per day in 2006). This resulted from a combination of environmental education and economic incentives.

On the one hand, beginning in 1990, the Taiwan government set aside a 15-year period to sporadic efforts to educate the public and encourage recycling and reuse. A ten-county pilot project was launched in 2005 requiring citizens to sort garbage into recyclables, food waste, and refuse. The policy became mandatory nationwide in 2006, and households now face fines of up to NT\$6,000 (US\$181) if caught mixing recyclables with household trash. On the other hand, the Taipei City government introduced the economic instrument of a per-bag trash collection fee in 2001. Citizens are required to purchase government-issued trash bags at convenience stores and supermarkets. The bags are priced above generic brands to cover the cost of pickup and to serve as an incentive to discard less garbage in favor of recycling. Only city-approved trash bags will be accepted by local trash collectors, who are better able to identify potential recyclables due to the bags being made of translucent plastic. The fee has reduced daily domestic waste in the city by one-third and has increased recyclable garbage collection three-fold.

My main message is that education alone is not enough. In order to induce environmentally-friendly behavior we need both education and economic incentives, along with many other attitude components, such as social pressure. Social pressure which is not being discussed in this talk due to the time constraint is also very effective in inducing environmentally- friendly behavior.