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Virtual Field Visits to the Pearl River Delta

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Preamble

One of the aims of the Institute for Natural Resources and Environmental Management (INREM) is to promote education in environmental management. Henceforth, the purpose of this report is to describe a new teaching strategy using multimedia which will enhance teaching and learning in the field of environmental studies. A field visit is a valuable way for students to gain first-hand experience and knowledge of a site, however, it may sometimes be difficult for teachers to arrange such field visits for students due to time constraints and cost requirements. For example, the recent rapid deteriorating environmental quality of the Pearl River Delta (PRD) provides a perfect opportunity for students to learn about environmental management. However, a field visit to the PRD may not be possible due to limitations in organising study tours. Alternatively, a virtual field trip via multimedia can allow individual students to gain a better understanding of the current environmental problems in the PRD without an actual visit to the field. The virtual field trip will enhance classroom teaching and promote high quality teaching. This report describes the development of a web-based "Virtual Field Visits to the Pearl River Delta".

Abstract

The PRD has been undergoing an economic take-off, however, at the same time, its environmental quality has been rapidly deteriorating. Field visits to the PRD would be ideal for students to explore different environmental problems. Unfortunately, organising field visits would involve lots of manpower and resources. As such, this project developed a web-based "Virtual Field Visits to the Pearl River Delta" in order to allow students to visit different field sites via the web. This teaching aid enabled students to understand the landscape, population, industries and current environmental problems of the major cities of the PRD simply by browsing through the website.

Keywords

Virtual experience, field trip, Pearl River Delta, environmental problem, waste treatment

Introduction

Since the implementation of the Economic Reform and Open Door Policy in 1978, rapid economic growth has been observed in China, especially in the PRD (Chan & Kwok, 1990). Because of the encouragement of various developments, environmental concerns are not always adequately considered (Liu, 1992). Development in the region has also given rise to increasingly serious pollution problems (CEN, 1997c; Ma & Qiang, 1988). Hong Kong relies on China for supplying more than two-thirds of its drinking water (CEN, 1997b). Deteriorated water quality may damage our health. Moreover, poor water quality also increases the occurrence of red tides leading to enormous economic loss and health hazards.

The adverse air quality of Hong Kong has also drawn a lot of public attention recently. It has already reached a level adverse enough to damage human health (Chung, 1998). Pollutants can be transported from one area to another by means of wind or water current. Serious air pollution in Hong Kong may be partially due to trans-boundary pollution from industrial areas of the PRD (CEN, 1997a; Hills et al., 1998; Shen, 1983; Wei, 1997). Pollution respects no boundaries so environmental problems should be addressed in a wider or regional perspective. In order to protect the environment and maintain its sustainability,

environmental education encompassing a regional perspective is the ultimate solution. It should be worthwhile to educate students in the environmental issues of the PRD region.

Aims and Objectives

INREM aimed to develop a web-based "Virtual Field Visits to the Pearl River Delta" in order to enhance teaching and learning quality of environmental related courses. It would allow students to have a better understanding of the current environmental problems of the PRD even though they have not actually visited the field.

Methodology

1. Background Research

Relevant information about the environment of the PRD was collected from different sources such as books, periodicals, maps, aerial photos, video, etc.

Some of the major topics of information collected are listed as follows:

- Sustainable Development
- Environmental Impact Assessment
- Biodiversity and Conservation
- Waste Management
- Waste Treatment, Disposal and Recycle
- Ecological Park

2. Site Visits and Recording

Three site visits were conducted to the

major cities of the PRD, including Shenzhen, Guangzhou, Shunde, Heshan and Xiaoliang. Relevant and interesting information was collected and recorded using a digital camera (e.g. photographs, videos).

3. *Information Compilation*

After collecting the required information, the information was edited for the development of the website "Virtual Field Visit to the Pearl River Delta".

4. *Website Design and Construction*

The production of the website was carried out with the help of seven students of the Department of Computer Science, HKBU.

5. *Monitoring and Maintenance of the Website*

The website is being maintained by INREM. We are grateful to Dr Wai Wong for providing technical advice on the maintenance of the website.

Results/Findings

The PRD is broadly triangular in shape, extending down both sides of the Pearl River estuary with the provincial capital of Guangzhou at its northern apex, the Special Economic Zone (SEZ) of Shenzhen at its southeast corner, the Zhuhai SEZ at its southwest corner. The area of the PRD is about 461,000 km² with a population of 21.4 million (1995) (Jiang, 1996; Ma & Lin, 1993). The climate of the PRD is humid mesothermal, and is affected by the monsoonal circulation. It is characterised by an annual mean temperature at Shunde

of 22°C, and an annual average range of 15°C, with mean temperatures in the warmest months of 28.7 °C (July) and 28.4 °C (August), and in the coldest months of 13.0 °C (January) and 14.7 °C (February).

The PRD is the economic leader of Guangdong. The tremendous and perhaps miraculous economic and industrial advancement enjoyed by society in the past few decades has also brought about many environmental tradeoffs (CEN, 1997c). The rapidly developing PRD has generated lots of revenue and employment opportunities. But at the same time, these economic achievements have also produced enormous environmental and health problems. Some of the major environmental problems of the PRD such as water pollution (United Nations, 1998; CEN, 1997b; Ruddle, 1988), air pollution (CEN, 1997a) and biodiversity reduction (Silver, 1996; United Nation, 1997; Xie, 1994; Xu, 2000) and their remedial strategies have been discussed in the website (Xu, 1999).

In the website, some good examples of sustainable environmental management in the PRD are illustrated. They are Guangming Overseas Chinese Livestock Farm (Integrated Farming Systems), Dinghushan Biosphere Reserve (Conservation of Biodiversity), Shunde Ecological Park (Eco-tourism), Xiaoliang Tropical Artificial Forest Ecosystem Station (Restoration of Derelict Land) and Heshan Hilly Land Comprehensive Experimental Station (Restoration of Derelict Land).

Guangming Overseas Chinese Livestock Farm is an intensive enterprise group with animal industry, beverage, western style meat products, biological products, fodder and fruits. The net capital of the farm is over RMB 173 million. The farm owns 40 joint companies and more than 40 semi-product processing factories. The farm also emphasises the importance of environmental protection and conservation, and its products are regarded as "Environmental Pollution Free Products".

Dinghushan Biosphere Reserve is one of the foremost national reserves in China. There are different types of forests exhibiting very high biodiversity. Dinghushan Biosphere Reserve is an excellent place for studying forest development, wild animals and plants, geography and other environment related subjects.

Shunde Ecological Park is one of the most beautiful artificial parks in Guangdong Province. As well as enjoying the beautiful and comfortable scenery of the environment, visitors can learn the importance of conserving natural resources and sustainable development in the park. The park is divided into five zones: Ecological Conservation Zone, Ecological Education Zone, Ecological Recreation Zone, Ecological Appreciation Zone, and Ecological Agricultural Zone. Different educational and/or recreational activities are available in different zones.

Xiaoliang Tropical Artificial Forest

Ecosystem Station is a rural station managed by the South China Institute of Botany, Chinese Academy of Sciences. Due to the heavy pressure of human activities in the area, the original forest has been seriously damaged. Soil erosion has been occurring over a period of hundred years and resulted in degraded environmental quality, delayed production and poor living standard. In 1959, the Chinese Academy of Sciences selected Xiaoliang as a testing site for investigating effective methods in rehabilitating degraded tropical ecosystems.

Heshan Hilly Land Comprehensive Experimental Station is another rural station for studying artificial rehabilitation and reconstruction of degraded lands. It aims to develop an integrated development demonstration station which is ecologically and economically sustainable and compatible on the degraded subtropical abandoned land. There are eight artificial forest ecosystems available for studying the structure, function and mobility of different eco-agricultural systems.

Questionnaires were distributed to year-one students of the Hong Kong Baptist University in the course *You and Your Environment* to collect their comments on this website. Of the returned questionnaires, all students indicated "strongly agree" or "agree" to the statement "The website can help me to understand the environmental issues of the Pearl River Delta". Moreover, 92% of the students "strongly agreed" or "agreed" that the information provided by the website was interesting or useful. Over

60% of the students “strongly agreed” or “agreed” that the website could raise their interest in learning about the environment of the PRD.

Discussion

This informative and well illustrated website was able to arouse the learning interest of students. Although the students were not actually visiting the fields, they could obtain environmental related information of the PRD, such as the landscape, population, industries, environmental problems and some good examples of sustainable development, through this website.

The PRD is a typical example of a rapidly developing economic zone. Lessons learnt from the occurrence and subsequent management of environmental problems of the PRD can serve as a model for other similar developing economic zones. This easy accessible electronic environmental information of the PRD is very useful for studying the environmental problems of other actively developing cities.

Enhancement on Teaching and Learning

Field visits are essential to provide students with direct contact with the environment, and to stimulate their interest in acquiring knowledge and developing skills. Organising field visits to areas of the PRD undoubtedly increase the learning quality of students in studying environmental issues, however, it will involve a lot of manpower and preparation.

This web-based “Virtual Field Visits to the Pearl River Delta” reduced the workload of teachers in arranging field visits without sacrificing the learning quality of students. It allowed students to have a better understanding of the current environmental issues of the PRD even though they had not actually visited the field. The information related to the environmental issues of the PRD was well presented in the website.

With the aid of the “Virtual Field Visits to the Pearl River Delta”, teachers acquired techniques to organise innovative activities associated with the Internet, and students actively participated in the course to enrich their environmental knowledge. At the same time, they adapted to self-education mode and familiarised themselves with the World Wide Web interface in searching information. It was a valuable practice to prepare themselves for future studies.

Questionnaires were distributed to year-one students of the Hong Kong Baptist University in the course *You and Your Environment* to collect their comments on this website. The summary of the results of the survey can be found in Appendix 1. Encouraging responses were received such as 61.5% students agreed that the website could raise their interest in learning, 38.5% strongly agreed and 61.5% agreed that the website could help them to understand the environmental issues of the PRD. Thus, the project could really enhance teaching and learning quality.

Limitations/Difficulties

Not much of the information related to the environment of the PRD was accessible through Internet. Most of the information of the literature was not up-to-date so it was difficult to find the up-to-date information of the environmental issues of the PRD. Moreover, due to logistical and administrative procedures, it also took quite a long time to arrange field visits to some of the important sites. Field visits and video shooting were time-consuming as video footage had to be carefully edited.

Conclusion

This web-based "Virtual Field Visits to the Pearl River Delta" was the first information providing website made by INREM. Students can easily obtain information related to the PRD through this website. In order to improve the quality and user-friendliness of the website, we are planning to enrich the website with more information related to natural resources and environmental management such as the conservation of endangered animals and plants in China and the conflicts between development and conservation in China.

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Appendix I

Summary of the Results of the Questionnaire Survey to Students

	Strongly disagree	Agree	Disagree	Strongly disagree	Does not apply
The information provided by the website is interesting or useful	23.1%	69.2%	7.7%	0%	0%
The website can raise my interest in learning	0%	61.5%	30.8%	0%	7.7%
The website help me to understand the environmental issues of the Pearl River Delta	38.5%	61.5%	0%	0%	0%

Other comments given by students:

1. The website is well organised and easy to read and understand.
2. The website is user-friendly.
3. The website is very useful for students to understand the Pearl River Delta environment.
4. The information is detailed, and the photos and tables can raise our interest and help us to know more about the Pearl River Delta.
5. The website has a complete structure, useful information and interesting pictures.