

Development of Web-Based Open Learning Units in Sustainable Technology

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Abstract

There is an identifiable need to provide focused support for training and business in sustainable development. The aim of the project is to develop, test and disseminate three open learning units allied to the subject area of sustainable development. The project relies on a consortium of five university partners located in the UK, Sweden, Malaysia, North Philippines and South Philippines. A focus for the preparation of the open learning units will be at a newly formed Centre for Sustainable Development (CSD) based at De La Salle University, Manila, Philippines. The units will be applied to postgraduate programmes within the partner universities and also be used as industrial short courses. The target groups are academic staff and postgraduate students, companies and other organisation who will affiliate with the Centre for Sustainable Development during the term of the project. The project will investigate extensions to the units offered and conditions for quality assurance leading to proposals for an accredited International MSc Degree in Sustainable Technology. It is intended that the CSD will act as a centre for business cooperation between Asia and Europe. The EU funded project will run for a term of three years after which the activities are expected to be self sustaining.

Keywords: open learning; clean technologies; international cooperation.

1. Introduction

Increasing environmental concerns have called for the development of methodologies and technologies geared towards sustainability. Research thrusts are thus focused on techniques such as optimizing resource and energy utilization and minimizing environmental impacts of industrial processes. From these issues emerged the concepts of clean technologies, renewable energy and environmental management systems. These are essential tools towards sustainable development and must thus be well disseminated, particularly to people in the industry, in order to maximize their impact and significance. However, these tools are often encountered and mastered in the university and are thus foreign to industrial practitioners unless they decide to pursue postgraduate studies. With industrial estates located far from universities and with the time constraints experienced by industrial practitioners, the conventional education system cannot address their need for learning. Thus, it is essential that alternative modes of knowledge delivery be explored and developed.

2. A Post Graduate and Industrial Training in Sustainable Technology Project

A project entitled “A Post Graduate and Industrial Training in Sustainable Technology” is being undertaken by five university partners from Europe and Asia. The five project university partners are the University of Portsmouth, UK; De La Salle University – Manila, Philippines; Universiti Teknologi Malaysia, Malaysia; Royal Institute of Technology, Sweden and Xavier University – Cagayan de Oro, Philippines. These partners are working towards the project goal of developing, testing and disseminating three open learning units in sustainable development with funding from the European Commission’s Asialink Programme.

This project addresses the need for disseminating sustainability concepts to industrial practitioners either through a postgraduate degree or through short course trainings and thus takes into consideration their constraints and needs. The learning materials will be developed and designed particularly for online delivery. This will thus address concerns such as time availability and geographical proximity, which constrain industrial practitioners from obtaining postgraduate degrees.

2.1 Project Goals and Objectives

In working towards the project goal the following objectives must be realized:

1. To develop and test three open learning units in areas of (1) Energy Engineering, (2) Life Cycle Assessment and Clean Technology and (3) Environmental Management Systems.
2. To embed units in partner postgraduate programmes
3. To develop units as stand alone short courses for industries in partner countries
4. To establish a Center for Sustainable Development in Manila, Philippines to act as a focus for pedagogic and business activity between Europe and Asia.

Project Schedule

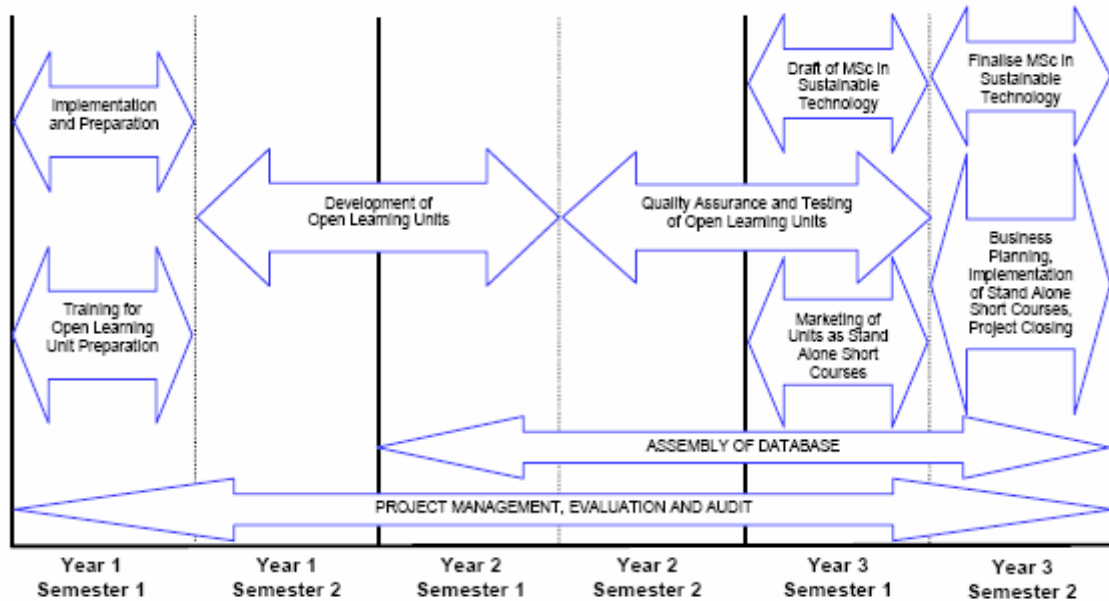


Figure 1 Project Schedule (CESDR, 2007)

The project is to be completed within a three-year time frame beginning from the year 2005 and ending in the year 2008 within which the following main activities are to be conducted:

1. Development of training tools on Sustainable development and tools;
2. Offering of open learning units on sustainable technologies and energy engineering;
3. Modelling for resource conservation and environmental impact assessment and management systems
4. Adaptation of units to account for local conditions using case studies and comparative studies;
5. Use of units in partner postgraduate programmes;
6. Development of short course programmes for the industry;
7. Establishment of a Center for Sustainable Development at Manila, Philippines;
8. Study of professional accreditation for environmental auditors and teachers in further and higher education; formulation of curriculum for international MSc in Sustainable Technology;
9. Generation of business activity between Europe and Asia using the specialisms focused on the Center for Sustainable Development

Each partner university has a key role in reaching the objective of the project as can be seen in Figure 2 and can be summarized as follows:

University of Portsmouth (UoP), United Kingdom

1. Applicant and overall management of the project
2. Lead institution for the preparation of the content of Learning Unit 3 on Environmental management systems
3. Contributor to problem solving activity on 'Cleaner Production' in Learning Unit 2
4. Lead institution for project reporting and evaluation
5. Contributor to problem solving activity on 'Biomass Combustion' in Learning Unit 1

De La Salle University – Manila (DLSU-M), Philippines

1. Management of Center for Sustainable Development at DLSU
2. Lead institution for the preparation, delivery and dissemination of three open learning units in the Philippines
3. Lead institution for the preparation of the content of Learning Unit 2 on Life Cycle Assessment and Clean technologies
4. Assembly of industrial database
5. Contributor to problem solving activity on 'Renewable Energy' in Learning Unit 1
6. Contributor to problem solving activity on 'Contaminated Land' for Learning Unit 3
7. Manager of e-platform

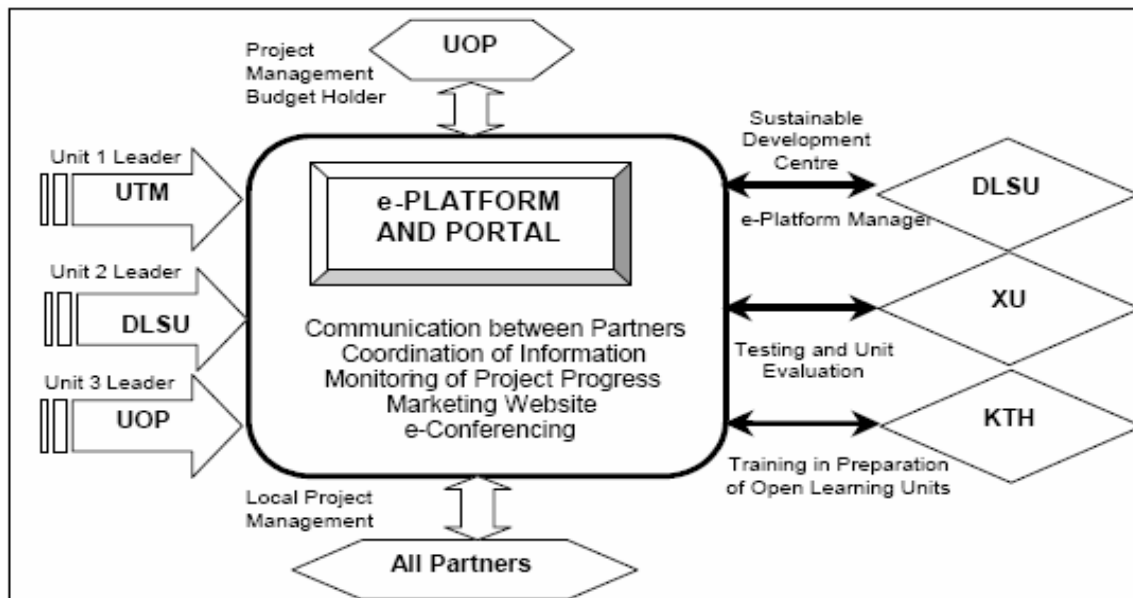


Figure 2 Role of Project partners (CESDR, 2007)

Royal Institute of Technology- Kungliga Tekniska Högskolan (KTH), Sweden

1. Lead institution for training and advisory service for the preparation of open learning units
2. Networking and publicity of the units

Universiti Teknologi Malaysia (UTM), Malaysia

1. Lead institution for preparation of the content of open learning Unit 1

2. Contributor to problem solving activity, 'Economics of Waste Management' for Unit 2
3. Institution for the dissemination of the project in Malaysia

Xavier University (XU), Cagayan De Oro, Philippines

1. Lead institution for comparative studies in Educational Quality Management and testing of open learning units in industry and university
2. Contributor to problem solving activity, 'Agro-Waste Management' for Unit 3

2.3 The Open Learning Units

The 3 open learning units which are to be developed are (1) Energy engineering, (2) Life Cycle Assessment and Clean technologies and (3) Environmental Management Systems. These are briefly discussed below:

Unit 1: Energy Engineering

This is based on the commitment of all partner countries to comply with their Kyoto Protocol obligations to reduce reliance on fossil fuels and to rapidly introduce renewable energy technologies.

The production of biofuels in Malaysia and the Philippines is having a significant impact on improving employment. Also, micro-hydro projects are providing important health and economic benefits to villagers living in locations remote from power lines.

Unit 2: Life cycle Assessment and Clean Technologies

Cleaner Technologies and Life Cycle Analysis are concerned with the conservation of resources, particularly materials used in manufacturing industry and transport fuels, and life cycle methods, which can be employed to analyze clean technologies. This has been a strong area of collaboration between UoP and DLSU-M for about ten years.

Unit 3: Environmental Management Systems

Environmental Management Systems is recognized as an essential tool in the assessment of sustainable technologies. Many companies in partner countries are seeking training for accreditation according to ISO 14001. The willingness of stakeholders to invest in companies is increasingly becoming dependent upon such actions. It is known that an increasingly significant proportion of international stock market transactions are being driven by the green stakeholder.

The units will each consist of a core material and two case studies. The core material discusses on the founding principles and theoretical concepts of the learning unit while the 2 case studies will serve as assessments where students can apply and integrate learned concepts and principles. A lead university with the expertise in the training material develops the core content and contributions on problem solving and comparative studies will be provided by the other partner universities. These have been discussed as well in the previous section regarding the role of the partner universities. The structure and delivery of the units will be on the interactive open learning platform CompEdu, which has been compiled by Professor Fransson of the Royal Institute of Technology, Sweden. A screen shot is provided in Figure 3.

Each open learning unit is roughly equivalent to a lecture module with 150 learning hours (i.e., 30 – 40 lecture hours plus 110 – 120 hours of learning activities). The units are to be divided into “chapters” each corresponding to a 1 – 2 hours lecture session. At the moment, the content has been developed and is being formatted to fit the e-platform.

3. Conclusion

This project involves the development of extensive e-learning units for use in industrial and post-graduate training in 4 different countries in Asia and Europe. The multidimensional nature of the cooperation ensures that the content of the material has a distinctly international flavor. Some issues have arisen in the development of these units, particularly with respect to synchronizing academic credits. However, there remains considerable potential for a truly international, web-based MSc programme to be developed from these open learning units.

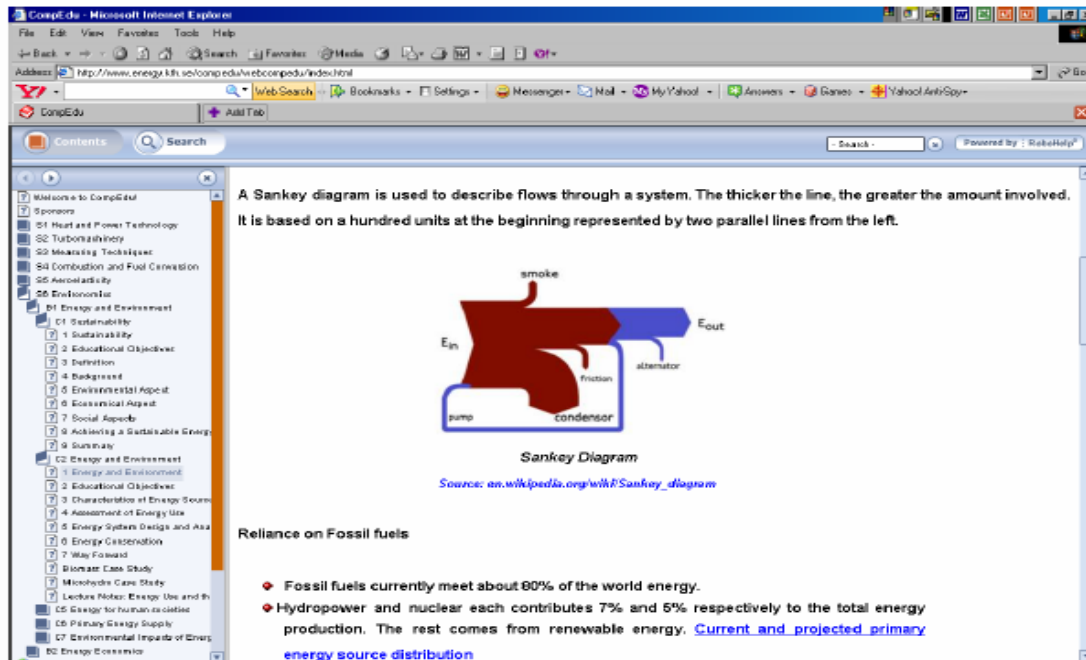


Figure 3 CompEdu Platform (Royal Institute of Technology, 2007)

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