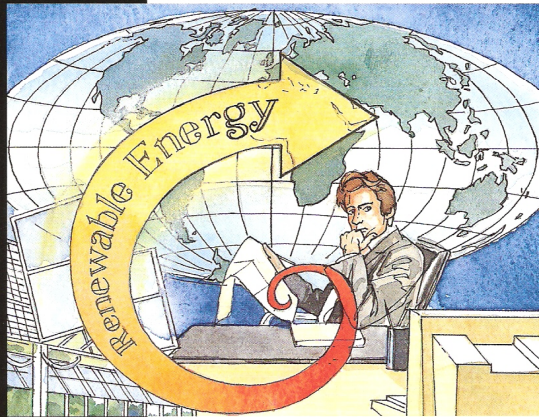


# LEARNING TECHNOLOGIES

*Renewable Energy Technology*

## SUN, SEA AND CBT



Sun, wind and tide are abundant natural resources whose potential as energy sources is only now being realised. As supplies of fossil fuels dwindle and the environmental impact of their use is discovered, these renewable sources will play an increasingly important role in supplying the world's energy needs. Wind turbine power stations and tidal generators are set to become increasingly familiar features of the landscape.

An Open Learning project carried out at the Open University's (OU) Faculty of Technology and jointly funded by the Employment Department and the OU set out to address the need for new skills in this important and rapidly-developing area.

The result was XT001 Renewable Energy Technology, an experimental eight-week intensive course using the latest computer-based training (CBT) techniques. This would introduce students to renewable energy technologies and the technical, ecological and economic issues associated with their development and use.

### **Project Aims**

The OU's initiative was an ambitious one which sought to achieve specific academic objectives, as well as wider educational benefits. Of these, the most important were:

- to develop a methodology for collaborative learning at a distance
- to create a state-of-the-art Interactive Learning Support Environment (ILSE) for distance learning and group collaboration
- to provide 'templates' by which to produce other courses adopting this educational approach.



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LEARNING METHODS CASE STUDY

## L E A R N I N G   T E C H N O L O G I E S

Three key questions were used to define the academic content of the Open Learning materials:

- What are renewable energy technologies ?
- How can renewable energy technologies be integrated into a nation's energy supply system ?
- What are the non-technical considerations affecting the deployment of renewable energy technologies ?

By addressing each of these questions, the learning materials encompassed the entire renewable energy scenario, from technical design features to the social and political implications of its use.

### **Materials**

The experimental XT001 system is built around three core activity areas, each supported by materials stored electronically on CD-ROM. Electronic mail and conference software allows students to communicate with each other and their tutors.

*Renewable Technology in Europe* is based on a library of 73 illustrated papers. A complementary audio-visual lecture is also included. In this introductory module, the task of students is to collaborate with each other to create a joint document, each group member contributing a chapter describing the use of a single renewable energy technology in a chosen European country.

*Integrated Energy in Ecotopia* uses an interactive model displaying the energy

supply and demand in an imaginary country. Model outputs provide graphs showing the interaction of the various energy sources and associated costs and energy savings. The student devises an energy strategy for the country, submitting his or her solution to the group and comparing results and interpretations.

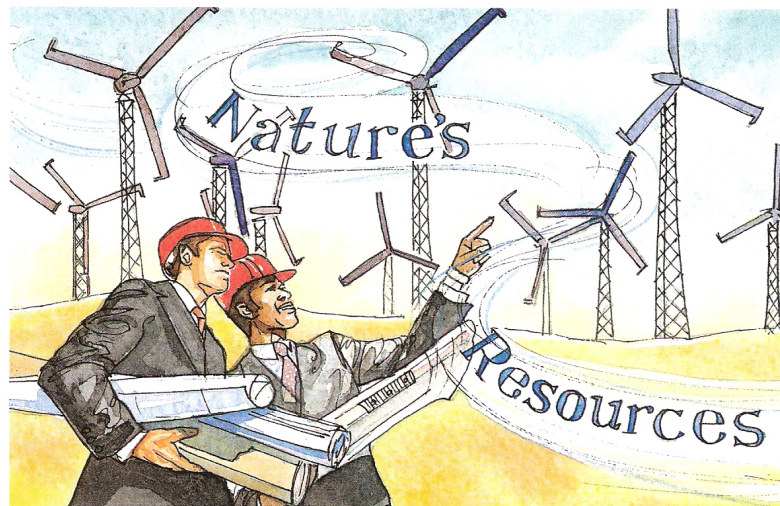
*A Wind Farm for Ambridge* is a role-play in which students adopt various roles as participants in a simulated public planning enquiry. The CD-ROM provides a set of brief roles, a library of reference papers to which to refer and a spreadsheet model for costing purposes. There is also a stand-alone video on wind turbines and wind farms.

In each activity, students alternate between private study and discussions with other members of the group using the communications facilities provided.

### **The Interactive Learning Support Environment**

Crucial to the success of the collaborative learning initiative was the development of the ILSE. This was also the most ambitious and innovative part of the project. The user environment would be crucial in motivating students, in facilitating learning and in enabling them to communicate with fellow learners at other locations.

The ILSE is built around the metaphor of a suite of rooms. The first is the library, a multimedia resource centre stored on CD-ROM,



containing an introduction to the course and its software, reference documents, simulations and lectures.

The next room is a study, incorporating tools for creating and editing structured documents, a hypertext-based browser and text and graphics editors.

Most crucial of all is the meeting room, linked via communications software, which enables groups to have discussions, comment on documents and co-ordinate activities. Every participating student is represented on-screen by an electronic face and name for easy identification.

The meeting room is the front end for a conventional conference or mail system. It stores messages received, maintains their linking structure and provides facilities for

creating new messages. Messages are transmitted by a standard system, such as UUCP mail, which uses the OU's own SUN Sparcstation as host.

In the meeting room, documents take the form of conversational 'threads.' These are made up of a series of linked messages enabling students to communicate both with each other and course staff. A thread can be anything from a single message from one person to a multi-way conversation involving several group members.

The simplest type of thread is the 'conversation', whereby responses and comments are attached to an original message. The second is the 'commented document' which facilitates the circulation of a reference document on which students can comment and exchange views. The most



## L E A R N I N G   T E C H N O L O G I E S

complex version is the 'virtual circle', which simulates a meeting at which members are asked in turn to give their opinions. The virtual circle thread, designed to synchronise the activities of different members of the group, contains an initial message and incorporates a reply-by date.

### **The Next Step**

The implementation of the XT001 Renewable Energy Technology system is now complete and students are currently being recruited for the pilot programme. The scope of the electronic mail system and the global relevance of the theme of renewable energy

mean that students from all over the world can be accommodated. Already, academic groups in Finland, Israel and Australia have asked to be included in the project.

Student feedback will provide valuable information as to the effectiveness of collaborative learning in this specialised academic field. It will also indicate the extent to which the learning support environment can be adapted for use in other educational or training initiatives. In this way, the Renewable Energy Technology project is set to become far more than just a single Open Learning solution for a specific educational challenge.