SUPPORT OF ENVIRONMENTAL EDUCATION USING INFORMATION AND COMMUNICATION TECHNOLOGIES

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Abstract.
Sustainable development can be achieved only with the support of people educated in the spirit of durable use of resources, waste recycling, generally speaking awareness for the surrounding environment.

SOCRATES Minerva Project *eNews – European Environmental News* is trying to develop pupils awareness for the values of environmental education by using the Internet. For this reason, the project will develop an electronic journal. The main contributors will be teams of pupils presenting the environmental problems in their city, county, region, country. Pupils will also interact with pupils from other countries in order to emphasise common problems appearing in different regions.

The on-line and off-line Web tools developed in the project also consider the teachers needs for suitable instruments and also pedagogical approaches of web-based learning. All the materials will be tested by pilot schools from all countries participating in the project (Austria, Finland, Greece, Hungary, Romania, United Kingdom).

Introduction.

Facing a defining moment of human existence, world leaders, intermediated by the United Nations Organisation, joined the UN Conference on Environment and Development in Rio de Janeiro (1992), emphasising the global concern for the environment degradation as a cause of economic development [1-3]. The main aim was to discuss ways of combining increased protection of the environment with more effective economic development, often referred to as **sustainable development** [4-5]. Lubchenco et al. [6] gave a more futurist definition for sustainable development, from a conservationist perspective – economic development that satisfies both present and future needs for resources and employment while reducing its impact on biological diversity.

Sustainable development is usually thought of as having economic, environmental, and social components, with a specific focus on the first two, the social component being the least well defined or understood [7]. Sustainable development represents more than greenhouse gases and ozone layer depletion, endangered species, growing health problems (asthma, allergies), forests destruction, or rational use or resources, environmental-friendly technologies and products and nevertheless ethnic conflicts, mass migration, corrupt practices. These are all symptoms of an ill Earth. Sustainable development means to solve the problems generating the symptoms: rapid growth and changing distribution of world population, persistence of poverty in widespread areas, growing pressure on the environment, increasing risk of gender, interracial or religious conflicts [8].

Educational systems, generally speaking education, plays a key role in developing people's capacity of acting as responsible citizens of the Earth, although the image of "the forgotten priority of Rio" [2; 9]. Several structures included training of different target group (higher education, business, civil society) in the spirit of sustainable development. European

Commission [10-11] encourages Member and Associated States to stimulate the development of European Citizenship, encouraging the people awareness for their common cultural heritage.

Initiatives on sustainable development

Quality Schools: schools network on sustainable development systems is a powerful initiative focusing on the implementation of Eco-Management Systems in schools, but also on creating a school network including multiple stakeholders (governments, NGOs, intergovernmental organisations, business). The project is strongly connected with the *Agenda 21* [12], as it is aims to change consumption patterns (Section I, Chapter 4, Chapter 8), protect and manage natural resources (Section II, Chapter 10), strength the role of children and youth in implementing sustainable development (Section III, Chapter 25), increase awareness of sustainable development concepts and tools (Section IV, Chapter 36). The wide spectrum of project partners guarantees the political legislative and financial support (governments), international exchanges and cooperation (intergovernmental organisations), technical and legislative know-how on implementation and certification of EMS (business), pilot studies (schools) [13].

Countries from Central and Eastern Europe also developed initiatives supporting environmental education and education for sustainable development. For example, ***Eco-Idea: ecological activate of local communities***, a project involving ecological and educational departments from Czech Republic, Poland, Slovakia and Hungary, and also local authorities from 60 localities in the mentioned countries. The project is promoting three concepts: *sustainable consumption* (establishment of a non-commercial information system for consumers) – addressed to trade-consumers-schools-local authorities; *sustainable management* (reduction of paper, energy and heating use) – addressed to business-local authorities-media; *youth eco-activation* (involvement of young people in projects and decision-making on environmental issues) – focusing on schools-householders-local authorities [14].

ICT, Environmental and Sustainable Development Education

The approach definitely has to be interdisciplinary, a large number of studies supporting it [8, 15-18]. Geography, Chemistry, Physics, Citizenship education, can play a key role. That is why environmental and sustainable development education is an excellent opportunity for the use of ICT in educational system [18; 19].

ICT can contribute to Environmental Education by [18]:
a. Information retrieval, allowing access, preparation and creation of information to share with others
b. Experimentation, analysis and reflection, where consequences can be explored in order to understand the complexity and dynamics of a given situation and then to consider and interpret their attitudes and approaches
c. Collaboration, establishing a learning dialogue between many learners using multiple channels, extending studies beyond the traditional classroom, and
d. Communications, providing interaction, access to experts and support-on demand

The problems usually appearing in using ICT in education are related either to *infrastructure* (especially in developing countries e.g. Romania), *teachers attitude* (doubting the relevance and efficiency of ODL or lack confidence in using information technology), or, most often, by the *integration* of ICT in the classroom activities [20-23].

The eNews initiative

The eNews Project has been developed as an open distance learning initiative in the frame of SOCRATES Minerva Programme. The main aim is to establish a product that will inspire young people to become actively involved in decision-making process related to the future of European environment, without losing sight of the responsibilities they have on their local roots and regional environment.

The project website (www.e4news.net) will provide a place for pupils and teachers to present and discuss their perspectives on environmental issues, thus developing new dimensions to support the teaching and learning process.

The website development was carried out counting on the end-user research performed in the six countries partners in the project (Austria, Finland, Greece, Hungary, Romania, United Kingdom). The report emphasized some issues affecting the process: the interdisciplinary approach is understood as a shared responsibility in theory, but no clear responsibility in the field. Several subjects are though including themes like waste management, climate change, and human impact during the classrooms. Also mentioned was the fact that "media" is probably the most important resource they use in the classroom for teaching different environmental themes, usually accessed via Internet. In most of the cases, the Internet is use as an information source, but some of the teachers also mentioned opinions exchange by mailing lists or forums.

The website will consist of environmental information case studies generated by groups of pupils across Europe, guided by their teachers. Geographical Information Systems (GIS) will enhance access to resources through a highly interactive **geo-referencing tool** (Figure 1a). In addition, pupils will be also able to search for articles using keywords (in title or in article) or authors email (Figure 1b). Intermediated by the web-tools, pupils will be able to search and find, explore, analyse, exchange and present information responsibly, creatively and with discrimination [24]. Also to be considered is the cultural dimension of learning, thus some specific local content will be presented, with the possibility that the other to visit. The feedback from the others is also expected.

Figure 1a (below). Geo-Referencing Tool.
Figure 1b (right). Searching for articles by keyword in article, title or author's email.
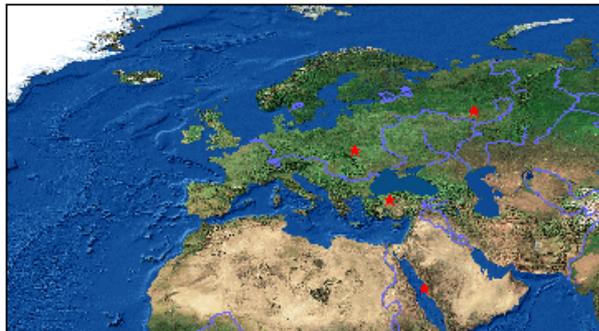
On-line cooperation will be also stimulated by organizing periodical debates on environmental themes between groups of pupils from different regions or countries.
The tools to support the debates will be a **Chat-room** (for real-time communication, Figure 2) and a **forum**.


Figure 2. eNews Chat-room

Also available for pupils and teachers will be a **collection of web-links** and a **glossary of terms**. The links are categorised depending on the way to use them in the classroom (information gathering, processing information, presenting information, communicating, reviewing and reflecting, planning and producing), with the opportunity for the users to add the links they found and might be useful for the others to access and use. The glossary will

include environmental terms, in alphabetical order, in order to make sure pupils understand the terms they might found in the articles of other pupils.

Figure 3a (below). "Add link" option
Figure 3b (right). Link collection (categorised)
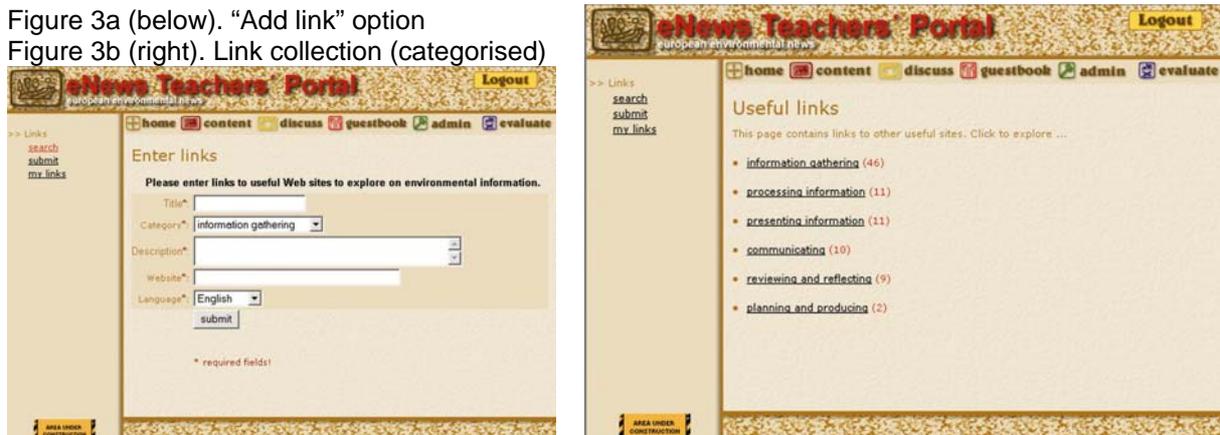
Conclusions

The eNews initiative was designed on one hand to encourage and enhance the integration of Information and Communication Technologies into the teaching and learning process, and on the other hand to educated pupils in becoming responsible for their common European environment. By offering them the opportunity to communicate, collaborate, be creative and responsible [Mason, 1994], eNews encourages the pupils to be involved in and responsible for their own training. Trying to eliminate a missing in the curriculum related to ICT introduction into the learning process, eNews examines some educational changes associated with creating the society of tomorrow.

Acknowledgements

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