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**MOBILE E- NOVATIVE USE OF E- LEARNING TECHNOLOGIES FOR
ENVIRONMENTAL PROTECTION - MENUET**

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Abstract: The aim of this EU Leonardo da Vinci project is to develop arts and skills for teaching in the m-Learning era. Comprehensive guidelines that integrate learning drivers with enabling mobile technologies are being prepared in order to provide a logical framework for promoting and coordinating new m-learning practices adapted to the needs of learners and teachers. Relevant didactical concepts and methodologies in the field of mobile learning, computer technologies and applications are being developed to disseminate best practices in the use of ICT in environmental protection for sustainable development, with emphasis on mobile technologies in ODL, classroom learning and blended learning. The resulting product will constitute an integrated training and decision support tool aimed at providing end-user skills for the management of environment protection.

Introduction

The MENUET Project commenced in December 2008 and is due to be completed in November 2010.

Its aim is to introduce students and their trainers to the new technologies involved in interactive E-books for self-paced learning. E-Learning Technologies use interactive multimedia (the simultaneous transmission via computer screens of text, graphics, computer software, animation, video, voice-over and music in stereo sound, as well as virtual reality worlds). The use of E-Learning Technologies allows user-interaction with controlling computer software programmes and may be used effectively in education and training. Sophisticated computer hardware and software are available for the production of high quality flexible training materials and at low cost.

Interactive teaching materials enhance the learning process, are enjoyable and, using wireless networks, may be used anywhere, at any time and by anyone. An individual has the freedom to learn at one's own pace, to select the appropriate level and to pick times for study, so as to be able to study at work or at home or in travel. The use of this dissemination medium, if prepared carefully and comprehensively, can eliminate the need for face-to-face workshops, seminars, conferences, site visits and attendance at technical fairs, saving time, travel and fuels and so also reducing polluting emissions to air.

All the elements involved in the delivery of materials in classroom situations can be incorporated via video and sound. By making the multimedia package multi-dimensional with help menus and cross-links, the user may interrogate the system, just as questions are asked and answered in a classroom situation. The multimedia instructional package never becomes tired and never retires. Each use is as fresh as the first. An infinite amount of materials and knowledge can be accessed via the internet.

The future of teaching is envisaged as being heavily involved in distance-learning using multimedia, CD-ROMS, the Internet and intranets incorporating video-conferencing and computer-assisted learning.

The use of E-Learning Technologies throughout educational systems will bring about a major revolution in teaching world-wide. It is now possible to transmit files throughout the Internet containing all the elements of multimedia: video, animation, text, graphics, stereo sound and computer software.

Presentations, containing interactive diagrams, pictures, animations, videos and voice-overs may be viewed anywhere in the world at any time. Multimedia lecture material may thus be produced and presented exactly as in a lecture room situation, but viewed by millions. There is therefore the opportunity for huge revenue streams arising from the delivery of university courses world-wide.

Broadband telephony, internet, email and videoconferencing can be used for two-way communication between “lecturers” and students. International courses will grow like wild fire on the internet or via exclusive intranets. Mega-courses will be offered by consortia of educational organizations and new E-Learning companies.

The immediate challenges facing educational providers are as follows:

- To set up multidisciplinary multimedia studios for E-book course production.
- To convert existing courses to multimedia E-book format.
- To convert class and lecture rooms to electronic classrooms with stereo sound, computer-assisted learning and Internet connection to in-class projection systems.
- To present teaching materials in interactive multimedia formats and to place these on the internet for delivery world-wide.
- To establish exclusive world-wide intranets.
- To set up international videoconferencing facilities in the lecture rooms.
- To network with key universities and organizations world-wide.
- To offer international courses via this facility to in-house students.
- To offer international courses via the established network from the multimedia studios to individuals and groups of students world-wide.

Project Activities

In order to accomplish the project aim, four main activities are being undertaken: STUDY, DESIGN, TEST AND EVALUATION and DISSEMINATION OF RESULTS.

The STUDY activity involves studies on ICT and E-learning concepts, the production of a Guide to the production of interactive E-books, test methodologies and available hardware and software.

The design activity involves the production of four E-books covering the Basics of Web-Design (BWD), ODL Techniques, E-Commerce (EC) and Energy Saving and Environment Protection (EP). These E-books, currently under construction, include DHTML technologies,

Internet Links, Text, Graphics, Audio, Animations, Video, Interaction, Excelets, MultiMedia Quizzes and Automatic Score Generation.

The TEST AND EVALUATION activities will take place in the second year of the project. A system of wireless networks will be set up at the universities involved in the project. Students and Tutors will use and evaluate the training materials.

Project Outputs

The project outputs will be the four E-books, the results of the evaluation and a Step by Step Guide for Tutors on how to produce multimedia materials, tests and automatic score generators.

Development Plan

The development of the four e-books, instead of a plain serial or parallel approach, follows a structured development plan. Figure 1 illustrates that plan by showing the task dependencies between the four e-books. According to it, first the BWD e-book is developed to provide the technologies and the methodologies of the development and implementation of web design materials, which will be then used by ODL e-book. Then the ODL e-book is developed to provide the pedagogical guidelines and scenarios for the design of EC and EP e-books. Finally, the EC and EP e-books are developed based on the guidelines developed in the previous books. Of course, development phases of the books are overlapping with the top layers offering necessary feedback to the bottom layers, especially from the EC and EP e-books to the ODL e-book.

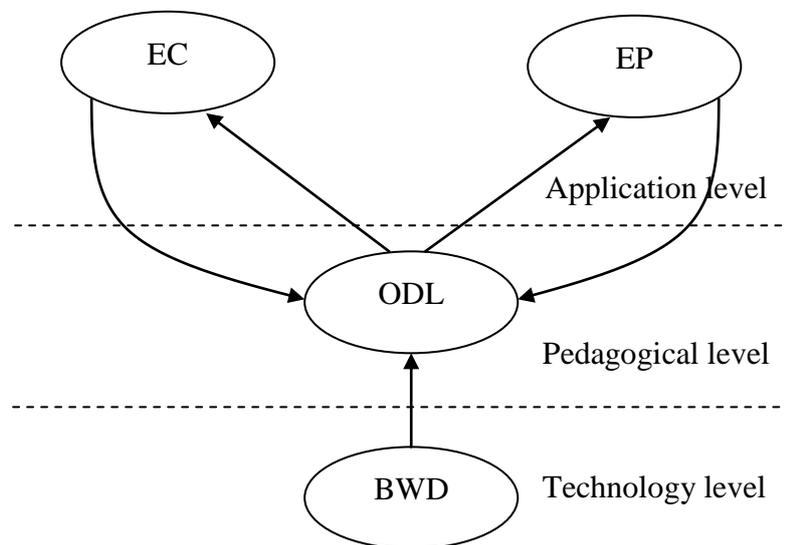


Figure 1. MENUET Development Plan

We can see the structure of the project development as consisting of three levels: Technology level, Pedagogical level and Application level. In the technology level, the basic technological

tools are provided. In the pedagogical level, the basic distance learning techniques are provided taking into account web design aspects. Finally, in the application level, e-books for two application areas are developed based on the background provided by the previous levels. Evaluation of the two application oriented e-books will give feed back to the e-books on other layers. The proposed structure is extensible, having horizontal scalability, so other e-books can be added on each level, while the increase of complexity remains linear. By using the proposed structure, we have an integrated approach on the training of the target group and also an extensible system.

Design Issues of the BWD e-BOOK

The objective of this e-book is to teach the basic (and more than that) technologies and methodologies related to web pages design and implementation. It has been designed to be user-friendly and interactive. The basic user interface divides the screen in three areas: the title area, the navigation area and the content area (see Fig. 2). The title area, which comprises the upper part of the screen, is fixed and contains the title of the e-book and other related info. The navigation area, which lies at the left-hand side of the screen, contains the table of contents of the book. At first level, the names of the chapters are displayed. By clicking on each of them, a pop-down menu displaying the sections of the chapter is displayed and the title of the chapter is displayed on the top of the content area and a proper image in the center of it. Clicking on a section's name its real content comes up in the content area.

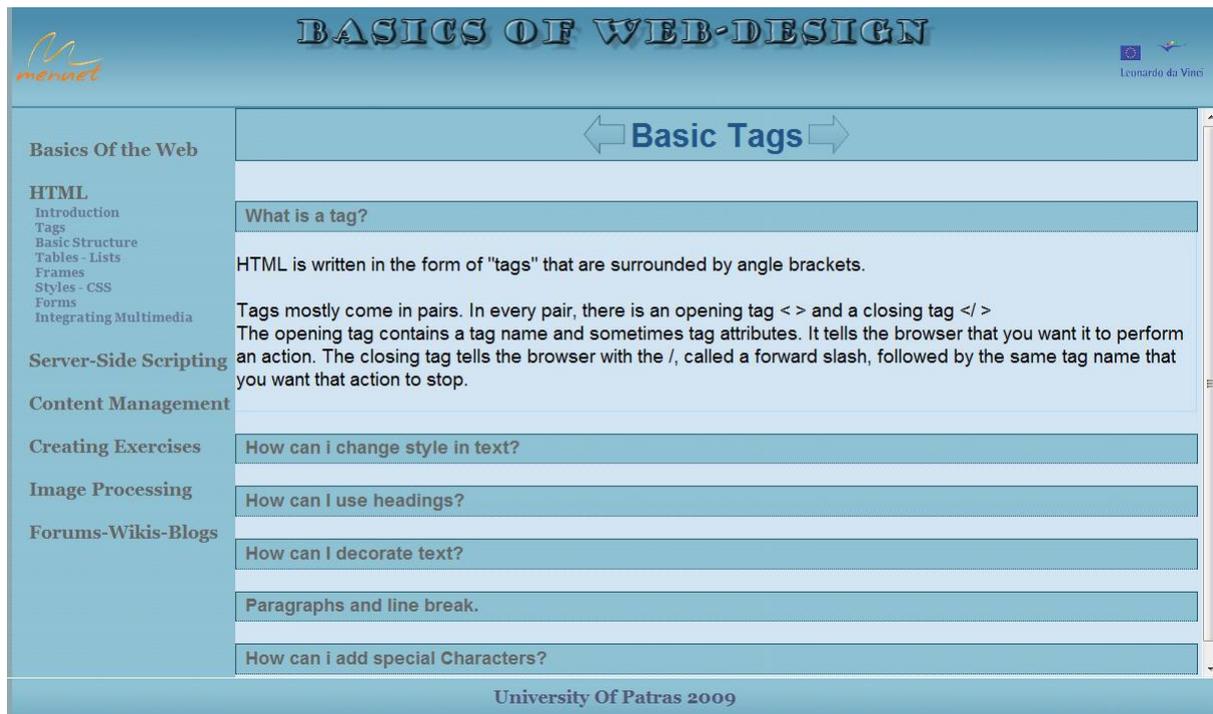


Figure 2. The basic user interface of the BWD e-book

The content of a section is organized as a set of questions that we identified that the provisional users would like to be answered (see Fig. 2). By clicking on each question a more or less short answer is provided to the user. The answer may contain links to other questions' material or suitable images or some animation or some kind of interaction with user. By

clicking again on the question, its content is hidden. So, in this way, the questions/answers will remain open and will be available to the user at anytime.

An interesting facility of the e-book is the “try it” section (see Fig. 3). It allows the user to practice in any of the issues he/she has studied and see the results on-line. So, he/she can write his/her own html code and see directly the result on the same webpage. Also, it is integrated in many of the provided exercises.

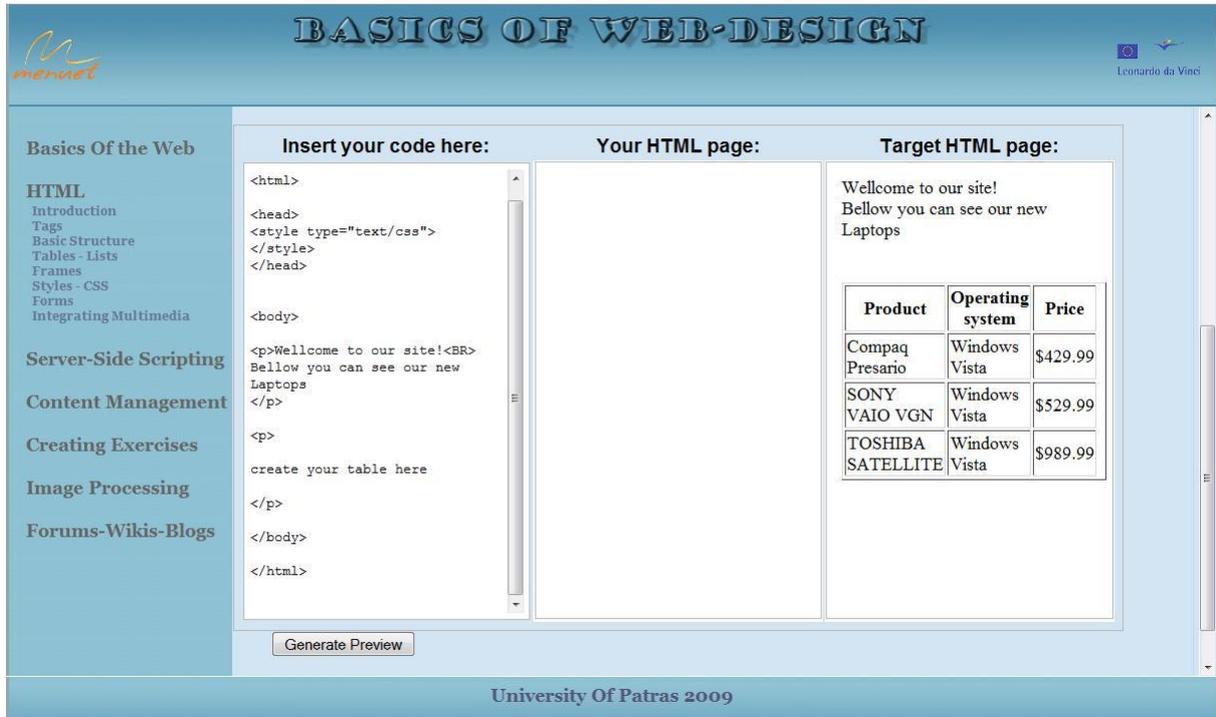


Figure 3. The “try it” facility of the BWD e-book

Issues of the EP e-book

The Energy and Environmental Protection E-Book first lists the environmental problems facing the Earth and explains why we should be concerned. The history of fossil fuel consumption is reviewed and it is seen that today’s consumer society has led to Air Pollution and Acid Rain, Global Warming, the Eutrophication of Water and Ozone Layer Depletion (see Fig. 4).

Energy Statistics are analysed to predict the future lives of the fossil fuels, under various scenarios of reserves and consumptions. This leads to predictions of Future Global Temperature Rises. The chemistries and combustion calculations of various Coals, Oils and Gases are developed in terms of kg CO² released/kg combusted and MJ of heat provided.



Figure 4. Environment Problems

Uses for energy and how it may be conserved are covered, as well as the clean-up techniques for air pollution. The E-book ends by examining various future scenarios and stresses the need for sustainable development (see Fig. 5).

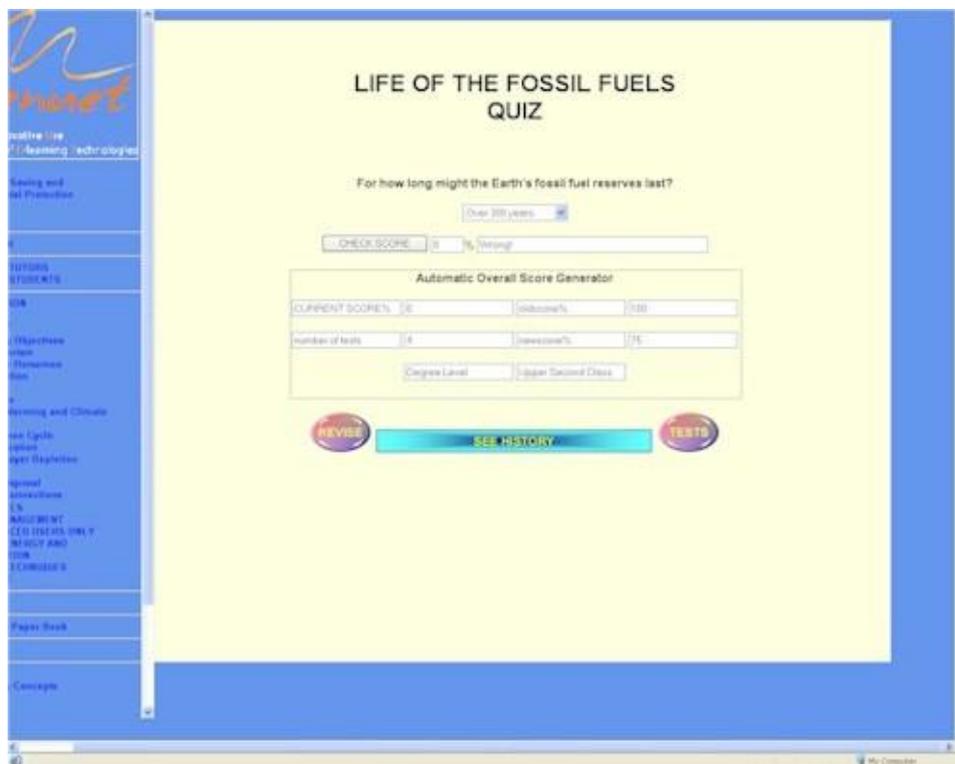


Figure 5. An Example Quiz

Conclusions

There is an urgent need now to make the current education and training systems better available, more effective, accurate, and flexible in order to enable true training on-demand services for the individuals and their work-organizations. The key to a successful resolution to this need lies in the effective usage of e-learning methods and methodologies, especially their latest evolution – m-learning, which can provide the necessary learning content anywhere, anytime and to anyone. However, being a new technology, it requires complex testing and good mastering skills from those who will apply it, in order to achieve maximum effectiveness of performance improvement and return on investment. In the framework of the project **MENUET**, the authors are studying relevant didactical concepts and methodologies from the fields of mobile learning, “eco-field” and related computer technologies and applications, in order to respond to the increasing need of specialists working in environment protection field for mobility and availability of information-on-demand.

References

1. Becta, Emerging Technologies for Education, 2006
2. Becta, The Becta Review 2006, Evidence on the progress of ICT in education, 2006
3. EDUCAUSE Center for Educational Research, M-Learning: Emerging Pedagogical and Campus Issues in the Mobile Learning Environment, 2004
4. Ellen D. Wagner, Enabling Mobile Learning, EDUCAUSE, 2005
5. Richard Nantel, How to Determine Your Readiness for Mobile E-Learning, Brandon-Hall, 2001
6. Holly Behr, Is the Time Right for mLearning?, eLearning Solutions, 2005
7. KNOWLEDGESTORM, Mobile Wireless Communications Management and Enterprise
8. Telecommunications Management, 2004
9. Mobile Learning Pilot Project, HARVESTING FRAGMENTS OF TIME, ISBN 0-07-088866-3, 2003
10. David Webster, Learning About e-Learning, Kookaburra Studios Pty. Ltd., 2005
11. Norshuhada Shiratuddin, Monica Landoni, Forbes Gibb and Shahizan Hassan, E-Book Technology and Its Potential Applications in Distance Education, JoDI, 2003
12. R. Hamilton, C. Richards & C. Sharp, An Examination of E-Learning and E-Books, 2001
13. Chris Clark, Tablet PC Initiative Briefing, University of Notre Dame, Kaneb Center for Teaching and Learning, 2003