Education Portal on Climate Change with Web GIS Client

Vilém Pechanec, Department of Geoinformatics, Palacký University, Olomouc, Czech Republic

Aleš Vávra, Department of Geoinformatics, Palacký University, Olomouc, Czech Republic

EXECUTIVE SUMMARY

E-learning as the use of new multimedia technologies and the Internet is widely used to improve the quality of learning. This leads to improved quality of the pupils' and students' learning approach. The research aim is to create e-learning courses with a thematic focus on the climate and its change consisting accurate information from the field of climate change and environment. The main objective of the courses is to provide educational materials to various groups of users, focusing on natural and social sciences related to the climate change. During the creation of e-learning courses the authors faced the following problem: the e-learning system they used, Moodle, did not include any modules for work with maps or geodata. Their solution is based on the LMS Moodle and thin client which was created with the use of ArcGIS Server.

Keywords: *Climate, Courses, E-Learning, Education Portal, Web Client*

ORGANIZATION BACKGROUND

Worldwide development of modern technologies led to the fact that many people use the Internet as their primary source of information. Apart from descriptive (textual), image (photographs, pictures), audiovisual (soundtracks, movies) information the Internet newly offers various types of information saved as web maps and map servers. To ensure good availability of spatial information in various formats, documents and environment they must be published on the Internet correctly (Xu, Pun-Cheng, & Lee, 2004). E-learning online courses represent a modern educational tool that is used as part of distance learning. They have both advantages and disadvantages. They enable users to study in their free time and at a place that is convenient for them (home, work or school) without the necessity to enter into direct contact with the lecturer. Availability and adequate technologies can be considered key elements of distance learning (Bates, 2005).

The Palacký University, Olomouc (Czech Republic) hosts the research project Education model of e-learning for lifelong learning in selected branches of environment (E-klima). Its aim is to create e-learning courses with a thematic focus on the climate and its change consisting of up-to-date and accurate infor-

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mation from the field of climate change and environment. The main objective of the courses is to provide educational materials to various groups of users, focusing on natural and social sciences related to the climate, climate change and other Earth sciences. Portal is available at http://kurz-eklima.cz.

Our educational portal contains e-learning courses with a thematic focus on the climate and its change consisting accurate information from the field of climate change and environment. The analysis and study of corresponding literature on e-learning led to a definition of the current trends and basis for the creation of new e-learning courses for the E-klima project. During creation of portal we adopted the blended-learning approach. This approach consists in e-learning chapters and ongoing face-to-face meetings (Masie, 2002). Parallel with the growing use of ICT in the educational setting, blending learning approach can be contributing tools to complete face to face experiences (Ginns & Ellis, 2009). Our decision was based on the study of literature (for example Hameed, Badii, & Cullen, 2008 or Tayebinik & Puteh, 2012) and our own experiences. So our educational portal is used through blended learning approach.

During creation of courses, we put emphasis on interactivity (especially in the case of courses for younger users), feedback and multimedia aspect of e-learning. Students in a fully interactive multimedia-based e-learning environment achieved better performance and higher levels of satisfaction than those in a traditional classroom and those in a less interactive e-learning environment (Zhang, 2005). Feedback is needed for the quality assessment of the course, and can contribute to the effectiveness of the all course. Feedback is necessary for evaluation of all components of e-learning (de Carvalho, 2003). Important is multimedia aspect of e-learning, e.g. video, images, animations, sounds (Mayer, 2003). One of the key characteristics of e-learning is its capability to integrate different media, such as text, picture, audio, animation and video to create a multimedia instructional material, promoting the reading interests and willingness of the learner (Suna & Cheng, 2007).

From the users' point of view e-learning courses must lead to the development of key competences (soft skills), including teamwork and teambuilding (Noll & Wilkins, 2002). These course characteristics are developed through discussion forums or surveys. We also included the principles of competition (quizzes, crosswords, competitions) and cooperation (fictitious projects). Sharing of information was enabled through notice boards or discussions. In some tested courses modern elements were implemented, especially edutainment, games, playing roles and etivity, i.e. elements that require online communication to complete the tasks and activities (Salmon, 2002). All elements of high-quality contribute to the attractiveness of e-learning courses and to the improvement of the process of information transfer towards the target group or a particular user.

Target user groups of the education model and the e-learning courses are specified as follows:

- School group (three sub-groups: primary schools, secondary schools and universities),
- Departmental group (two sub-groups: experts who work in the departments of the ministry of the environment and civil servants without specialised education who work in the departments of the ministry of the environment, including public administration employees and employees of research and consulting institutions),
- Public group (the lay public interested in information in this field, including the business sector and ngos).

SETTING THE STAGE

Design and Topics of the Education Model

An e-learning tool can be effective only when its structure and design has been thoroughly prepared and compiled (Nichols, 2003). Therefore,

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