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SHARING E-COURSES WITH EUROPEAN PARTNERS: EXPERIENCES WITH 'GEODATA VISUALIZATION'

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Abstract

The paper describes our experiences in the 'eduGI' project, a project to promote re-use and sharing of e-courses in GI Science among partners. Main project characteristics are briefly described. Then more details are provided about ITC's involvement. In the pilot phase, we received three courses from different institutes and - in return - offered an e-learning course in Geodata Visualization to two project partners. The main underlying ideas of the Geodata Visualization course are highlighted, as well as the course structure and course components. Our positive and negative experiences with courses that we received and with the design and execution of our own e-learning course at a remote platform are also described. Possibilities for future cooperation after the pilot execution are mentioned. The paper ends with some some recommendations and conclusions.

The edu-GI project

The main aim of the eduGI project is re-use and sharing of e-learning courses in GI Science education. Each partner is supposed to develop one course about a topic that belongs to its core competence, making re-use of existing materials. In the pilot phase, each course is offered once to (usually) two partner institutes, allowing 15 students per institute. Main advantages are: efficiency (receiving two courses in return for one saves efforts), quality and access to international GI know-how (each course is designed by domain experts) and the set-up creates virtual mobility for teaching staff and students.

The project wants to establish an organization model for future exploitation; after the pilot phase, course materials are improved (if necessary) and made available on the project's website (http://www.edugi.net/eduGI, maintained by the University of Münster in

Germany) for re-use in- and outside the GI-community. In addition, full course exchange (including teachers) among project partners is foreseen. The project started in February 2006, and ends as EC sponsored project [1] - with fully developed courses - in July 2007. Eight partners in seven European countries are involved (figure 1).

Figure 1. Project partners are located in the seven (highlighted) European countries.

Table 1 provides an overview of institutes in the consortium and their courses. All courses are designed at M.Sc.-level; the study load is 90 hours and students who successfully complete a course receive a credit of 3 ECTS (European Credit Transfer System).

Table 1. Courses provided in the eduGI project by the various project partners.

eduGI courses offered by GI Science Institutes	
Data Acquisition and Integration University of West Hungary, Faculty of Geoinformatics, Székesfehérvár, Hungary.	***GeoSpatial Data Mining*** New University of Lisbon, Institute of Statistics and Information Management, Lisbon, Portugal.
Data Quality Technical University of Vienna, Department of Geoinformation and Cartography, Vienna, Austria.	***GI Standards*** BW University Munich, Munich, Germany.
Geodata Visualization International Institute for Geo-Information Science and Earth Observation (ITC), Geo-Information Processing Department, Enschede, the Netherlands.	***Project Management*** University of Münster , Institute for Geoinformatics, Münster, Germany.
Geographic Data Bases (Advanced) Harokopio University, Department of Geography, Athens, Greece.	***Virtual Excursions in Earth Sciences*** Uppsala University, Department of Earth Sciences, Uppsala, Sweden.

Some other common characteristics are:

- course structure consists of parts, subdived into modules;
- components are theory, practicals, contact sessions and assessments (selftests, exam);

- all courses are running on the educational platform of the New University of Lisbon (figure 2);
- each course is evaluated by staff of the receiving institutes and the course participants.

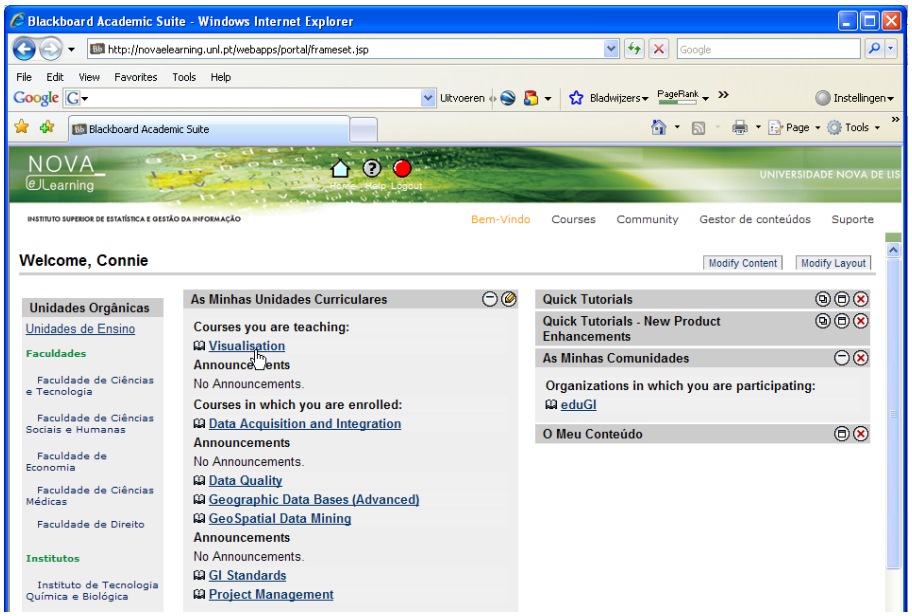

Figure 2. Common e-learning platform at the New University of Lisbon, Portugal (http://novaelearning.unl.pt).

Received pilot courses

ITC received the following courses from consortium partners:

- GeoSpatial Data Mining - from the New University of Lisbon;
- Data Acquisition and Integration - from the University of West Hungary;
- Virtual Excursions in Earth Sciences - from Uppsala University.

Unlike the other institutes, we could not recruit students for these courses from our in-house student population, mostly because timing and length of the courses do not fit into our schedules. Therefore, we mostly tried to recruit students from our networks (like the extensive alumni network) by newsletters, announcements on our website and posters.

Provided pilot course: Geodata Visualization

ITC has designed the Geodata Visualization course, for which in total 25 students of the Harokopio University in Athens and Uppsala University were registered. The aim was to motivate and stimulate students to actively learn, and keep going (see also Kester et al., 2007). We mainly tried to reach that goal by offering the course content in relatively small and attractive work packages (modules), in which theory and small tasks were integrated to

externalize and reconstruct the participant's knowledge. Tasks had to be done in small teams to stimulate discussion and collaboration The individual module tasks were ultimately leading to one final deliverable: a presentation - meant for a general audience - containing maps that together tell a story about a particular theme. The theme could be freely selected based on African data sets that were provided and data gathered on the Web. In the module tasks, decisions for the final deliverable had to be made. Based on feedback, teams could adapt their initial choices for the final task.

Table 2. Structure of the Geodata Visualization course.

Part	**MODULE**
1. TAKING OFF…	1. Maps! 2. Setting the visualization scene
2. THE BASICS	3. Geometric foundations 4. Graphic foundations 5. Colour counts… 6. Mapping topography 7. Mapping thematic attribute data 8. Multi-scale issues 9. Map output
3. ADVANCED	10. The third dimension 11. Visual analytics and geovisualization

The course structure can be found in table 2. Students had some flexibility in the sequence of modules (figure 3). Six staff members provided content and were involved in execution of the pilot course.

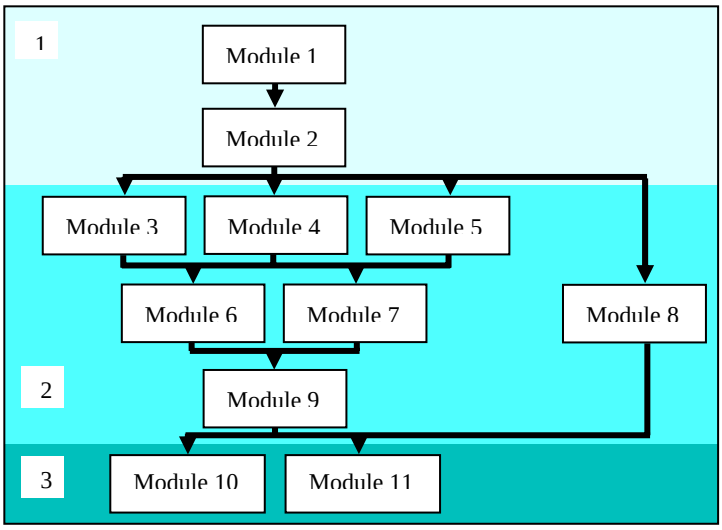

Figure 3. Arrows connecting the modules indicate possible sequences through the course; numbers 1-3 left refer to the three parts.

The main course components are listed below.

- A *study guide* containing overall course goals and objectives, information about course stucture and organisation, and detailed descriptions of each module (including objectives, notions to be grasped and learning activities). In the appendix, access and use of the educational platform (Blackboard and Horizon Wimba, an additional tool for interactive communication between students and teachers in live classrooms) was explained. An example of learning activities can be found in table 3.

Table 3. Example of learning activities.

Learning activities
• **View** the e-lecture on Geometric Foundations • **Read** in Kraak & Ormeling (2003), Chapter 5: sections 5.1, 5.2 , 5.3 • **Perform** and **submit** Task 3 • **Attend** synchronous session Module 1-3.
Optional
• **Visit** the following web site*:* *http://kartoweb.itc.nl/geometrics* • **Read** the following textbook*: Understanding_Map_Projections.pdf* (Blackboard under *Course Documents/M3 Geometric foundations)* • **Execute** the exercise on Geometric foundations (Blackboard under *Course Documents/M3 Geometric foundations)* • **Do** the self-test • (Blackboard under *Self tests)*

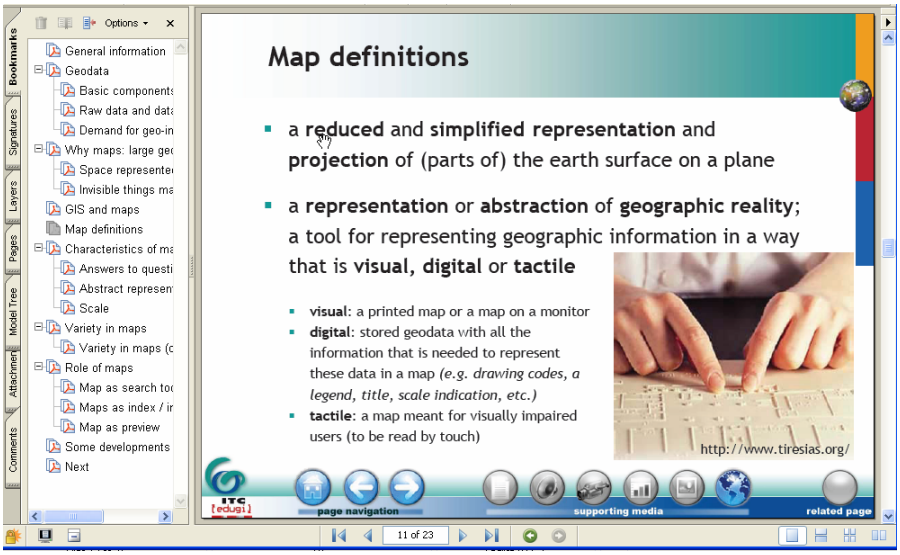

Figure 4. Example of a page in the e-lecture of module 1.

- *E-lectures* for each module. Although we used existing course materials of our face-to-face courses to develop the lectures, quite some adaptation were required. Main issues

were limiting the slides to the most essential ones, making them as self-explanatory as possible - hence more explicit in text and examples - and adapting them for online use (figure 4).

- *Tasks* (to be done in small teams): descriptions were made for each module. Module tasks had to be submitted online for feedback (figure 5). The final task consisted of two parts: submission of the presentation (see above), and peer review of the final task of another team.

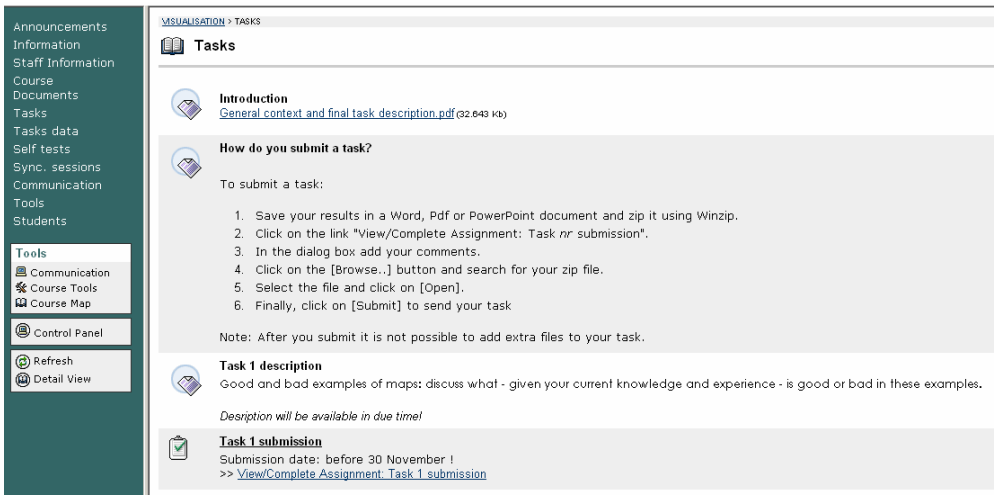

Figure 5. The figure illustrates how tasks had to be submitted online.

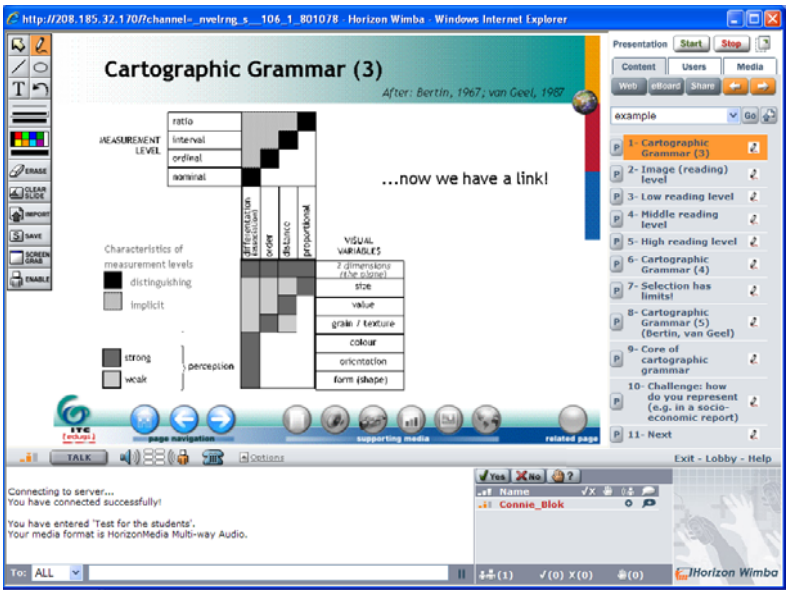

Figure 6. Wimba Horizon enables - amongst other – use of a white board, sharing applications or (part of) the desktop, hand-raising and polls. Sessions can be archived.

- *Synchronous sessions*: we intended to have three session using Horizon Wimba (figure 6) to answer questions of participants, but actually performed only two (see the next

section). We used one-way audio, course participant could only communicate by typing and voting.

- *Discussion boards* and other *supportive materials* (if applicable) have been provided. Figure 7 shows some supportive tools made available for colour. Another example is a website giving all kinds of support for geometric aspects, map projections etc., including a FAQ (see table 3, under 'optional').
- *Self tests*: developed for some modules to enable students to assess their level of knowledge of the theory.
- *Final theoretical exam*: executed in Blackboard. Exam and tasks counted for 85% and 15% respectively in the final course mark.

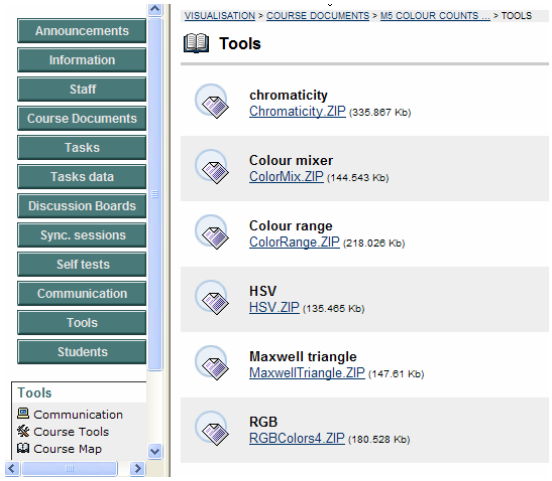

Figure 7. Supportive tools for colour.

Experiences

Although 25 students were originally registered, we had difficulties with students of one of the institutes. These students did not need the credit points for their study, a number of them never actually started and two wrote that they even never applied for the course! Reasons for dis-continuation among all students were extracted from e-mail correspondence, a questionnaire to students who did not successfully complete the course and from Blackboard's statistics; they are listed in table 4. Time constraints were in two cases related to thesis work. Only 8 students continued the course till the end; 6 of them completed successfully, while 2 completed all the tasks, but one failed the exam and the other one did not take it for personal reasons. Both were offered a second chance, but they did not want to use it.

Table 4. Main reasons for not completing the course.

Reason for discontinuation	Number
• Never started according to Blackboard's statistics	4
• Time constraints early in the course	3
• Time constraints later in the course	3
• No capacity to store the task data and lack of local support	2
• Moved to Uganda, and had limited connections and time	1
• Unknown	4

As mentioned above, a common aspect of all eduGI courses was evaluation by the receiving institutes and the students. I will not discuss the evaluation results of the courses that we received, but provide the main results of the Geodata Visualization course.

We only received an evaluation report of one *institute*. Overall, the results were quite good. Scores given were - on a scale from 1 (high) to 5 (low) for clarity of goals, appropriateness of contents, meeting expectations, quality and overall opnion – 4 times '2' and one time '1'. Additional positive remarks were made about the teaching staff and the fact that students enjoyed the course. Critical notes were confined to the synchronous sessions (the students apparantly expected some teaching during those sessions, and not just answers to their questions). It was recommended to included more self tests, exercises, and training on e-learning methodologies.

Only 5 *students* returned the evaluation form. The lowest score ('4') was for the self tests: their limited number was not really helpful. Furthermore, there were 3 middle scores for appropriateness of amount of time, and for providing information and help in time. Remaining scores for questions about course contents, organization, materials etc. were all high, with particular appreciation for the quality of the online material. Critical additional remarks were made about the organisation of the synchronous session, and feedback on tasks that was not given in time.

Our *own* experiences with the eduGI project are mixed. The partners did not develop a common view on e-learning courses at the start. The current pilot courses vary a lot in didactical approach and in materials offered. Contacts about appointments and other communications between partners were not always easy and conducted in time. This was one reason why some courses started later than planned. Additional reasons were other

obligations, platform difficulties (e.g. no administrator rights) and probably some under-estimation of the work needed to be done. For example, ITC could not rectruit internal participants for the courses that we received (see above), so we had to put additional energy into recruiting participants for three courses from outside ITC. We also had to make software arrangements for one course, and provided some help to access the courses on the platform in Portugal.

Less positive experiences with respect the Geodata Visualization course include delays due to late provision of student names from receiving partners, platform problems, and delays caused by unexpected happenings (like the closing of a receiving institute for some time because of a strike). This caused some problems in the execution of the course (e.g. timely feedback) because staff was then already involved in other obligation. Less positive were also the platform capabilities (small files, rather slow), the effort needed to communicate to students (many e-mail messages), the number of drop-outs, and the apparent need to organize online sessions differently. Since our aim was to make the course materials self-explanatory, we anticipate that on-line lectures were not needed, and that the synchronous sessions could be used for answering questions of students. This was not the case; the students were expecting something different and there were hardly any questions. There are, however, also positive aspects. Among these are the international contacts and the positive reactions of students and a partner institute. We gained some experience in e-course development and execution, new input in our face-to-face courses, and possibilities to add the course to a regularly offered series of ITC distant short courses.

Further project activities

Further project activities include improvement of the teaching materials after the pilot, making these materials free of charge available on the project homepage (see above), and discuss future activities of the consortium. The proposal was to exchange courses among partners for 3 more years, based upon a balance between supply and demand. ITC cannot accommodate the consortium's courses into its educational programmes, so we do not have a demand, but are willing to contribute further to the consortium activities by offering the course in a mixed mode for 25 students, with 10 places guaranteed - free of charge - for network partners, and the remaining 15 places will be offered – against some course fees - to our target group: mainly students from less developed countries. We will run the course on our own server.

Some conclusions

Ultimately, structure, didactical methods and tools used in an e-course depend on course objectives and target participants, but it is clear that we cannot just use our face-to-face approaches and course materials one-to-one in an e-learning course. Stimulating students, preventing them to drop out, requires an attractive course. Did we succeed in offering such a course? Partly yes: particularly the course materials were very well received; partly not: some improvements would be needed, particularly in online sessions, feedback and (self) assessments. Important are also good appointsments and communication with partners.

Development and execution of an e-learning course is time consuming, and requires input of different human resources (course designers, tutors / teachers, IT and secretarial support). Re-use / portability of materials should therefore be considered. Ways to make the whole execution more efficient include gradually developing one or more FAQ's and avoiding (as much as possible) personal e-mail communication with students, but to use in stead communication to groups or to all students. Difficulties that might occur with international students are cultural differences, technology gaps and differences in tutoring and learning styles. This requires good communication skills of teachers/moderators, flexibility, and perhaps different modes of offering the same course content. It may also limit the use of tools and software in the course. Fancy tools are often not needed, the main questions is what effective and efficient tools are.

Although technical aspects are important, most important remain the human aspects. Stimulating and motivating students remains most effective in face-to-face contacts. Therefore, blended learning (with a limited part face-to-face, and the rest at a distance) is probably the best approach.

Notes

[1] The eduGI project is sponsored by the European Commission (EC), Directorate-General for Education and Culture (Project's reference: eduGI – EAC/23/05 DE 011).

Reference

Kester, L., P. Kirschner and G. Corbalan (2007), Designing support to facilitate learning in powerful electronic learning environments. Computers in Human Behavior 23, pp. 1047-1054.