EuroSDR's EduServ SERIES - TRANSFERRING KNOWLEDGE FROM THE RESEARCH TO THE USER DOMAIN BY DISTANCE eLEARNING

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ABSTRACT:

This paper concerns an initiative of EuroSDR (formerly OEEPE) in the area of continuing professional development (CPD) by distance eLearning and EduServ3 (Spring 2005) represents the third installment of this annual eLearning distance education service. The EduServ series is intended as a means of transferring the findings of the research activities of EuroSDR from the research to the user domain of the spatial information sciences. It is primarily, but not exclusively, aimed at staff of Geographic Information (GI) production organizations such as national mapping and cadastral agencies (NMCA). In practice, however, participants are drawn from NMCAs, the private and public sectors and the academic community.

Each installment consists of a series of short (two-week) eLearning distance courses, which run consecutively. The courses are practically focused and follow the principle of 'learning by doing'. Participants come together for a two-day workshop prior to the commencement of the courses where they meet other participants and receive course material and hear background presentations in the context of the courses.

Challenges that face the course designers and organizers may be seen as (i) accommodating participants from a broad range of diverse organisations with considerable differences in educational and cultural experience; (ii) achieving a practical 'learning by doing' element to Internet-based courses in technical areas; (iii) providing timely and effective learner/learner and learner/teacher communication; (iv) evaluating the performance of the participants in a reliable manner and providing effective feedback; and (v) building a sense of 'class group' and enhancing the learning experience.

In this paper the courses, which range from 'Digital Cameras and Sensors' to 'Positional Accuracy Improvement in GI Databases' are placed in the context of the objects of EuroSDR. The means of designing, delivering and assuring the quality of these courses to meet the pedagogical challenges, as outlined, are addressed in detail.

1. EduServ

1.1 Transferring Knowledge

EuroSDR is an organization, which was established as OEEPE in 1953 by signature to an International Treaty ratified by the governments of five European countries. EuroSDR currently has nineteen member states represented by delegates from a GI production organization and a Research Institute or University.

The aim of EuroSDR is to address the spatial data research needs of GI production organizations, such as NMCAs, in Europe through its publications and dissemination. These represent the outcomes and findings of a comprehensive series of applied collaborative research projects, focused workshops and active networks, of which a significant number are running at any given time.

The research agenda of EuroSDR is designed by delegates from the member GI organizations and research institutes in order to address real issues affecting members in a practical and timely manner. The dissemination of its results is therefore a key element of EuroSDR's research activities. Its official series of publications has now reached Number 48 (EuroSDR 2005) and these consist of either book or CDROM publications. They are disseminated free of charge to the member countries where they are further distributed by the national delegates. EuroSDR's Taskforce on Education, however, has long felt that the addition of a more effective means of transferring its research findings from the research to the user domain was needed.

In order to improve the effectiveness of its dissemination, EuroSDR initiated EduServ, a series of short eLearning courses in October 2002 to transfer the outcomes of its research activities to GI users and producers (Höhle 2004). EduServ3, the third installment of EduServ, consisting of three two-week eLearning courses ran between April and June 2005.

1.2 EduServ eLearning Courses

Annual EduServ installments are short (usually two-weeks) Internet-delivered eLearning courses, which are linked to the research activities of EuroSDR. EduServ3 consisted of three courses:

1. Co-ordinate Reference Systems for Spatial Information
2. Positional Accuracy Improvement in GI Databases
3. Digital Cameras/Sensors

The first two courses were included following the outcome of the joint EuroSDR - Dublin Institute of Technology (DIT) workshop on 'The Implications of Improving the Positional Accuracy of GI Databases' held in May 2004 in Dublin (EuroSDR 2005). Served from the DIT WebCT® server, they have been developed by DIT, Ordnance Survey Great Britain (OSGB) and the Technical University of Berlin and ran from 11th April to 22nd April and from 2nd May to 13th May 2005 respectively. Course content was designed to specifically address issues raised at the workshop and to convey, in practical terms, an understanding of the essential concepts.

The third course was first included in EduServ2 and liaises closely with the EuroSDR project on 'Digital Camera Calibration' (Cramer 2004). It is served from the Ohio-State University server in the USA and ran from 23rd May to 3rd June 2005.

Twenty-five participants from GI organizations and universities in Belgium, Cyprus, Denmark, Greece, Ireland, Italy, Latvia, the Netherlands, Switzerland and the United Kingdom are registered for EduServ3 with approximately fourteen following each course.

All participants, together with the course developers and tutors met in Dublin for a two-day pre-course workshop at which they heard presentations at three levels in relation to each course, namely:

- The course subject area in its broadest context
- The theoretical background to the course
- The logistics of the course, including schedules, methods of delivery and assessment.

In addition, participants gained hands-on experience of the courses through focused Internet laboratory sessions where they could sample elements of each course and practice downloading and submitting assignments. They were also provided with offline course material and reference documentation. Finally, all participants were required to complete and submit a short questionnaire by way of quality assurance of the workshop.

On returning to their countries, participants followed the courses from their workplace or other Internet-enabled location over a two-week period. During this period, in addition to following the online course content, they received additional online tutorials, reference documentation and detailed assignments. Extensive use was made of discussion board and mail facilities of the eLearning system environment.

Participants were expected to allocate approximately thirty hours to each course and were guaranteed timely responses from course tutors and feedback to submitted assignments. On successful completion of all assignments and the submission of a detailed course evaluation feed back questionnaire, they received a signed 'Certificate of Completion' from EuroSDR.

2. THE EduServ PHILOSOPHY

2.1 Learning by Doing

EduServ courses are designed to follow the principle of 'Learning by Doing' and therefore include practical assignments which require, for example, the participant to manipulate data or processes, evaluate the consequences and draw reasoned conclusions.

This represents a significant challenge to the course designers. In the course 'Co-ordinate Reference Systems for Spatial Information', for example, use was made of Microsoft Excel worksheets where participants could experiment with four-, six- and seven-parameter transformations to investigate the characteristics of the transformation, the effect of redundancy and the influence of gross errors. In the course 'Positional Accuracy Improvement in GI Databases' interactive Flash exercises were developed where participants could move vectors into 'improved' positions and evaluate and report the knock-on consequences.

2.2 Enhancing the Learning Experience

EduServ participants come from diverse educational and cultural backgrounds and are not required to possess any formal academic or personal qualification because it is important not to impose barriers to accessing this type of educational resource. However, participants must possess a working competence in Information Technology (IT). The pre-course workshop helps to identify and remedy weaknesses in this area.

In order to gain knowledge from eLearning courses the learner must find them stimulating and enjoyable. The two-day pre-course workshop is carefully designed to include a social element to give participants time to relax and get to know course tutors and fellow participants. Background presentations on each course topic are presented in a semi-formal manner. In other words, whereas the presenter will use standard conference-typical delivery methods, frequent interruptions with questions and clarifications are encouraged. In this way the participant is helped to feel part of the EduServ process.

During the course, the participant has access to a range of material, some online and some offline. Frequent use of the internal conferencing facilities of the eLearning platform helps to inform the learner of progress and give encouragement where necessary.

The correct balance of content and assignments is essential in enhancing the learning experience. The degree of difficulty of the assignments should increase gradually from the first to the last and be of such complexity that extends the learner without requiring too onerous a commitment within an already busy work schedule.

2.3 Sharing Experiences

Bringing course participants together from over ten European countries and from a variety of working backgrounds generates a synergy which results in fruitful exchange of experience. EduServ organizers have noticed a significant unanticipated benefit of the pre-course workshop, that of providing a forum for the inter-country exchange of ideas on the practical implementation of methods covered by the courses. This, in turn, informs the course tutors of the practical realization of theory in busy GI production environments, which can only improve the effectiveness of current and future course development.

2.4 Accessing Experts

EuroSDR, by its nature, brings delegates from GI production and user organizations together with GI researchers and experts. It is a natural philosophy of EduServ, therefore, that course participants should enjoy effective access to course tutors. All course tutors are invited to participate in the pre-course workshop including the social events. For mid-career staff following CPD courses, there is often a perceived barrier between them and the so-called experts in the field. This barrier is intended to be removed in EduServ.

Participants are encouraged to ask as many questions as they need of tutors throughout the course in order to maximize their understanding and gain maximum benefit from participation.

Course tutors, generally invite participants, where practical, to maintain this contact long after the EduServ courses have finished.

2.5 Establishing Contacts

Course participants are encouraged to exchange contact details, thereby becoming part of a network, which they can utilize in the future as appropriate. The effectiveness of this has not yet been monitored by EuroSDR and represents an interesting exercise to be undertaken by the taskforce in its regular reviews of EduServ. Anecdotal evidence suggests that such contacts are difficult to maintain in the context of busy and changing working environments.

3. DELIVERING EduServ

3.1 EuroSDR Taskforce on Education

EuroSDR created a Taskforce on Education in 2001 under the chairmanship of Professor Joachim Höhle of Aalborg University (Höhle 2004). Its tasks are to

- Organize the annual EduServ installments
- Select course topics together with EuroSDR project leaders and workshop organizers
- To monitor the effectiveness of the EduServ series and report to the EuroSDR Steering Committee.

To date, the taskforce has overseen three EduServ installments. Prior to EduServ3, courses were delivered in

- Automatic Orientation of Aerial Images on Database Information
- Integrated Sensor Orientation
- Airborne Laser Scanning and Interferometric SAR

Further information about the EuroSDR Taskforce on Education is available at its website http://www.plan.aau.dk/~jh/eduserv/.

3.2 Course Development

The development of eLearning courses requires a significant commitment of time and resources on the part of course developers. The development of eLearniing courses may, therefore, not be a realistic expectation in many cases of EuroSDR research activities. However, the availability of a course template and access to a learning technology team can greatly facilitate the development of such courses by reducing the workload of the project leader.

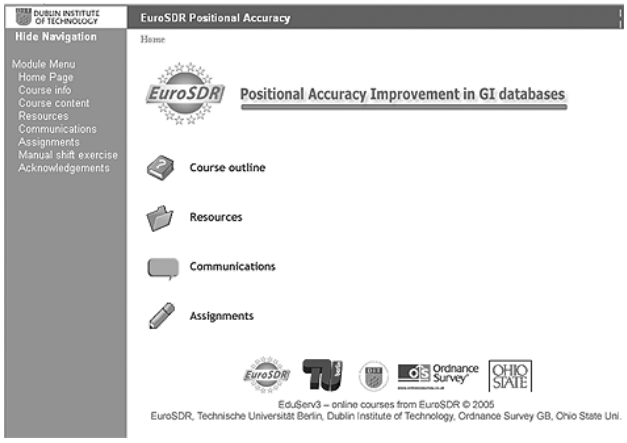

Figure 1. The Homepage of one of the EduServ3 eLearning courses showing the structure of the course and navigational links

In the case of EduServ3, the Learning Technology Team of the DIT had previously developed an eLearning template for courses of the Department of Geomatics (Martin et. al. 2003) and adapted it to accommodate two of the EduServ courses.

The template has been designed with the following sections:

- Course Outline (including the intended learning outcomes)
- Course Requirements (such as schedules, assignment and other key dates)
- Introductory (Pre-course workshop) Seminar Presentations
- Course Material (divided into logical sections)
- Reference Material (recommended reading, online/offline/references)
- Practical Exercises (to include any required download programs)
- Assignments
- Gallery (Photo of each course tutor and possibly each participant)
- Contact Information (EuroSDR, tutors)
- External Links (course specific and relevant general links).

Course material content pages include

- A java enabled means of interactive graphic illustration
- A comprehensive glossary of terms and
- The facility for self testing through multiple choice questions

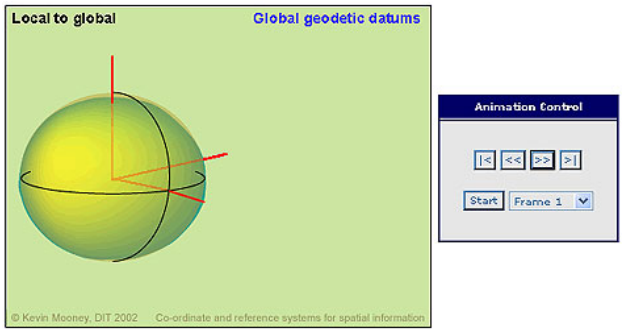

Figure 2. An interactive Applet allowing course participants to step through a detailed set of illustrations of a complex concept.

It is intended that content for future courses may be provided in generic form by topic experts and 'dropped into' the template requiring a minimum amount of editing and linking to produce

the Internet-enabled course. It is worth stating that course material developed for eLearning must meet the high standard demanded by participants who, themselves, are professionals used to a high level of performance in their own work area. Any material developed for such courses will, of course, have a life outside of such courses and many course developers use the material for multiple courses in their own institutions, thereby justifying the investment of time in its development.

However, it is important to emphasise that this 'technical' element is but one part of the course development. The pedagogical aspects of the course design are of equivalent or more importance. If the learning experience for the participant is a fulfilling one, then it will also be productive. Course designers must, therefore, give serious consideration to this aspect of the development of their courses. They must achieve an appropriate balance of content and tasks that stimulate the learner, while providing a rich source of up-to-date reference material and sources. Above all, courses must encourage as much learner/learner and learner/tutor interaction as possible.

3.3 The Host Organisation

Each installment of EduServ is hosted by a different organization, which may or may not also provide one of the courses. EduServ3 was hosted by the DIT in Ireland. The host organization is responsible for all logistical arrangements relating to

- Marketing of the courses (together with the EuroSDR taskforce and Secretariat)
- Enrolling of students
- Collection of course fees
- Organization and hosting of pre-course workshop
- Provision of appropriate support throughout the courses

3.4 Marketing of the Courses

EuroSDR is anxious that those individuals, who might benefit from EduServ courses, should be aware of the courses on offer and how to apply for them. Marketing can always be improved and the organizers rely on extensive emailing lists and promotion through all usual channels.

It has become clear from a review of the country of origin of course participants that marketing should be improved in those countries that do not enjoy a comprehensive 'basket' of resources for the CPD of GI staff, such as the smaller and emerging European states.

4. EduServ IN CONTEXT

4.1 Continuing Professional Development

Due to rapid technological advances and the changing needs of users of geographic information there is a constant need for the updating of skills of the staff of GI production organizations such as national mapping and cadastral agencies. NMCAs increasingly identify the CPD of their staff as an area of vital importance and many allocate a significant percentage of their annual budget to training and development (Kirwan and Greenway, 2002). Until recently, CPD within NMCAs has taken one of three forms (Martin et. al., 2003) i.e.

- In-house short courses or seminars directed at small groups of key staff,
- Distance-learning courses from 'Open Universities' and other Colleges and Universities, and/or
- Limited study leave for individual courses.

However, such traditional CPD methods of training are not always practical in a busy working environment due to:

- Disruption to the organization when short courses are held for large numbers of personnel,
- Inadequate dissemination of information provided by in-house seminars,
- Difficulties in accessing various courses due to location, as traveling often impinges on work time, and
- Difficulties experienced in sourcing relevant CPD courses.

It has clearly emerged in recent times that distance eLearning represents a valuable resource for the CPD of staff in GI organizations (Höhle, 2004; Mooney & Martin, 2004). This is particularly so in the case of countries where CPD resources are not widely available. In such cases, eLearning can provide access to a wide range of otherwise inaccessible courses if properly managed.

4.2 International eLearning Networks

It makes very little sense to duplicate the considerable effort involved in developing eLearning courses. Wherever possible, resources should be pooled to the benefit of the target community of learners. This is not always practical and certainly not a trivial matter. Issues relating to language and cultural differences between countries together with variation in national education systems can lead to barriers to such integration.

The EduServ series, however, brings a disparate group of learners and teachers together and successfully combines courses from different education centres in Europe and beyond. It demonstrates the potential of collaboration in course development and delivery in the GI disciplines.

Various Directorates of the European Commission, from time to time, issue funding to support a variety of eLearning initiatives, particularly those which support lifelong learning, cultural understanding and those that reach outside the European Community. Such funding sources should be exploited by the GI community in order to more effectively bring the potential of eLearning to those that require it.

4.3 Awards

Course designers must be sensitive to the consequences of their marking and award schemes. It must be realized that the essential purpose of EuroSDR's courses is to transfer knowledge and skills. The marking of, and feedback to, the submitted assignments should aim to identify strengths and weaknesses in a participants understanding and remedy the latter in so far as practical. Grading should be avoided where possible, particularly where a participant's status within an organization might be affected.

However this presents course designers with an important difficulty. Many potential participants and participants of courses with which the author has been associated have expressed the wish to receive an accredited recognized award on completion of the courses such as ECTS (European Credit Transfer Scheme) credits (Mooney & Martin, 2004). ECTS

credits can only be awarded, however, following the assessment and grading of participants.

5. CONCLUSIONS

Participants have reacted positively to EduServ courses as reflected in workshop feedback questionnaires and end-of-course questionnaires. They regard eLearning resources of this type as useful and are likely to undertake similar courses in the future. They report, however, that the time commitment to following the courses is significant and onerous in the context of continuing work responsibilities. They expect and demand a high standard of course material and interaction with tutors.

EuroSDR recognizes that its EduServ series provides a CPD resource among many resources that are available to GI production organizations in Europe. It is clear from the countries of origin of participants in EduServ courses that some countries enjoy more CPD resources than others and therefore may not regard the courses as providing an economical or useful addition. However, EduServ courses frequently cover topics not widely covered through eLearning resources elsewhere. It is hoped that effective marketing of EduServ courses will bring them to the attention of those members of staff of GI organizations that can benefit from their content and who are required to effect the practical implementation of many of the outcomes of research developments.

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