

e-Learning in GI Sciences – Approaches towards Sustainable Content

Susanne Bleisch¹, Stephan Nebiker¹, Joël Fisler²,

¹University of Applied Sciences Northwestern Switzerland (FHNW), CH – 4132 Muttenz
Tel. +41 61 4674 398 Fax +41 61 4674 460 Email (susanne.bleisch, stephan.nebiker)@fhnw.ch

²University of Zurich, CH-8057 Zurich
Tel. +41 44 63 55252 Email joel.fisler@id.uzh.ch

KEYWORDS: e-learning, sustainability, xml framework, open content, user community

1. Introduction

In the year 2000 the Swiss Virtual Campus Initiative (Edutech 2007) was initiated. During seven years over 80 projects engaged in the development of e-learning content in many different higher education subject areas were financially supported. Among them also several projects dealing with geographic information: NAHRIS 'Dealing with Natural Hazards and Risks' (NAHRIS 2007), CartouCHE 'Cartography for Swiss Higher Education' (CartouCHE 2007) or GITTA 'Geographic Information Technology Training Alliance' (GITTA 2007). Most of these projects are now or will soon be completed. However, the developed e-learning content shall remain usable and be maintained in the coming years. In the GITTA project, like in other large e-learning projects involving multiple teams and multiple languages, sustainability regarding content development has been an important issue since the project started. This paper introduces three different approaches how the future use, updating and revision of e-learning lessons developed in the GITTA project and other SVC projects can be ensured and simplified. The approaches discussed here are the XML framework eLML for structuring and storing the content (eLML 2007), the publication of the content under a Creative Commons Licence (Creative Commons 2007) and the foundation of a supportive association (GITTA Association 2007).

2. eLML – eLesson Markup Language

When in 2000 the e-learning project GITTA started there were no available formats, content standards or learning management systems able to meet our needs. We learned from the difficulties other projects had using proprietary formats and commercial learning management systems that were faced with vendors' decisions to stop support for a format or increase prices drastically. An evaluation showed that back then rarely a learning management system supported standardised import or export of content. Thus, content could not easily be transferred to another learning management system. Additionally, the GITTA project consortium was heterogeneous and multilingual. Some mechanisms, pedagogical or technical guidelines, needed to be put in place to ensure that all content authors created consistent lessons with the same look and feel.

Due to these reasons the eLesson Markup Language eLML (eLML 2007) was developed. It satisfies all of the named requirements. Its structure is defined and implemented using XML Schema thus allowing for easy checking and validation of created content using standard tools. The content is stored separately from the layout in XML files. Layout templates are defined and updated using XSLT style sheets. With the help of different style sheets various output formats such as PDF, HTML or standard SCORM or IMS content packages (Jones 2002) for the import of the lessons into any learning management system can be generated. The creation and use of an XML based framework for e-learning content was inspired by some of the team member's positive experiences with geospatial data modelling and exchange mechanisms such as INTERLIS (INTERLIS 2007) or GML (OGC 2007). Didactically, the framework is based on the pedagogical model ECLASS (adapted from

Gerson 2000) which stands for Entry, Clarify, Look, Act, Self-assessment and Summary. These are the important parts of an e-learning lesson and shall guide authors in the creation of good content. However, the authors are free in the order they wish to use some or all of these parts allowing the implementation of just about any teaching or learning structure in eLML (e.g. case studies or experimental learning).

eLML was documented for general use and published as an open source project under the General Public License (GPL) on Sourceforge.net in 2004. Since then a constantly growing number of projects and authors in Switzerland and other European countries started using eLML as their tool for creating e-learning lessons (e.g. Dykes 2007). The large user community ensures the updating and maintenance of the XML framework. A comprehensive overview of the eLesson Markup Language eLML can be found in Fisler and Bleisch (2006).

3. Open Content under a Creative Commons Licence

In the GIST (Geographic Information Systems Technology) e-learning project GITTA 43 lessons at two experience levels – basic and intermediate – in four languages were developed. The lessons cover the six topics GI Systems, Data Capture, Database Systems, Spatial Modelling, Spatial Analysis, Data Presentation and a number of case studies. Towards the end of the project the consortium had to find ways to ensure that even though funding was ending, the developed content would not become deserted and outdated. Discussing different options such as offering access via paid subscriptions or restricting the access to partner institutes the consortium decided on an open access strategy. As a consequence, in 2006 the content was made freely available under a Creative Commons licence (Creative Commons 2007). The open content GITTA e-learning lessons shall be used throughout the world and a community of users and authors interested in the maintenance of the lessons will hopefully emerge. Similarly, well-known open content initiatives include the open course ware project of MIT (MIT 2007) or the connexions project (Rice 2007).

4. The GITTA Association

However, freely available content and a possibly large user community do not yet ensure the sustainability of e-learning offerings; since they do not address the important issues of content hosting and updating. In response to these additional challenges, the GITTA Association was founded in 2006. All users of GITTA lessons and especially authors who would like to update or change existing GITTA e-learning lessons are encouraged to participate. GITTA Association members are either active individual authors or schools and institutes or sponsors. A low membership fee allows everyone to become an active member. Being an active member of the GITTA Association has the advantage of having access to different versions of a lesson and of being able to not only use the content but also to update it and to provide contributions, e.g. in the form of translations into further languages. The funds of the association are used for the hosting of the e-learning content on a content versioning server (CVS) and for special projects such as an expected cooperation with South American universities for the translation of the lessons in Spanish and Portuguese.

5. Conclusions and Outlook

e-learning has many advantages but also disadvantages. Surveys among students attending e-learning courses have shown that they like having flexible working times and being independent of a specific place such as the computer lab at the university. On the other hand, they note that it is hard to read lessons on the screen. However, with eLML we can offer them a print-version of the lessons in PDF format as a complement to the online HTML version. Looking at e-learning from the teaching side our experiences have shown us that the students achieve much better results compared to the traditional face-to-face teaching if the e-learning content is either highly interactive or teaches

computer related aspects. Namely courses in the 3D modelling language X3D and the database query language SQL are highly popular among students and they achieve higher grades in tests compared to student who had not used the e-learning lessons.

Using eLML ensures that the e-learning content is independent from any proprietary format and that content and layout are handled separately. Thus, the lessons can either be stored on an independent server and made available directly through a website (see GITTA 2007) or transformed to SCORM or IMS content packages which can be imported into any modern learning management system. eLML lessons could also be made available to the students in HTML or PDF formats on a CD or DVD.

In case of the GITTA e-learning content, the publication of lessons as open content combined with the foundation of a supportive association helps ensure that the created content can be used by many different users. Some of them may also want to update or enhance the lessons they have integrated in their curriculum and thus giving back some value for the free use of the content. The GITTA Association allows structuring and guiding these cooperation processes and facilitates the integration of authors that were not GITTA consortium members in the first place.

Highly important is the sustainability of e-learning content. With the concepts described in this paper we believe to have found a way to ensure that the developed GITTA e-learning lessons will be usable also in the years to come. There are already other SVC projects who are interested in opening up their content and possibly joining the supportive association.

References

- CartouCHe (2007) *CartouCHe - Cartography for Swiss Higher Education*. <http://www.e-cartouche.ch/> (online December 17, 2007).
- Creative Commons (2007) *Creative Commons*. <http://creativecommons.org/> (online December 17, 2007).
- Dykes J (2007) *InfoVis 2007 tutorial : 'Visualization with Google Earth and GIS'*. <http://www.gicentre.org/infoVis/> (online February 22, 2008).
- Edutech (2007) Swiss Virtual Campus. Swiss Virtual Campus, <http://www.virtualcampus.ch/> (online December 17, 2007).
- eLML (2007) *eLML - eLesson Markup Language*. <http://www.elml.ch> (online December 17, 2007).
- Fisler J and Bleisch S (2006) eLML, the eLesson Markup Language: Developing Sustainable e-Learning Content Using an Open Source XML Framework. WEBIST 2006 - International Conference on Web Information Systems and Technologies, Setubal, Portugal.
- Gerson S (2000) ECLASS: Creating a Guide to Online Course Development For Distance Learning Faculty. *Online Journal of Distance Learning Administration*, Vol. III, No. IV (Winter 2000). State University of Western Georgia. <http://www.westga.edu/~distance/ojdl/winter34/gerson34.html> (online December 17, 2007).
- GITTA (2007) *GITTA - Geographic Information Technology Training Alliance*. <http://www.gitta.info> (online December 17, 2007).
- GITTA Association (2007) *The GITTA Association*. <http://www.gitta.info/association> (online December 17, 2007).
- INTERLIS (2007) *INTERLIS The GeoLanguage*. <http://www.interlis.ch> (online December 17, 2007).
- Jones E R (2002) Implications of SCORM and Emerging E-learning Standards On Engineering Education. *Proceedings of the 2002 ASEE Gulf-Southwest Annual Conference*. <http://falcon.tamucc.edu/~ejones/papers/ASEE02.pdf>.

MIT (2007) *MIT OpenCourseWare*. <http://ocw.mit.edu/OcwWeb/web/home/home/index.htm> (online December 17, 2007).

NAHRIS (2007) *Dealing with natural hazards (NAHRIS)*. <http://www.nahris.ch/> (online December 17, 2007).

OGC (2007) *Geography Markup Language*. <http://www.opengeospatial.org/standards/gml> (online December 17, 2007).

Rice (2007) *Connexions - Sharing Knowledge and Building Communities*. <http://cnx.org/> (online December 17, 2007).

Werner M and Stern B (2003) Active and Self-controlled Web Based Education in GIS Technology and Cartography: The GITTA Project. *Proceedings of the 21st International Cartographic Conference*, Durban, p. 805-815.

Biography

Susanne Bleisch is a scientific collaborator for the e-learning projects GITTA, CartouChE and eLML at FHNW and a PhD student at City University London. She studied Geomatics at the University of Applied Sciences Northwestern Switzerland FHNW in Muttenz, Switzerland and has research interests in 3D geovisualization, cartography and geoinformatics and e-learning.

Stephan Nebiker is professor for geoinformatics, photogrammetry and remote sensing at the University of Applied Sciences Northwestern Switzerland FHNW in Muttenz, Switzerland. He is actively involved in the e-learning projects GITTA and CartouChE. Among his research interests are virtual globe technologies, 3D geovisualization, mobile geosensors and augmented reality.

Joël Fisler works at the IT services of the University of Zurich. His tasks cover supporting the open source learning management system OLAT and the continuing development of eLML. Both OLAT and eLML are strategic e-learning tools at the University of Zurich. He originally studied environmental sciences at the Federal Institute of Technology ETH Zurich and was the coordinator of the GIS e-learning project GITTA presented in this paper.