**GI-BoK - Open Source GIS Education perspective**

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**Abstract**

Today many aspects of geospatial science including information, standards and tools are created and developed as “open”. The effects of this openness are not only providing the free access but also spreading knowledge and responsibility to the whole community. The objective of the ELOGeo project has been to enable the wider community of GIS and non-GIS users to learn and make use of open source geospatial tools.

*Keywords*: Crowd sourcing, elearning, repositories.

1 **Introduction**

The expanding range of Open source GIS tools greatly enhances the use of geospatial technologies by the wider community and facilitates the sharing of information and collaborative work. But in order to fully utilize the potential of these new and innovative technologies there are key challenges that need to be overcome. These include (1) a solid understanding of the technology by the wider geospatial community and (2) knowledge of how to integrate these technologies with existing theory, techniques and models. There is growing demand from the geospatial industry and academia for students with these skills. The ELOGeo vision is to provide a framework environment for the seamless sharing of geospatial and map based information and knowledge in this theme.

2 **ELOGeo background**

The ELOGeo is a JISC-funded project based at the the University of Nottingham in partnership with the Mimas Centre of Excellence at the University of Manchester. The ELOGeo repository was launched in June 2011 and within 5 months was successful in building a strong community of contributors and users for the project. ELOGeo was implemented as a community-led project (with strong support from the Open Source Geospatial Foundation, Open Geospatial Consortium, etc). Openness is the key element in all aspects of this project. Not only is open geospatial the repository topic but access to the materials is also open to the public through open (Creative Commons) licenses, and even the framework itself is developed in open source platforms.

Crowd sourcing refers to projects which make use of group intelligence. Crowd sourcing is a distributed problem-solving and production model. Citizens volunteer to collect and sometimes maintain information for a variety of initiatives.

These on-line communities self organise into productive units and have produced some excellent results (McLaren, 2009).

Shao et al (2012) has carried out research to understand the social history of collaboration in the various communities in Open Source Geospatial Foundation (OSGeo with more than 20 collaborative open source projects, to map out the social history of collaborative activities within the OSGeo ecosystem. It describes the data collection methodology used on SVN commits from each mutual project to reflect user activities in OSGeo. Du et al. (2012) describes results from a research project undertaken to explore the technical issues associated with integrating unstructured crowd sourced data with authoritative national mapping data.

3 **System overview**

There is an increasing demand from both teaching staff and students for access to good quality teaching and training materials in open source geospatial technologies, standards and data and ELOGeo targets this need of the community. The ELOGeo’s aim is to cater for all levels of users (from novice to expert) who are interested in learning and using open source GIS. The users can access to the collected materials, as well as to create, upload, modify or share them with others. The user interfaces include:

The main website (elogeo.nottingham.ac.uk) provides links to the main features of the system including the repository, wiki and blog. There is also interactive tag cloud based search facility provided to the users.
The ELOGeo repository (elogeo.nottingham.ac.uk/xmlui) is where the learning materials are classified and archived. The users can search and find their materials through different searching and listing tools, including full-text search. They also can register/login to the system to manage their uploads. The administrators can run the workflow of accepting/rejecting/modifying the uploaded materials as well as administrating the user accounts.

The arrangement of the ELOGeo categories and collections is inspired by the users’ requirements. The contributors can upload their materials into any branch, or suggest a new branch to the administrator. Two usecases of ELOGeo are presented below to give an overview of the platform.

**Use Case 1:** One example is the use of ELOGeo platform to disseminate the learning materials from the Open Source GIS Summer School in Girona (http://www.sigte.udg.edu/summerschool2011/) which is organized by the GIS and Remote Sensing Centre (SIGTE) of the University of Girona (Spain) with the collaboration of the Sextante Project and the Centre for Geospatial Sciences (CGS) of the University of Nottingham. The aim is to get students to learn methods, techniques and resources that will enable them to work independently in making decisions on issues about the impact on the environment and community. The ELOGeo platform has been used for the sharing of the teaching materials. The courses available cover topics from basic concepts to advanced use of Free and Open Source Software, Creating GIS Web Services, OGC specifications, Network analysis etc. Course materials are available at http://elogeo.nottingham.ac.uk/xmlui/handle/url/110

From the user’s perspective, ELOGeo can be the primary source of learning to use the open geospatial resources. From the teachers’ perspective, ELOGeo can be the primary archive for their needed material and to share them with the students. From the public perspective, this helps to get the benefits to a wider audience. Without ELOGeo, the materials could be shared online temporarily, but there was no specialized and established source for all those related materials.

**Use Case 2:** A non-geospatial specialist from any discipline realizes that they need to work with the open geospatial data and software (e.g. for flood mapping). They can go through the Introduction for Beginners wiki page which covers topics such as Introducing GIS, Vector Data, Data Capture, Raster Data, Topology, Coordinate Reference Systems, Map Production, Spatial Analysis (Buffers analysis, Interpolation etc.) which are all fundamental subjects to learn to be applied in any application theme. Once they have this knowledge, they can move on to advanced topics such as web services and OGC standards which are available in the repository.

4 Usage summary

The ELOGeo repository was launched in June 2011 and within 5 months was successful in building a strong community of contributors and users for the project. As of November 1, 2011, ELOGeo has 58 registered users, with 66 material items (lecture notes, practical, handouts, papers etc) submitted to the repository by the community. In this 5 month period there were over 17000 accesses of the materials from over 4000 users which demonstrate the strong demand from the targeted community.

The statistics of repository (cumulative) are presented, below:
Fig 4- shows the number of items in the repository over the 5 month period (June-Sep 2011)

Fig 5- shows the count of the searches performed within the repository and does not include search engine redirections

Fig 6- shows the geographical distribution of users accessing the repository

A usability survey has been conducted in the last month of the project (details at http://elogeo.nottingham.ac.uk/documents/UsabilitySurveyResults.pdf) which also helped the team to apply some improvements on the user interface. The overall look of responses shows a relative satisfaction in experiencing the ELOGeo project. The following chart shows the sum of all the collected responses.

Fig 7 shows the chart of the responses of the usability trail.

5 Future planned developments

We are looking for the best policy options for developing and maintaining an ecosystem to manage the integration and development of open repositories. Specifically, we are interested to find the dynamics and interactions among multiple parties, the types of interdependence and integration risks of such ecosystem in contrast to other arrangements. The underlying challenges of creating an innovative ecosystem that is open, sustainable, and resilient in tandem with the government open source strategy in the UK will be examined.

We believe that aligning the repository with the “Body of Knowledge” can help improving the accessibility of the materials, and consequently improves the usability sustainability of the product. The Body of Knowledge (or BoK) is a complete set (or hierarchy) of concepts in a specific knowledge domain, that is centrally governed by the professional bodies. By BoK alignment, we mean mapping the material structure according to the BoK arrangement, so the contributors and other users can use the BoK as a mean to place a new material or to find a requested one. In GIS domain, the first edition of “Geographic Information Science and Technology Body of Knowledge (GISTBoK)” has been developed between 1997 and 2006 lead by the University Consortium for Geographic Information Science (UCGIS) mainly in the US. The first edition of BoK has been published in 2006. Although the first edition is not considered to be up-to-date, the context of development was not global and the updated edition may not become available soon, the research can still examine 1) The effect of BoK alignment on the repository usability; and 2) Comparing the open structure and centrally-managed structure in the contribution experience.

In summary, we aim to continue develop different techniques around the current ELOGeo system and will assess their individual impacts on the sustainability. These include:1) Interface Enhancement: A combination of Web development tools to ease the user experience, particularly for finding and browsing material from different semantic viewpoints.2) Material Enhancement: Adding embedded interactivity to the ELOGeo materials. Web-mapping is one of the interactive functionalities that will be focused in delivering GIS modules.3) Content Management Enhancement: Applying Web 2.0 techniques to make the contents as much manageable
and annotatable as possible. This will also ensure managing the aged materials and keep the materials updated.

References


