



## Open source and E-learning...

Suchith Anand from the university of Nottingham looks into how by combining the potential of e-learning tools and open source GIS, the academic community can strengthen education in GIScience providing students with holistic technical skills for industry and changing times.

The exponential growth of GI Industry over the last few years has generated a huge world wide demand for skilled graduates. Open Geospatial Consortium's role as a global forum for development of international standards for geospatial interoperability has in turn lead to the rapid developments in open standards based GIS and widespread availability of open source GI products. The availability of free and open source GIS has made it possible for a large number of local government agencies and researchers working in areas like environmental issues, transportation, urban poverty, town planning, waste management, rural development and education to make use of GIS tools in their work.

The widespread application of E-learning tools and open source GIS will help enable widening access to GIS education and research.

Development and maturity of open source GIS can be especially seen as a key advantage for new universities and colleges planning to start GIS programmes. They can tailor their course curriculum to fit in open source GI software for the associated practical's so that students all over the world can make use of the freely available open source software for their learning rather than be dependent upon costly proprietary GI software. This will in a true sense bring down the entry barrier for many students especially in developing countries to learn GIS and make use of GIS for development work. For universities this will be a big step in enabling widening participation for GIS programmes.

The exponential increase in usage as well as development of e-learning tools and initiatives has highlighted potential for distance learning GIS courses. The transition to online distance learning, primarily driven by social change, is creating a paradigm shift in the way colleges are viewing teaching and learning<sup>1</sup>. As the demand for GIScience education grows, so too does the demand for effective modes of instructional delivery to students, regardless

of time, place, or, in some cases, educational background<sup>2</sup>. The key universities that already have established distance based GIS programmes include Birkbeck University of London, City University London, Kingston University, California State University, Purdue University, Simon Fraser University, UNIGIS (worldwide network of universities offering distance learning courses in GIS), University of Colorado, University of Southern California, Western Michigan University and Curtin University. Knowledge of GIScience is essential for researchers in multiple disciplines. GIS education should provide holistic education in GIScience by giving students the opportunity to experiment with different GI software and understand the importance of geospatial interoperability and standards.

One key concern is that despite these exciting developments in geospatial open standards there have not been changes in the curriculum of universities teaching GIS programmes reflecting these changing industry and societal needs. This is very important as knowledge in key areas of geospatial interoperability and standards need to be given to graduates to enable them to develop and make use of open standards based GIS in their respective domains. Considering the advantages it can bring to universities, graduates, industry and to society at large the effort needed to redevelop course materials to accommodate open source GIS need to be given immediate priority by academics. This can be achieved only through a substantial revision in current GIScience curriculum.

There are many examples of open source GIS applications in use in various domains that can be used to help design course materials for GIS programmes. The next five years will see many more new GIS courses being started by universities especially in USA, Europe and Asia focussed on open source GIS and distance learning. There is a huge skilled manpower requirement for geospatial software development and a combination of open

source GIS tools and distance learning GIS programmes will help meet this demand.

**References**

1. Rogers, D. L., 2000, "A paradigm shift: Technology integration for higher education in the new millennium" *Educational Technology Review*, 13, 19-27
2. Wright, D., DiBiase, C. Pancake, R. Wright, and K. Foote, 2002. "Challenges and Opportunities in Distance Education for Geographic Information Science," University Consortium for Geographic Information Science Special White Paper, 20 pp

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## Relationships with non-academic partners

Met briefly at the recent Snowflake event in Edinburgh, Dr Robin S. Smith from Sheffield University, kindly agreed to offer his view too!

Geographical Information Systems are underpinned by notions of supporting interdisciplinarity, collaboration and inter-organisational working. Universities have long been players in the development and adoption of the technology of, and principles underlying, GIS and our field of GI Science. We introduce undergraduate students in diverse subjects to GIS as part of their toolkit to explore and, importantly, share their understanding of our world, often with those lacking technical expertise.

In the Informatics Collaboratory of the Social Sciences (ICOSS), at the University of Sheffield, we specifically employ GIS to help bring together data from different researchers' contexts to create new shared meanings of their topics, often re-using existing data. Notably this extends beyond our academic arena to actively engage with public sector partners, particularly at a local level, through fora such as the South Yorkshire GIS group. This regional engagement is important, as local issues are often what academic researchers wish to address and where local public sector data and specific problems can be found. As such, universities should be acting as local training hubs, where shared understandings of an area can readily develop training beyond the generic application of our tools.

Such activity falls within an increasingly commercial aspect of UK higher education following the models of 'knowledge transfer' or, perhaps more appropriately, 'knowledge exchange'. This is a growth area in the academic sector but such commercialisation is a change with some issues internally and externally. For example, almost all components that would come together to provide high level training outside of formal courses are fettered by problems

with licensing of both datasets and systems. In particular, the perception of what is and is not permitted is as harmful as the reality. Opportunities, however, exist in 'CASE' PhD studentships, where a dedicated researcher can benefit from access to data and expertise to provide focus to their study and address the topics of their public, voluntary or private sector co-funders [1].

However, underlying issues of continuing lifelong education and 'information literacy' (in a rapidly developing technical field such as GIS) need to be considered, something that is currently being investigated in an e-learning context by researchers in Sheffield [2] and more widely by activities such as Spatial Literacy in Teaching (SPLINT) [3], alongside high-level international multi-sector training via organisations such as the Vespucci Initiative [4] and the Continuing Professional Development schemes of bodies such as the Association for Geographic Information [5]. All these examples help to develop training across sectors, where learning from one another can enrich all our understandings.

An arena where such issues could be more readily addressed is in the development of international, national and local Spatial Data Infrastructures (SDI). Notable policies emerging at the European level such as the INSPIRE directive should offer us all an impetus to consider who our broad GIS community actually is and what our likely ongoing training needs may be. SDIs must be more than well connected geospatial datasets and policy frameworks. Their emergence relates to a strong social element and could, therefore, also be timely foci for our small but well-organised community to better understand what it means to share data and what skill-sets will also be needed in such collaborative contexts. Although many tools are becoming easier to use, the interpretation of outputs may require increased expertise, particularly when acting in an 'advocacy' role for citizens. It is SDIs where debates about access to GI will take place and where issues around licensing may, therefore, be mediated to support flexible user-centric lifelong learning.

Duplication of digital data and associated effort is known to be wasteful. What we may need to consider next is the ways in which shared, multi-sector infrastructure could be developed so that (through appropriate online user-authentication) partnerships are sustained and new ones fostered at varying geographical scales, supporting the social dimensions of our community. Training is an integral part of the academic world but we are already a notable part of the GIS economy, whether that is providing research-based analyses for partners, fostering the development of new tools and systems or even the charges we need to make for supplying our training expertise.

**Reference**

- (1) <http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/opportunities/postgraduate/pgtrainingpolicy/index4.aspx>
- (2) see short note about the work by Ms. Maryam Nazari currently here: <http://www.shef.ac.uk/is/research/seminars.html>
- (3) <http://www.le.ac.uk/cetl/splint.html>
- (4) <http://www.vespucci.org>
- (5) <http://www.agi.org.uk>

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