

UNIGIS Online Distance Learning Towards International GIScience Qualifications

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Abstract:

A large number of students in Southern and Eastern Asia aspire to study abroad at undergraduate and postgraduate levels for obtaining international qualifications, but only some of them can fulfill their dream through a scholarship or financial support from other sources. The developments and growth of eLearning and Online Distance Education are boosting the internationalisation process of education and facilitating excellent opportunities of obtaining international academic qualifications without moving abroad. This paper discusses the UNIGIS online distance learning programmes in Geographical Information Science and Systems as an alternative and cost effective model for obtaining widely recognised and highly regarded international academic qualifications. Local academic institutions can offer such opportunities by establishing joint study programmes in cooperation with worldwide UNIGIS member universities.

1. Introduction

Aspirations of studying in Europe, North America or Australia towards reputed international qualifications are widespread among undergraduate and postgraduate students in all the major countries in Southern and Eastern Asia (see Australian Government, 2013, Davis, 1998, Institute of International Education, 2012, OECD, 2011 and Verbik and Lasanowski, 2007). However, most students find the costs of studying and living at their destination countries very high as compared to their local economic levels (see Australian Universities Net, 2013, Study Group, 2013 and Study Portals B.V., 2013) so they need to compete for various means of financial support i.e. limited number of scholarships and/or other sources of funding for higher education on meritorious basis. Among other requirements, most of the scholarship sponsors ask for high scores in English language competence tests like TOEFL, IELTS etc. (see Studies in Australia, 2013, Study Abroad, 2013 and UK2 Study, 2013) which are expensive, conducted at selected places and the scores are valid only for a limited period of time. Even with demonstrated high levels of academic achievements, only few competitors succeed in securing scholarships from reputed universities, or financial support from other sources. On the other side, technological developments supporting online distance learning (ODL) during the recent decades have facilitated an increase in the opportunities of obtaining academic

qualifications from reputed universities irrespective of students' location (Allen and Seaman, 2010, Gunawardena and McIsaac, 2004, Hostetter, 2013, Sumner, 2000 and McIsaac and Gunawardena, 1996). ODL is proving effective not only in delivering quality education to remote students but particularly beneficial for those who want to continue their lifelong learning towards further qualifications, but do not have enough time to devote to regular classroom-based programmes; e.g. adult learners, working professionals and parents of young children (Moss, 2004 and Müller, 2008). However, most institutions face a number of difficulties in establishing and operating ODL in subjects which involve practical assignments. An example of such study programmes is UNIGIS courses in Geographical Information Science and Systems involving extensive hands-on practical exercises largely based on the use of commercial GIS software, too costly for individual students. The UNIGIS International network presents an excellent framework for ODL in Geoinformatics which has evolved over last 20 years and already benefitted a large number of students around the world.

2. UNIGIS International Association

UNIGIS was conceptualised in 1993 from the central idea of 'Educating GI professionals worldwide' through distance learning programmes in response to the increasing needs of quality

Geoinformatics education in various parts of the world. Visionary university professors from Austria, The Netherlands and the United Kingdom initiated an informal network and collaborated in the design and establishment of a framework to offer university level study programmes in Geoinformatics from regional institutions. This effort proved successful and soon recognition grew among other like-minded institutions of higher education / universities in different countries. Some of these were offered to join the network and the UNIGIS International Association (UIA) was formally registered in the Netherlands, functioning as an umbrella organisation for member institutions (Strobl, 2013 and 2011a, Molendijk and Scholten, 2005). Under the banner of UIA, member institutions cooperate in setting benchmarks for internationally recognised Geoinformatics education by designing demand-based professional curricula (Shahnawaz, 2003 and 2008), and developing state-of-the-art learning materials and media under strict quality control measures (Shahnawaz, 2010 and Car, 2008). Availability of commercial GIS software is essential for supporting professional learning the students and successful completion of their coursework UIA has concluded several agreements with leading vendors like Bentley Systems, Clark Labs, ESRI, INTERGRAPH, Oracle, Safe Software and Trimble for providing their software either free of cost or at discounted student prices. In this way, UIA provides leadership, represents the network internationally and expands it by integrating new institutions. UIA's main task is to support member institutions by enhancing the quality of their study programmes and working towards standardized and recognized qualifications.

3. Study Programmes and Curriculum Structure

3.1 Study Programmes

The UNIGIS network focuses on university level education and offers two different study options. Since the network involves institutions from several countries, the courses are offered in languages like German, English, Hungarian, Spanish, Portuguese. Academic degrees follow national educational conventions and prevailing university rules. However, a majority of institutions offer UNIGIS courses in English language and award qualifications according to international standard degrees, i.e. Master of Science (MSc) and Certificate/Diploma awards. Both programmes are Bologna conformant and based on the European Credit Transfer System-ECTS (European Communities, 2009).

The MSc programme is designed to develop geospatial managerial level skills and competences. It aims at developing a deeper understanding of geospatial concepts and methods, as well as technical requirements of GI-Systems; involving hands-on training of generating, acquiring, processing, analysing and visualising geospatial data as well as organisational aspects of Geographical information at enterprise level. It supports career advancement of graduates as qualified GIS project managers and/or GIS team leaders. Students are required to complete a total of 120 ECTS points during 2 to 3 academic years. The UNIGIS Certificate/Diploma programme focuses on developing application-oriented skills and experience towards professional competences among students. This includes broader understanding of spatial concepts, collection, processing and analysis of geospatial data; GIS application development and cartography. This trains the students as productive and efficient GIS team members. Students need to collect a total of 60 ECTS points within 1 to 1.5 academic years.

3.2 Curriculum Structure

UNIGIS programmes are designed in a modular structure, the curriculum consists of four major components: compulsory modules, elective subjects, residential (workshop) phases and supervised individual scientific / practical work (Table 1). The 'Compulsory Modules are at the core of the 2 study programmes (see 1, 2, 3... in Figure 1). In sequence, these modules cover the essentials of Geoinformatics starting from basic concepts and concluding with the state-of-the-art in each subject. Although the titles of some compulsory modules may be identical in both study programmes, levels and details of topics are more advanced in the Masters programme. The 'Elective Subjects'(see *E1, E2, E3* in Figure 1)woven in the study allow students to orient themselves towards their specific areas of interest. Students can select from a range of elective subjects covering various GIS application fields, specific software skills, GIS programming competences as well as a mixture of these. The active participation of students in the 'Presence Phases' organised in the form of topical workshops and summer schools does not only help to strengthen their professional orientation but also provides an opportunity of face-to-face interaction with their instructors and peers. and competences in the form of a Master Thesis and/or an Applied Project.

Table 1: Main components of UNIGIS Courses at the University of Salzburg

Course Component	Master Programme	Diploma Programme
Compulsory Modules	66 ECTS	42 ECTS
Elective Subjects	24 ECTS	18 ECTS
Residency (workshop, summer school etc.)	A part of the Elective Subjects can be covered through these activities	A part of the Elective Subjects can be covered through these activities
Supervised Individual Scientific / Practical Work	Master Thesis 30 ECTS	A part of the Elective Subjects can be covered by an Applied Project
TOTAL	120 ECTS	60 ECTS

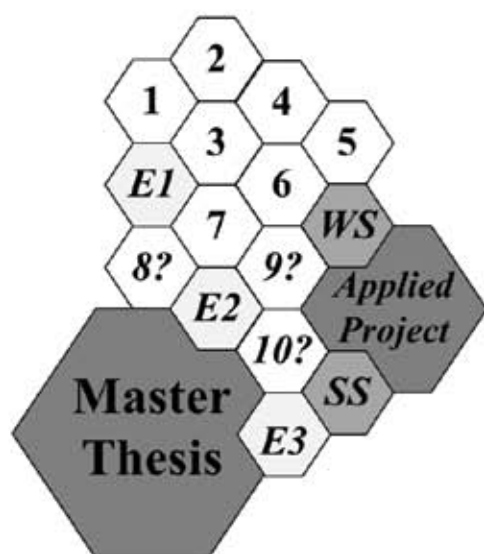


Figure 1: UNIGIS course structure

Finally, students get a chance to test the outcomes of their learning process during the ‘Supervised Individual Scientific/Practical Work’ and present their skills

4. Course Delivery System

UNIGIS courses are delivered via online distance learning, therefore all learning materials are integrated in an eLearning platform and these are revised in a cycle of 2-3 years. Students registered in a course receive credentials for the eLearning platform to access learning materials. As mentioned above, UNIGIS courses have a modular structure, a module covering a particular area with a complete learning unit designed to facilitate self-learning of students. Students get access to modules in a sequential manner, according to the schedule and then these modules remain accessible till the completion of the study programme. An instructor is appointed to mentor students throughout each

module, remaining in regular contact through e-mail for solving questions as well as through audio-visual conferences as and when required. At the University of Salzburg, a full course module contains 15 lessons, 4-6 exercises and 4-6 assignments. It requires around 150 hours of study and practice over its duration of 6 to 8 weeks depending on the nature of the content and tasks and is valued at 6 ECTS points. Each module is designed to fulfill certain overall learning objectives which are achieved through the defined specific objectives of each lesson. A lesson consists of core concept study materials developed by the UNIGIS team, 2-4 compulsory readings obtained from external sources and further recommended readings and learning materials in the ‘hungry minds’ section. The evaluation of learning outcomes is carried out at 2 levels i.e. 1.) self-assessment by the students through exercises which do not carry any grades and 2.) assessment by the instructor through assignments as a basis for awarding grades. Although students can complete all the requirements of a UNIGIS study programme without ever attending lectures or taking personal examinations, the UNIGIS team offers residential activities and events like workshops, summer schools, conferences etc. where participation of students is highly recommended. These events provided opportunities of interacting with other GIS professionals and sharing experiences, an added value to learning and development of competences.

5. International Joint-Study Programmes

The use of geospatial techniques and technologies has been increasing rapidly in all the major countries, but not all of them have sufficient number of well-educated GI professionals. The responsibility of generating qualified GI professionals lies largely with higher education institutions, but this requires a significant effort for designing, developing and offering the required courses.

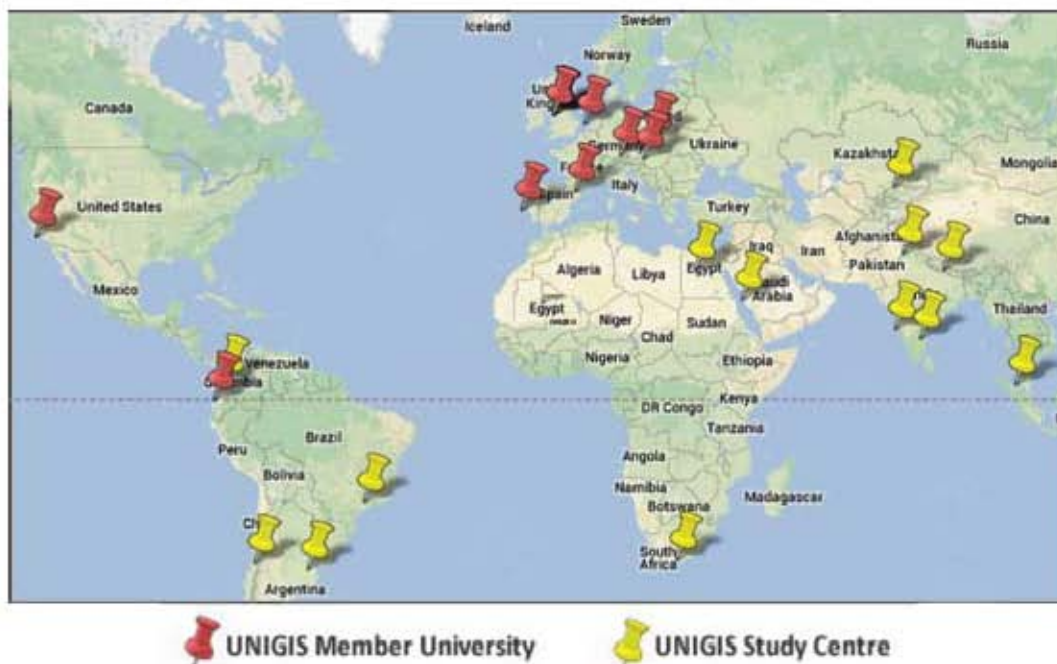


Figure 2: Location of the institutions offering UNIGIS study programmes

Another option for educating the required professionals is to send them for studying in those countries where such education programmes exist but that may turn out to be highly expensive along with the risk of brain-drain. Observing this situation in several countries and keeping true to its primary principle of 'Educating GI professional worldwide', UIA member universities initiated collaboration with several institutions in Africa, Asia and Latin America and concluded Memoranda of Understanding (MoUs) for offering joint study programmes in Geographical Information Science and Systems. (Figure 2).

The salient features of these MoUs are as follows:

- students join a study programme at the local UNIGIS partner institution but also are admitted and registered at the partner institution in Europe.
- students access internationally standardised learning materials integrated in an eLearning platform.
- the European partner institution supports the capacity building process at the local institutions and aims at enhancing the GI competences of their teachers.
- the mentoring and supervision of learning modules is done by local teachers facilitating

lower course fees affordable at local economic levels.

- graduates complete their studies at a local institution in their home country and receive an academic qualification awarded by the European partner university or by both the partner institutions.

Presently, UNIGIS network consists of 22 partner institutions located in 20 countries (Figure 2) and it is expanding further. Altogether they register about 500 new students to UNIGIS study programmes every year. UNIGIS is proud of a widespread network of its more than 5000 alumni excelling in various geospatial organisations, industry and education institutions.

6. Conclusions

The growing aspirations of studying abroad and obtaining international qualifications among the undergraduate and postgraduate students in Southern and Eastern Asia seem to be the result of the motivation to attain advanced education on one hand and increasing competition in the job market on the other. Those who succeed in getting a scholarship or financial support will leverage the opportunity of studying abroad, but others can be offered access to international qualifications via ODL.

The UIA presents an excellent example of joint-study programmes helping students to earn international qualifications while studying at local educational institutions. This model has proved quite effective in saving resources, in terms of time and money, involved in process of obtaining reputed international qualifications.

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