

DEVELOPMENTS IN GEOMATICS EDUCATION (7)

Geomatics Education in Australia

Surveying/geomatics education programmes for the training of professional surveyors in Australia were introduced in each state in the second half of the twentieth century, replacing an articulated pupil system that had operated for more than a century. There are currently about 1,100 equivalent full-time undergraduate geomatics students in the eight four-year geomatics programmes, with approximately two hundred graduating each year. The preferred optimum would be twice that number.

Reduced government funding and declining enrolment on geomatics courses have put education institutions under increased pressure to rationalise their programmes, resulting in reduced staff numbers and, in some cases, closures. Formal programmes for surveying education in Australian universities have been a relatively recent development. While the University of Melbourne (Melbourne) has had a programme since 1863, most were established in about the last fifty years. For example, RMIT University (RMIT) was established in 1954, University of NSW (UNSW) in 1957, University of Southern Queensland (USQ) in 1967, Queensland University of Technology (QUT) in 1970, Curtin University of Technology (CUT) in 1970, University of Newcastle (UNewcastle) in 1975, and University of Tasmania (UTasmania) in 1978. During this time, three programmes have been closed due to enrolment figures not reaching viable levels.

Programme Architecture

The general design philosophy is to equip graduates with a broad range of career opportunities in surveying and geospatial information sciences, enabling them to contribute to their profession and succeed at local, interstate and international levels. The four-year undergraduate programmes usually comprise core units in mathematics, computing and physics. Typically also landform subjects, for example, in Year 1 elements of geography. In Years 2 and 3 there are core units in surveying, analysis of observations, geodesy, GIS, computing, land development and land management, photogrammetry and remote sensing, while in Year 4, depending on the programme, the focus is on core geomatics topics or electives that enable the students to specialise. In 2008 Melbourne will be introducing a 3+2 programme, consisting of the three-year generic Bachelor of Science (with a geomatics specialisation) and a two-year master's degree. All these programmes are taught on campus, but USQ offers three- and four-year programmes that may be taken either on campus or by distance learning.

Double Degrees

Some programmes have limited staff and therefore cannot offer a full programme from within their own department. In this case, some aspects of the course may be offered by staff in other areas: geography, town planning, civil engineering or spatial sciences, and hence these programmes will reflect the expertise of the staff teaching the overall programme. Most programmes include a requirement for practical experience in professional practice of three to six months. Many universities offer double degrees with their geomatics programme; Civil Engineering is the twin degree from UNewcastle, Commerce from CUT, Melbourne and UNSW, Science from UNSW, Melbourne and CUT, and Social Sciences or Arts from Melbourne, CUT and UNSW. The four-year degree programme qualifies graduates to practise as professional surveyors. However, since the property cadastre is guaranteed by governments in each state, graduates are required to demonstrate their competence in the laws and methods of definition of property boundaries by undertaking additional practical experience and examinations. This would normally take candidates a minimum of two years while employed full-time in a survey practice.

Critical Shortage

The total number of new students entering the eight geomatics programmes each year is fairly consistent at 250 to three hundred, while output is two hundred. The number of staff varies with each institution: from three to more than ten staff at the larger institutions running full graduate and postgraduate degree programmes. There is a total of about sixty academic staff involved in teaching all programmes across Australia. At about 40:1, the student/staff ratio is very large for some programmes and more modest for the larger programmes, less than 20:1. The fees charged for Australian permanent residents are based on a federal government-defined Higher Education Contribution Scheme (HECS) of AUD5,700 (US\$4,700) per year in 2007, paid upon enrolment or deferred, with surcharge, until a graduate gains employment, when they must repay the money as an additional charge on their income tax. International students are required to pay full fees for their degree, which may amount to about AUD16,000 per year (US\$13,000). Since numbers of graduates have for some time been below those required to satisfy the needs of the surveying profession and spatial industry in general, there is a critical shortage of qualified graduates. The optimum number of graduates depends on such factors as economic growth and professional age profile and is thus difficult to estimate, but would preferably be approaching twice the current number, at least until the shortage of professionals has been alleviated.

e-Learning

Few programmes have attempted to undertake e-learning. USQ has run trials but found it unpopular, since students still want hardcopy study materials. USQ provides students with multimedia materials, plus modules of courses available over the web and full web access to all facilities. At CUT, with over six years e-learning experience, students have access to a web-based communications system enabling students to interact with unit co-ordinators, tutors and peers using online discussion forums, email, etc., and online unit-based resources. Students are also given access to required software and/or datasets (on-line or via CD). At other universities, WebCT Vista is employed for audio recordings of lectures, and there is provision of PowerPoint material and related available online resources.

Student Exchange

Since the Australian government requires universities to partly fund their operations by fees earned from overseas students, most universities with geomatics programmes will have contact with a number of overseas universities, particularly in the Asian region. However, co-operative/exchange arrangements involving students from Australia spending some time studying at an overseas university are less common. Some students have spent time in Scandinavian countries and others in other European countries, while UNSW on one occasion had an exchange of students with ITB in Bandung Indonesia.

Marketing

Because of the shortage of professionals and the difficulty in attracting students, marketing of programmes is important. Most universities adopt a strong marketing policy, possibly employing a part-time marketing person. The approaches include information packs, course and careers information, letters to science and high-school careers-advice teachers, visits to career exhibitions, presentations at high-school careers nights, and on-campus workshops for high-school students (see Figure 1). There are special exhibitions on campus at annual university courses and careers days, and promotional material such as rulers carrying department logo and web address, satellite posters carrying department information, and even raffle tickets. Other vehicles for publicity are newspaper/industry magazine advertising, marketing of scholarships and internships, production of videos and short promotional 'vidlets' (short videos) for websites, and a good website. Such activities have been undertaken for at least ten years by most institutions without significant improvement in enrolment numbers. Some institutions have acted on the belief that a change of departmental name and associated advertising would improve the image of the spatial industry, seen by some students as a technician-type activity. But this too has failed to produce any significant shift in the popularity of the profession as a career choice.

Co-operation

All universities in Australia with geomatics programmes depend on a significant level of input from and co-operation with the profession. This includes consultation on the development and restructuring of teaching programmes. But also the provision of prizes, scholarships and internships to encourage the entry of high-quality students, assistance in marketing activities, particularly at careers exhibitions, and the provision of undergraduate thesis topics and assistance with their execution. Also dependant upon co-operation are partnerships with industry on research projects, teaching of advanced professional practice units such as property surveying and small-business management, and employment of undergraduate students for the practical experience component of the programme.

Acknowledgements

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Further Reading

- McDougall K., Young F.R. and Apan A., Operational Infrastructure for Quality Distance and Online Geospatial Programs, <http://eprints.usq.edu.au/archive/00001240/>.
- Kevin McDougall K., Ian Williamson I., Chris Bellman C. and Rizos C., 2006 'Challenges Facing Spatial Information and Geomatics Education in the Higher Education Sector', paper presented to the Combined 5th Trans-Tasman Survey Conference & 2nd Queensland Spatial Industry Conference, Cairns, 18th to 23rd September 2006.