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Developing Appropriate Educational Modules Aimed At Industry

an example from surveying at Masters level

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Abstract

This paper describes the process from inception to completion of developing academic modules appropriate for upgrading survey professionals engaged in the public sector. It focuses on one such module continuing professional development module in 'Gravity and Height' for National Mapping, developed by the Dublin Institute of Technology Spatial Information Sciences Group for the National Mapping Agency, Ordnance Survey Ireland (OSi) and staff from similar organisations.

Key words: continuing professional development; spatial information sciences; national mapping agencies; international modules; gravity and height.

Context

In Ireland, the educational needs of the Spatial Information Sciences (SIS) is served by a number of third level institutions (Martin *et al.*, 2014). The Dublin Institute of Technology (DIT) in particular has a long history of providing expertise in teaching in this area. In late 2014, the SIS Group in DIT was approached by industry to produce an advanced module in Gravity and Height. This module was intended for those wishing to develop deep knowledge and competencies in the provision, management and delivery of national levelling networks and the generation of the gravimetric surface that underpins them. In developing the module a number of considerations were addressed including: target audience, academic level, expertise required, academic and administrative partnerships and economical aspects with respect to delivery, each of which are discussed here. The module was accredited by DIT and block delivered to an international audience of 24 participants in February 2015.

Development considerations

In the development process, a number of aspects were taken into considerations, including the following: target audience; module content, module design and accreditation; administration, partnership in delivery; costs; assessment. Each aspect is considered below.

Target Audience

The advanced 'Gravity and Height' module was intended for those wishing to develop deep knowledge and competencies in the provision, management and delivery of national levelling networks and the generation of the gravimetric surface that underpins them. At the development stage it was recognised that the specialised nature of the module would limit its appeal. In addition, only a handful of experts involved in national mapping and research would benefit from attending the module. Thus to ensure viability and a long shelf-life, the necessity to attract pan-European participants was identified. The extensive experience of European Spatial Data Research (EuroSDR) in managing and promoting international workshops and courses, in collaboration with related organisations was therefore harnessed and the programme was promoted to all European National Mapping Agencies (NMAs) via EuroSDR.

Module Content Design and Accreditation

The module content was designed over a period of four months by the DIT in collaboration with specialists in the subject area and in consultation with the requirements of staff in national and international mapping agencies. Of significance in the design of the module was the need to provide flexible educational options for mature and life-long learners whilst aligning learning outcomes with professional competencies (Martin and McGovern, 2011). Learning outcomes were aligned with Masters level 9 of the National Framework of Qualifications scale (NFQ: <http://www.qqi.ie>), level 7 on the EQF-LLL, and thus transferable across Europe. The module adhered to the DIT standard 5 ECTS (European Credit Transfer System) credit format whereby a 5 ECTS module equates to 100 learning hours effort by students, of which 20-30% usually comprises of teaching contact hours for Masters level learners. The development of this module is also aligned with current strategy for third-level education in Ireland (Government of Ireland, 2011).

Academic and Administrative Partnerships

Due to its specialist nature the delivery of the module was enabled through international co-operation between the DIT, scientists and researchers at the Geodesy Department, Lantmäteriet, Sweden, the Dublin Institute for Advance Studies (DIAS), OSI and the Land & Property Services (LPS), Northern Ireland.

Module Delivery

The module was delivered in a block format from Monday 2nd to Friday 6th February 2015, through lectures/tutorials and was supported by an accompanying online learning Moodle facility. The block

format delivery was essential to accommodate the international participants and staff attending. The module was assessed using coursework only, as it was believed that remote invigilation of examination would be too difficult to implement and at NFQ level 9 formative assessment methods are considered most appropriate. Subsequent to the 'face-to-face' delivery, students worked independently on module assignments which were submitted for examination in May 2015. During this time period it was possible for students to remotely contact lecturers and their peers for learning support.

Economical Aspects of Delivery

The course fee to the participants was €500 per person. EuroSDR reimbursed the teaching staff for travel, accommodation and essential subsistence expenses and sponsored the event dinner on the evening of day 4. In total, 24 students enrolled on the module, including 2 existing DIT MSc students. Participants came from Great Britain, Ireland, Northern Ireland, Norway, Oman, Spain and Sweden, and were accommodated at their own expense in local hotels.

Module Assessment

Following the module in February, participants received two assignments - one on gravity and the other on national height systems (vertical datums) – to be submitted online in late April. The nature of the assignments was discussed during the module with the participants, all of whom are working full-time, to agree a format. It was recognised that some participants would probably choose not to complete the assessment, thereby not availing of the ECTS credits on offer. The assessment of the module was completed in June 2015 as part of the DIT 2014-2015 Semester 2 examination schedule. All results were processed through the standard DIT examination procedure and students who passed the assignment were awarded a DIT level 9 5-ECTS CPD Certificate.

Outcomes

On the basis of participant feedback the module was deemed a success by the participants. It represents a sustainable academic model for accredited CPD module development suitable for future up-skilling opportunities in the Built Environment arena. In developing and delivering the module significant administrative support was provided by EuroSDR. Financial aid received from a CHOBE (Council for the Heads of Built Environment) grant supported delivery of the module.

CONTRIBUTION TO KNOWLEDGE

This was a new venture for the DIT. The model of joint development and administration with EuroSDR is a strong one and further courses could be devised on relevant topics. The concept of a

short course offering ECTS credits will be attractive to mature life-long learners. Subject to confirmation, it is highly likely that the DIT will continue to partner with EuroSDR in such modules in the future and promote CPD courses through both EuroSDR and CHOBE. A second delivery of the current module will include an option for more preliminary/refresher topics prior to starting the module. The theoretical nature of the content proved onerous for many participants and much of this was due to a weakness in essential mathematics topics.

The provision of focused CPD modules at MSc level should help to address an identified educational deficiency in the Spatial Information Sciences in Ireland and internationally. It is believed that the module design and delivery mode adopted here, which aligned the learning outcomes with professional competencies, provides an appropriate and workable design template for related disciplines in the Built Environment.

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Author biographical note

Dr. Audrey Martin is a lecturer in the Spatial Information Sciences and chairs the MSc in Geospatial Engineering in the Dublin Institute of Technology. She holds a PhD from UCD Engineering Faculty and her research interests include advanced mapping procedures and techniques including satellite surveying and active learning methodologies. Audrey is the invited Chair (2015-2018) of the International Federation of Surveyors (FIG) Working Group 2.2: Innovative Teaching and Learning for Surveying and Land Management. She is a Fellow of the Society of Chartered Surveyors Ireland (SCSI) and the Royal Institute of Chartered Surveyors (RICS) and has represented SCSI on the International Geomatics Faculty Board of RICS.

