

Challenges Facing Spatial Information and Geomatics Education in the Higher Education Sector

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Abstract

With the continuing high demand for graduates in the spatial information industry and the low student numbers entering university courses, the long term viability of higher education sector, and the industry it supports, is in question. The Australian higher education sector continues to undergo substantial change that is being driven aggressively by government. In particular, government continues to reduce their financial contributions to institutions by limiting indexation of funding and requiring universities to supplement the shortfall through alternative sources such as international student fees. In response to this pressure, universities are adapting their business models to focus on high volume, low overhead programs. In this context, programs in all areas of the spatial sciences are under threat because they traditionally have relatively small enrolments and are unable to attract large numbers of fee-paying students. The current difficulty in attracting undergraduate students is making departments and programs less viable and there is a serious risk that a number of the smaller departments or programs will be threatened with closure.

In February 2006, ASIERA facilitated a meeting of the university Heads of Departments (HODs) that offer professional spatial information/geomatics degrees to discuss the “crisis” in the higher education sector. The HODs and key industry players explored national strategies to assist both the higher education sector and importantly the whole industry, to achieve a balance between industry demand, higher education capacity and recruitment into universities.

This paper will provide an overview of the current situation in the higher education sector and report on the recommendations and interventions proposed by HODs and ASIERA.

Introduction

As a result of the crisis in the spatial information industry caused by the lack of graduates entering the workforce and the difficulties universities are having in attracting students to study their programs, the Heads of Departments believed it was essential to meet and to discuss a way forward. Under the auspices of the Australasian Spatial Information Education and Research Association (ASIERA), Heads of department met to discuss the future of the spatial information higher education sector from a strategic perspective. Importantly this is the first time the Heads had met specifically to discuss strategic issues across the sector.

It is important to recognise that the universities present at the meeting do not purport to fully reflect the broader tertiary SI education sector but rather that significant component of the sector that services the three and four year professional specialised degrees in spatial science.

The meeting was structured so that a scan of the higher education sector could be undertaken during the first day. This was followed by identifying and prioritising the key issues facing the sector and developing possible strategies to move forward. During the second day key representatives from industry were

invited to present their needs, to discuss the higher education sector from an industry perspective and consider the strategies proposed by the higher education sector. This report is a summary of the background and outcomes of the meeting. It sets out the resulting recommendations and action items.

Spatial Information (SI) Industry

From a higher education perspective, the industry comprises the core areas of measurement science, geographic information management and land related activities (cadastral, land development, land administration, environmental management). At times, these areas interact, while at other times they are pursued as separate industry activities within the SI industry.

The SI Higher Education Sector

It was recognised that an increasing number of universities across the sector now offer courses in GIS and related topics, however, this meeting represents those universities educating professional graduates for the core SI sector, typically through three or four year degree structures.

The current cohort of undergraduate students across Australia is approximately 1150 students in nine institutions. In 2006 the expected student intake will be approximately 290 students. Based on graduate outputs over the past three years the annual output of graduates will be 220-250 per year, a level likely to be well below that required to support industry replacement and expansion in Australia. About 40-50% of current graduates from the above programs become licensed cadastral surveyors.

Across these institutions there are approximately 290 post graduate students of which about 160 are studying research degrees (PhD and masters degrees). Annually, these may contribute to an additional 50-70 graduates given a number of postgraduates are already in employment.

In New Zealand, the University of Otago currently has approximately 270 undergraduates and is expected to take in approximately 65 students from a competitive intake of 120. Otago expects to graduate between 50-55 students a year.

The universities at this meeting have collectively an annual turnover of about \$45 million committed to SI education and research, of which about 50% is provided by government and about 50% is generated by research grants, student fees and commercial activities.

The undergraduate figures provided represent the capacity in the three and four year specialised professional degrees only. Further work is required to assess the potential output from the higher education sector where SI studies may comprise a lesser component of a university program and those programs in the VET sector.

The Crisis in the Spatial Information Industry

The Heads believe that despite the high demand for graduates there is a crisis in the spatial information industry as a result of the low numbers of graduates entering the industry and the difficulty that the higher education sector has in attracting students. In the last decade, some university departments in the sector have amalgamated, with there now being four independent departments and five programs within larger multi-disciplinary schools.

The Australian higher education sector continues to undergo substantial change that is being driven aggressively by government. In particular, government continues to reduce its contribution to institutions by limiting indexation of funding and requiring universities to supplement the shortfall from alternative

sources such as international student fees. In response to this pressure, universities are adapting their business model to focus on high volume, low overhead programs. In this context, programs in all areas of the spatial sciences are under threat because they traditionally have relatively small enrolments and are unable to attract large numbers of fee-paying students. Therefore, with the current difficulty in attracting undergraduate students thereby making departments or programs less viable, there is a serious risk that a number of the smaller departments or programs will be under threat of closure.

On the other hand, graduates in the spatial sciences have never been in such high demand at a time when the role of spatial information in society has been well documented in such initiatives as the Spatial Information Action Agenda. Due to the skill shortages, ASIBA, ANZLIC and SSI/ISA are examining strategies to address the situation, however the solution can only be achieved in partnership with the higher education sector.

Over the last few years the Australasian Spatial Information Education and Research Association (ASIERA) has played a valuable role contributing to the higher education debate, however its mandate does not permit it to directly represent individual institutions. As a result of the current crisis, the Heads believe they now need to supplement ASIERA and engage more directly so as to influence developments and strategies that affect the higher education sector. This has resulted in all the Heads, with the assistance of ASIERA, coming together to discuss the crisis and explore national strategies to assist the higher education sector, and importantly the whole industry, to achieve a balance between industry demand, higher education capacity and recruitment into universities. The Heads believe that they need, as a group, to be more actively involved in any national education strategies that impact on their sector. As a result, we have agreed to work through ASIERA in a more pro-active manner to achieve whole-of-industry outcomes.

Outcomes and Recommendations

The Heads have agreed to meet on a regular basis. Their next face-to-face meeting will be in February 2007. They have agreed to communicate as a group more effectively and to teleconference in the interim if required. Their spokesperson for 2006, who will also be the ASIERA representative on SEAC, will be Associate Professor Chris Bellman who heads up Geospatial Science at RMIT University. ASIERA, through the Chair of ASIERA, Kevin McDougall, University of Southern Queensland, will provide coordination and support for the Heads.

The major objective is to engage with ANZLIC, ASIBA, SSI/ISA and related organisations to discuss the following strategies:

1. Even though the universities have used a wide range of marketing and recruitment strategies they still cannot attract sufficient numbers of students to serve the needs of industry. The Heads believe this is an issue that can only be adequately addressed by a coordinated industry/higher education approach to marketing and raising the profile and reputation of the spatial information industry. We recognise the good work being done by ANZLIC, ASIBA and SSI/ISA for the wider industry and society (from primary schools to higher education), but together with all the hard work of the universities, the reality is that insufficient students are entering the discipline. We believe that only through a coordinated effort across the three sectors, and with all players, can the crisis be addressed. The Heads wish to engage with industry to develop strategies to raise the profile of the industry, promote the value of an SI career and attract more students to their courses so more graduates will enter the work force. An initial step could be a national recruitment strategy based on professional marketing advice.

2. The Heads have agreed to undertake a coordinated survey of all students entering their universities in 2006. Chris Rizos has agreed to develop a template in coordination with Chris Bellman. All universities will undertake the survey in 2006.
3. In tandem with strategic initiatives, the meeting identified a need for immediate responses that have potential to impact on student enrolments in 2007. Specifically, as a result of industry input, the meeting identified that the information in government careers information (Australian Government and states and territories) for school leavers is often out of date, misleading or confusing. The Heads believe that an industry effort is required to scan all existing material provided to prospective students across Australia, to standardise it and to update it. SSI has agreed to coordinate the effort if some funds can be provided to appoint a project officer. Consequently, the Heads have agreed to provide \$20,000 to support the project and, subject to formulating a suitable business case, will seek matching funds from ANZLIC and ASIBA for this initiative. SSI will provide the in-kind support to manage the project. The project will be coordinated by a Steering Committee chaired by Chris Bellman with SSI, ANZLIC and ASIBA representation, and one other Head.
4. Partly as a result of the crisis and partly as a result of the changing economic and business environment in Australia, the Heads believe there are significant opportunities and benefits to engage more fully between the higher education sector, and the government and private sectors. These strategies must be developed in the context of appropriate value statements that will provide real returns to industry and the higher education sector. It is recognised that in most cases individual proposals will be made by individual universities based on individual business cases. However ANZLIC, ASIBA and SSI/ISA are asked to consider whether they can individually explore one or more of these initiatives on a national basis (eg scholarships or internships). What is proposed at a national level at this stage is for the various industry sectors to agree in principle on the desirability of strengthening partnerships between industry (government and private sectors) and the higher education sector. Examples of specific initiatives may include:
 - Scholarship programs
 - Gap year employment program for high school graduates
 - Vacation employment and internships
 - Access to the latest technology for both universities and industry (software and equipment suppliers)
 - Endowed university positions
 - Sponsorship of university activities
 - Expanded research opportunities
 - Access to global markets
5. The Heads acknowledge the initiatives of ANZLIC, ASIBA, SEAC and SSI/ISA in skills formation and to encourage the spatial enablement of society, but believe that due to the current crisis, a more pro-active approach and stronger engagement is needed if workable strategies are to be developed which impact the higher education sector. All attendees at the meeting acknowledged that the Spatial Information Action Agenda did not adequately address education issues (although they acknowledged that since the focus was the private sector, there was no intention to investigate the education sector). The meeting acknowledged that SEAC was set up to partially fill this gap however it has focussed on the VET sector in recent times and has not fully engaged the higher education sector (it was acknowledged that this may be more of the fault of the Heads than SEAC). Considering the challenges facing both the higher education sector and

industry over the next decade, we wish to explore the development of a comprehensive national SI strategy for the education sector with the key industry and government stakeholders, as well as those from the VET and higher education sectors. These challenges include issues of changes in the skills and products required to be provided by the higher education sector to industry, the capacity of the sector, the commercial environment in which the higher education sector operates, the educational infrastructure demands to support world class SI education, the changing ICT environment, the changing methods of educational delivery (and evolving pedagogy) on educational products and the pressures of the global education environment. The Heads acknowledge the desire by industry to take a “whole of industry” approach that includes the VET sector as well as the higher education sector, however the Heads believe that due to the nature of the review required in the higher education sector it may be appropriate to undertake individual reviews drawing on common material and contributing to a national education strategy. It was noted by the meeting that any such review or strategy should engage with Engineers Australia since two of the eight Australian programs are engineering degrees and about 20% of the SI industry operates in the engineering sector.

Conclusion

This paper has reported on the outcomes of the first Heads of Spatial Science and Geomatics meeting held in Sydney in February 2006. The meeting has identified a number of actions which will require a “whole of sector” approach to effectively address them. The sustainability of the current education model and a number of existing university departments relies on improved communication across the three sectors and to our future students.