

**Opening up the profession by addressing the critical shortage of skilled
spatial science professionals and attracting new entrants**

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BIOGRAPHICAL NOTES

Since 1995, Shane has been a lecturer in surveying at the University of Southern Queensland and is currently program coordinator of the surveying and spatial science discipline. Prior to 1995, Shane was an endorsed cadastral land surveyor with 16 years experience in both the private and public sector primarily involved with engineering and construction projects. Shane completed a Graduate Diploma of Business (property studies major) at the University of Queensland in 2000. Since 1998, Shane has been honorary editor of the Queensland professional journals, *Queensland Surveyor* and *Spatial Science Queensland*. Shane's principal research interests include professional issues, land development and land law. Shane is actively involved locally with the USQ rugby club as a volunteer administrator and manager.

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Abstract

Currently there exists a national shortage of skilled workers and qualified personnel in many industries, with widespread acknowledgment of the shortage of skilled workers in the surveying and spatial science profession. There is a consensus that organisations requiring surveying and spatial science professionals are currently severely affected by the available pool of qualified personnel. The shortage of qualified spatial science personnel creates a cycle of turnover in staff, where regional and remote locations are either forced to attract staff from coastal and metropolitan locations or attract staff from other industries.

To address the problem of this skills shortage, the surveying and spatial science profession successfully applied for funding through the *Critical Skills Investment Fund*. The group adopted a supply chain approach for the provision of sufficient qualified personnel whereby training/education, attracting new entrants and regulatory registration/professional certification were identified as critical areas and priorities.

This paper analyses the profile of new entrants to the University of Southern Queensland surveying program from 2005 to early 2012 with the aim of identifying those related professions that are attracted and open to the surveying profession as new entrants to the profession.

1.0 Introduction

There is currently a national shortage of skilled workers and qualified personnel in many industries with widespread acknowledgment of the shortage of skilled workers in the surveying and spatial science profession. There is a consensus that organisations requiring surveying and spatial science professionals are severely affected by the current available pool of qualified personnel. The shortage of qualified spatial science personnel creates a cycle of turnover in existing qualified staff, where regional and remote locations are forced to attract staff from coastal and metropolitan locations or from local government agencies and survey practices, creating a cycle of staff vacancies in the industry whereby regional organisations either to retain or attract staff need to offer attractive financial incentives and conditions of employment. Available financial incentives and conditions of employment are obvious attractions for new entrants to the profession from other industries.

The Australian Government Department of Education, Employment and Workplace Relations (DEEWR 2011) identified that surveyors, planners and draftspersons represent areas of employment where there is a skills shortage. Some of the functions of DEEWR have been absorbed into the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) which was established in December 2011. A skills shortage is defined as when employers are unable to fill or have considerable difficulty filling a vacancy for

the area identified at current levels of remuneration and conditions of employment for that position and location. Interestingly, Queensland (QLD) and the Northern Territory were the only states and territories not reported upon in the occupational report list of states and territories with recognised shortages.

The Reserve Bank of Australia Governor, Glenn Stevens (2012) has been reported in the media (for example, in speeches entitled *The Glass Half Full*, *The Lucky Country*) discussing the variability in performance of industry sectors as being a two-speed economy, with an investment boom in the mining and resources sector and a struggling retail, accommodation and food services sector. Considering the probability of a two-speed economy, the demand for surveying and spatial science professionals in regional and remote locations has been driven by the resources industry with high commodity prices and demand for our natural resources. The demand has not just been fuelled by the exploration and mining of resources but also by the requirement to develop service, infrastructure and accommodation needs for rapidly growing regional centres.

The Australian Government Department of Education, Employment and Workplace Relations (DEEWR 2011) occupation reports contained many common themes:

- Shortage of cadastral, engineering and mining surveyors particularly in regional areas with at least 50% of vacancies not filled within the six week survey period.
- Vacancies are particularly difficult to fill for registered cadastral surveyors and for surveyors generally in regional areas, positions in regional areas are particularly hard to fill (for example,

successfully filled positions were only 36 % in regional areas compared to 71% successfully filled in metropolitan areas);

- Regional employers surveyed attracted a minimal number of applicants (for example, 50% of the advertised vacancies in regional New South Wales (NSW) did not elicit a single response from a qualified Australian-based surveyor);
- Suitable applicants declined a job offer due to regional location and decided not to re-locate, salary issues or found other suitable employment;
- Most commonly cited reason for the unsuitability of applicants, in order of frequency, were that they were based overseas and seeking sponsorship, they were not qualified or they did not have experience in the required specialisation or industry sector; and
- Local government employers have difficulty recruiting qualified surveyors as they could not match wages offered by the resources sector.

The chief operating officer for the Spatial Industries and Business Associations (SIBA) was quoted in the Queensland metropolitan daily newspaper, the Courier Mail (2011) as stating ‘the spatial industries, particularly surveying, have had a significant skills shortage for some time’. Lyons and Davies (2011) identified the shortage as being serious, long term and warranting urgent attention and inviting an industry response.

2.0 Industry Response

Many employers are finding it difficult to attract skilled and qualified staff, the surveying profession is no exception. Traditionally the response by employers to the failure to attract appropriate staff would be to offer cadetships, traineeships and scholarships to new entrants, look within the organisation and up-skill existing staff, re-advertise domestically or overseas in countries such as South Africa or New Zealand.

In 2010, a Queensland spatial science industry meeting was held to determine whether an initiative be undertaken to address the significant skills shortage identified as affecting the spatial science industry. Comprised of representatives from the surveying and spatial science disciplines, individuals, stakeholder organisations, government departments, professional and regulatory bodies, the *Skilled Workforce Development Initiative* evolved to develop an initial assessment response and options paper to determine whether the skilled workforce shortage required to be addressed and whether action was necessary.

Led by Ken Lyons and Kevin Davies, the Skilled Workforce Development Initiative is supported by the Queensland Spatial Information Council (QSIC), Surveying and Spatial Sciences Institute (SSSI Queensland), Surveyors Board of Queensland and Spatial Industries Business Association (SIBA Queensland) and an industry group of individuals as a steering committee.

Lyons and Davies (2011) adopted a supply chain approach and staged development approach to the provision of sufficient qualified personnel, whereby attracting new entrants, training and education, regulatory registration and professional certification were identified as critical areas and priorities. The

Lyons and Davies (2011) options paper developed a series of discussion papers under the following headings:

- Attracting new entrants
- Technician training
- First degree education
- Regulatory registration and professional certification
- Professional development - post first degree
- Supply and demand – estimation and modelling

Through the initiative, the surveying and spatial science profession applied for funding through the Australian government *Critical Skills Investment Fund* initiative resulting in funding to address the skills shortage in the surveying and spatial science profession and the allocation of funding for training in the vocational education sector and issue of a nationally recognised qualification within the Australian Qualifications Framework.

The situation is most likely worse than what is outlined in the Lyons and Davies (2011) options paper for supply and demand with regard to endorsed and registered cadastral surveyors. Lyons and Davies (2011) state that Queensland has approximately the same number of endorsed cadastral surveyors (approximately 600) in 2011, as it had 30 years ago. In 2005, Simmons in a seminar presentation which included research on cadastral endorsements that had been sourced from the Surveyors Board of Queensland reports and the register as was annually published in the Queensland Government Gazette from 1991 to 2005. The data indicated that endorsed cadastral surveyors peaked in 1993 with

789 registered cadastral surveyors and was skewed by the fact that emeritus surveyors were included as registered cadastral surveyors, despite retirement. The following year 1994, the emeritus category was separated from the register and there were 766 registered cadastral surveyors.

Since 1994, the number of registered cadastral surveyors has continued to drop and the Surveyors Board report (2011) lists 579 registered cadastral surveyors. Simmons (2005) utilising the trend line (based upon 1991-2005 data) from that seminar presentation indicated that by 2011 there would be approximately 625 registered cadastral surveyors. Using updated Surveyors Board (2011) data from 2008 to 2011, that trend line currently sits at 600 registered cadastral surveyors (actual 579 registered cadastral surveyors for 2011) indicating that the situation has further deteriorated than otherwise thought for the total of registered cadastral surveyors from 1994 to 2011.

The impact of the implementation of the competency framework in 2008 for the registration of surveyors has not altered the status quo to any great extent. The Surveyors Board (2011) identified that 64% of cadastral surveyors in Queensland are over 50 years of age and that many surveying graduates were not progressing to registered cadastral endorsement. Simmons (2005) identified that approximately 64% of cadastral surveyors were aged older than 43-44 years, in 2005. In the intervening period up to the Surveyors Board (2011) data analysis, the age profile of the profession has simply got older with 64% of surveyors being aged 50 years or older (Surveyors Board 2011). The greatest numbers from those analyses are currently aged around 50-57 years old (Simmons 2005) or 50-59 years (Surveyors Board as cited by Lyons and Davies 2011). Similar percentages

and figures were identified by Blanchfield (2005) for NSW and the Australian Capital Territory. One of the reasons for the lack of progression may be the commercial reality of a survey practice requiring one registered cadastral surveyor to sign off on cadastral plans and to supervise cadastral surveys thus weakening the resolve to progress to registration status without appropriate remuneration and compensation.

It is apparent that the conversion of University of Southern Queensland (USQ)/Queensland University of Technology (QUT) graduates to registered cadastral surveyor plus reciprocal registrations from interstate or overseas are not replenishing the loss of registered cadastral surveyors in sufficient numbers to reverse the decline in total number of registered cadastral surveyors. For example, for 2008 to 2011, USQ has graduated an average of approximately 20 surveying major 4 year degree students per year. Lyons and Davies (2011) identified that 45% of USQ students reside in Queensland, leaving an average of 9 surveying major 4 year graduates entering the surveying industry in Queensland, per year. When combined with QUT graduates, the potential pool to draw registered cadastral surveyors is approximately 20 to 35 graduates, depending upon graduate fluctuation numbers in any one given year. Lyons and Davies (2011) predicted model numbers of around local 15 to 30 graduates over the next 5 years or so. Unfortunately, not all will become registered cadastral surveyors and reciprocal registrations may not pick up the slack. Whilst the graduate numbers may mirror the potential loss of registered cadastral surveyors in any one given year, the current numbers are insufficient to arrest the overall decline in registered cadastral surveyors especially once the current 50-59 year old bracket retires from the workforce.

3.0 Attracting New Entrants

Lyons and Davies (2011) identified new entrants to the industry as being derived from three sources:

- School leavers
- Trained interstate or overseas
- Mature entrants from other industries

Lyons and Davies (2011) noted the following problematic considerations for analysis:

- There is no substantial vocational education training (VET) program in surveying /spatial in QLD, unlike most other States.
- New entrants from interstate and overseas indicate that approximately 25% of those registered did not obtain their qualifications in Qld training/education institutions and there is no whole of industry data to allow an analysis of this aspect.
- New entrants from other industries, no evidence has been seen to date of this being a significant source for the spatial skilled work force.

From 2005 to semester 1 2012, the total new entrants into the surveying programs at USQ has numbered 1289 students. This number whilst sounding impressive over a period of 7.5 years does have some issues with the accuracy of the search engine producing the results, however the numbers sound feasible when compared to enrolments in the introductory surveying course for each year since

2005. The total number includes approximately 10-15% of enrolments who will not actually participate in courses and also approximately 10% of students who will churn (enrol in either a higher or lower level program during the year) and change their program and thus can be double-counted as a new entrant.

Adjustment of those variations leaves approximately 1000 new entrants (includes all local, interstate and overseas enrolments since 2005) that have enrolled into USQ surveying programs.

Of those 1000 new entrants, 331 students applied for recognised prior learning for existing training/qualifications either obtained in surveying or other industries.

By deduction we can say 669 students were new entrants with no previous relevant qualifications. Of the 331 students with recognised prior learning, 189 students had existing surveying qualifications from another institution and 142 students possessed recognised prior learning credit from a non-spatial science program.

New entrant source	% new entrant source to new entrants
School leavers/no previous qual.	67% (669)
Existing training in spatial science	19% (189)
Trained in other industries	14% (142)

(Source data: personal files of S.Simmons, USQ)

Table 1: Source for new entrants

In Table 1, the existing training in surveying percentage is primarily dominated by enrolments from the NSW VET sector, QUT and the Royal Melbourne Institute of Technology as there is currently no available substantial VET program in surveying or spatial science in Queensland. Until a substantial VET is implemented in Queensland then the importance of new entrants trained in other industries is of importance as a source for new entrants. However, that

importance lags significantly against that of school leavers and is potentially less important than those with existing training in spatial science.

4.0 New entrants - trained in other industries

Analysis of 178 recommended prior learning applications and prospective applications provides a profile of non-spatial science industries that are attracted to spatial science. It is apparent that greater than 50% of applications are derived from students with a previous history in either engineering or the applied and physical sciences. Table 2 breaks down the other industry sources into their relative percentages and numbers for that particular industry into the surveying majors.

Other industry source	% other industry source to surveying
Engineering	32.5% (58)
Applied and physical sciences	24.25% (43)
Business	9.5% (17)
Drafting/cartography/graphics/CAD/media	7.75% (14)
IT/telecommunications	6.25% (11)
Education	5% (9)
Agriculture/natural resources	4.5% (8)
Building/construction/architecture	4% (7)
Arts	2.25% (4)
Project management	2.25% (4)
Urban and regional planning	1.15% (2)
Nursing	0.6% (1)

(Source data: personal files of S.Simmons, USQ)

Table 2: Other industry source participation rates for the surveying major

It is apparent that from analysis of Table 2, marketing for new entrants from other industries is best concentrated in the engineering and applied/physical science disciplines. If unqualified new entrants represent the longest timeframe for qualification then the existing cohort of trained and qualified surveyors at lower

academic levels should not be ignored as a potential solution to registration shortages.

5.0 Marketing to all participants and entrants

Qualification pathways to registration can be classed as being derived from three sources:

- Overseas qualified
- Domestically qualified
- Unqualified

Marketing to unqualified new entrants represents the longest temporal pathway leading to registration. Consequently, the existing cohort of qualified surveyors at say VET, 2 year and/or 3 year degree participants should not be ignored as a potential source to market the benefits of registration in the shortest possible timeframe. Figure 1 maps the registration pathways for all potential entrants in Queensland.

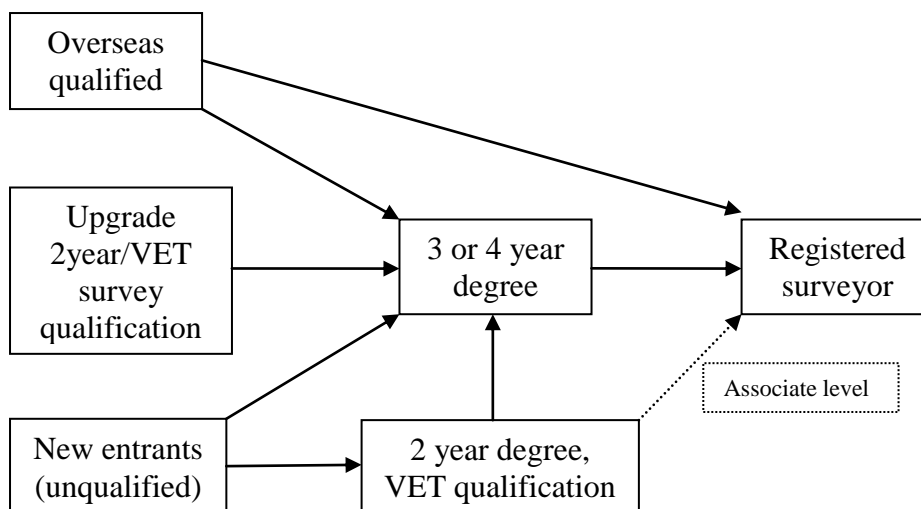


Figure 1: Qualification to registration pathways

In terms of the total cohort of USQ graduates and enrolments, the 2 year associate degree represents greater than a third of the total cohort and consequently is a prime resource to market the benefits of registration. If a VET program is established in Queensland for spatial science, based upon Table 1, approximately 20% of tertiary entrants would be likely to have that VET qualification.

6.0 Conclusion

New entrants to the profession are dominated by those leaving school or having no previous qualification, however significant numbers of entrants to the profession can be attracted from other industries, especially those from the engineering and science disciplines which have mathematics as a core subject area. Those that have academic qualifications at a lower level in surveying should not be ignored as a resource for increasing the number of registered surveyors in the profession at higher levels of qualification and registration.

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