

Are NSW Surveying Graduates an endangered species?

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Abstract

The state of New South Wales (NSW) has about 1500 Registered Surveyors of whom around 900 are active. The average age is in the mid-50s. Fryer (2008) identified that there are more Registered Surveyors aged over 60 than under 40. The recent development of BOSSI sponsored workshops has addressed this to a certain extent but the issue remains that not enough graduates are being produced by the two tertiary institutions in NSW to maintain a steady state of Registered Surveyors (Roberts, 2010).

A 4-year Bachelor of Engineering in Surveying qualification can be studied at the University of New South Wales (UNSW) in Sydney or at the University of Newcastle (UNewc) in Newcastle. A survey technician qualification can be studied at a Tertiary and Further Education (TAFE) campus in Sydney, Newcastle and Wollongong and can articulate into either of the University courses.

A closer examination reveals that the TAFE institutions face increasing funding pressures, the UNewc will experience staffing issues in the near future and the declining numbers of undergraduate students at UNSW threatens the future of the school. Coupled with this, only one institution in Australia offers the Surveying degree by distance education and many students and companies are choosing this option despite the very high attrition rate.

This paper discusses the institutions that offer Surveying degrees leading to Registration or Licensing in Australia and New Zealand and their different circumstances and then focuses on New South Wales.

The author then argues against perceptions that study at UNSW is inaccessible or difficult and presents 10 reasons to encourage the profession to support their only Sydney-based tertiary institution.

Universities offering Surveying degrees in Australia/ New Zealand

There are 10 universities offering Surveying education across Australia and New Zealand. Each course offers a specific focus and graduates finish with a range of qualifications such as Bachelor of Engineering (Surveying), Bachelor of Surveying, Bachelor of Applied Science (Surveying) etc.

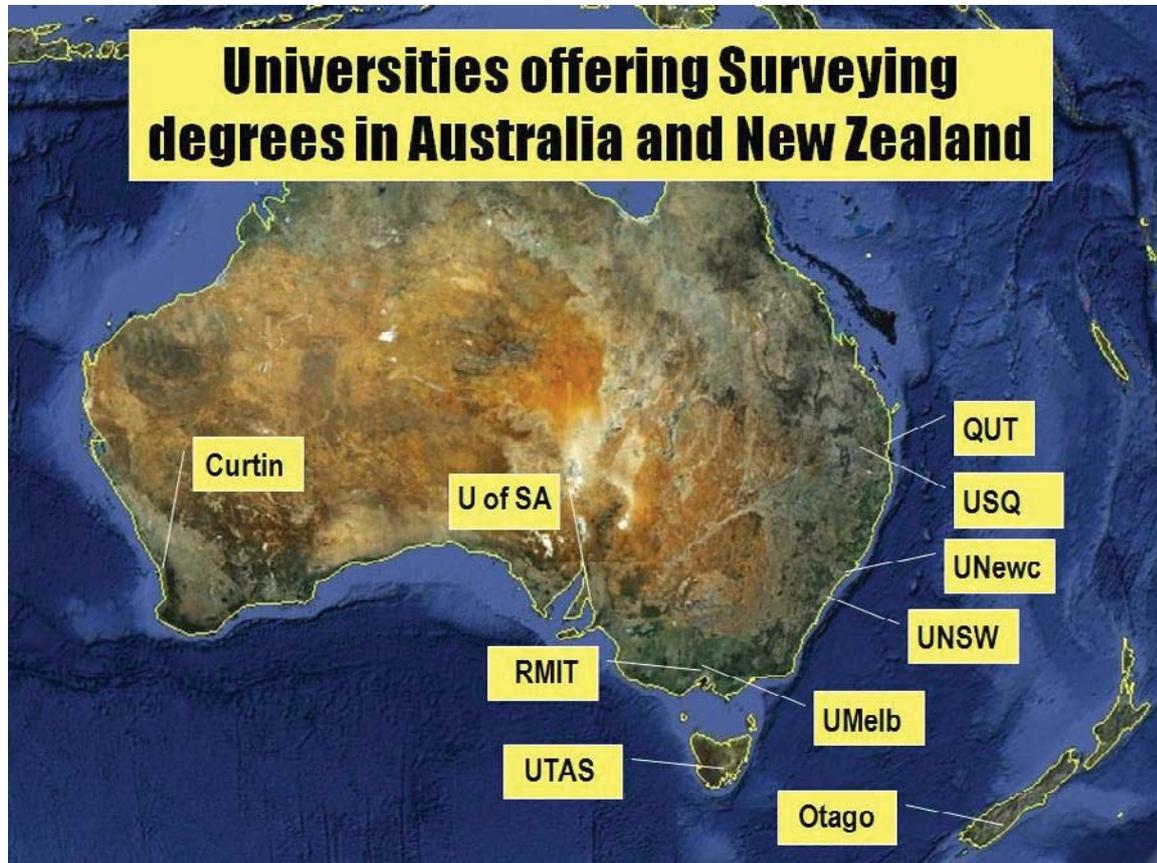


Fig 1 – Universities offering Surveying degrees in Australia and New Zealand

Some comments follow about each individual institution. The author has attempted to rank each institution from the most to least healthy. It should be stressed that labels such as healthy, endangered and threatened are terms adopted by the author and are purely anecdotal.

University of Otago

This is the only university in New Zealand offering Surveying education. Students from first year compete to enter second year. Generally there are around 65 commencing students with around 50 graduates per year. This number has been steady for many years. Research is also conducted at Otago and overall the program is very healthy.

Curtin University

Curtin experienced falling enrolments for a number of years but has reversed this situation about 5 yrs ago with a concerted promotional effort with support from industry and government. Nowadays their numbers are steady and they are producing 15+ graduates and this number is expected to rise. The mining boom is possibly a contributing factor. They are an independent school with a strong research culture and good ongoing industry/govt support. Consequently they are a healthy institution.

RMIT University

The Victorian Task Force, made up of the educational institutions, government and industry, have funded a professional marketing company to develop the “Life without limits” campaign. This seems to have had a positive impact on the numbers of new undergraduate students. RMIT is also an active research institution and can also be classified as healthy.

University of Southern Queensland

This is the only University to offer distance education. Indeed USQ have been doing this for over 20 years and do it very well. Distance education offers much greater flexibility for students with full-time employment and/or other commitments, however distance education is a long, lonely road and the number of students completing the degree is significantly less than those enrolled in the degree. There is very little research carried out at USQ, but the high enrolments would classify this as a healthy program.

University of Newcastle

UNewc has experienced growing enrolments in the last few years. This can be partly attributed to a lowering of the entrance mark and perhaps partly due to increased marketing efforts by the ISNSW careers committee and the Hunter Manning group of ISNSW. The program is part of the Civil Engineering school, which is reflected in the emphasis on civil engineering courses in the program offered. However, the staff profile is ageing and there appears to be little succession planning within the University. The School also conducts little research. Despite good support from the profession (in particular the Hunter Manning Group), good undergraduate enrolments and a growing numbers of graduates, UNewc would have to be classified as endangered due to unclear succession planning.

University of Tasmania

UTas has always had small numbers. A recent restructure has been unsettling for the school with some new staffing, but the new structure promises more stability despite the outlook of continued lower numbers of graduates. Universities these days are sensitive to small schools as they require more resources to educate a small student cohort, so for this reason only, UTas is classified as endangered.

University of NSW

UNSW is one of the top four universities in Australia and is research intensive. The Faculty of Engineering is the largest, (and they promote themselves as the *best*) engineering faculty in Australia. For this reason the ATAR (Australian Tertiary Admissions Rank) imposed on the School of Surveying and Spatial Information Systems is the highest of all the schools offering surveying qualifications in the Australia/ New Zealand region. The school has recently also experienced falling enrolments, however the excellent research output of the school has insulated it from dramatic structural changes. It remains an independent school with its own budget. Despite a relatively young staff with diverse experience and good support from the Cumberland Group of Surveyors and ISNSW, it is perceived as “inaccessible” or “elite” and it is believed (no evidence) that students do not attempt to even apply for a place in the program. The low undergraduate numbers classify UNSW as endangered.

Queensland University of Technology

At QUT, various internal structural changes have diluted the Surveying degree. There are few staff and the surveying degree is now offered within a school whose focus lies elsewhere. Nevertheless, the numbers remain small but steady and in recent years the Queensland industry has more strongly supported this program. 2011 enrollments are up. No research is undertaken and QUT is therefore classified as endangered.

University of Melbourne

The Department of Geomatics at UMelb has been merged into the new Dept of Infrastructure Engineering and has, as a result, lost its independence as an autonomous school. UMelb is the only other research intensive university offering surveying education in Australia/New Zealand. In recent years there has been a massive restructure to a 3+2 model which has been imposed across the university. In short, students enrol in a generic degree and after 18 months must choose a major which maybe Geomatics. After 3 years there is an exit point, but it is not possible to progress and become Licensed at this point. A further 2 years (a so-called professional degree) is required (+2) which attracts full fees ie it is not HECS-based. Consequently it is still not clear how many students will enrol in the “+2” professional degree and with RMIT just 1 km away offering a 4 year HECS based program which leads to Licensing, it’s hard to see how UMelb will be able to offer surveying degrees leading to licensing in the future. For this reason it is classified as threatened.

University of South Australia

The UniSA has also moved to a 3+2 model. The initial design offered little maths and physics in the first 3 years which would make the jump to the “+2” very difficult indeed. The local industry have stepped in and re-designed the 3 year offering and are also offering generous cadetships, funded through extra levies on plan lodgements (!), to encourage students to move into the professional degree. However SA is a small state, graduate numbers have always been small and there is no research conducted at all. These are all negative factors against the sustainability of a university program and for these reasons this program is classified as threatened.

Institutions offering Surveying education in New South Wales

A 4-year Bachelor of Engineering in Surveying qualification can be studied at the University of New South Wales (UNSW) in Sydney or at the University of Newcastle (UNewc) in Newcastle. A survey technician qualification can be studied at a Tertiary and Further Education (TAFE) campus in Sydney, Newcastle and Wollongong and can articulate into both of the University courses.

TAFE

The three TAFE institutions compete with each other for students. They receive funding from either a state-based source or a national source. The state-based funding is more generous and is received when the student enrolls, whereas the new National Traineeships are offered to encourage industry and government to upskill their staff at a registered training organization (RTO) such as TAFE. TAFE will only receive money upon completion of the studies and therefore takes all the risk. The monetary value is also less depending on the number of students and other factors (beyond the scope of this paper). In short the TAFEs in NSW have experienced continual funding cuts over many years which leads to issues such as:

- Old equipment and limited budget for replacement
- Retiring full-time teachers replaced with part-timers
- Tighter budgets
- Loss of young staff
- Sustainability under threat

Despite these tight conditions, the number of TAFE enrolments has actually increased in 2011 and the TAFE institutions have adapted to these tightening conditions. TAFE Wollongong have recently started offering distance education for a Cert III qualification, and are investigating a Cert II in schools to encourage school students to transfer to TAFE surveying. Even a postgrad certificate has been developed for career changers to address the skills shortage in Surveying. TAFE Ultimo have opened two new fulltime positions to replace the previous 4 fulltime positions from retiring teachers. They have also received a grant for new surveying equipment to aid their teaching. So despite the gloomy funding outlook for TAFE funding across NSW, the surveying school at TAFE Ultimo have received some good news in recent weeks. Enrolments are also up at TAFE Newcastle.

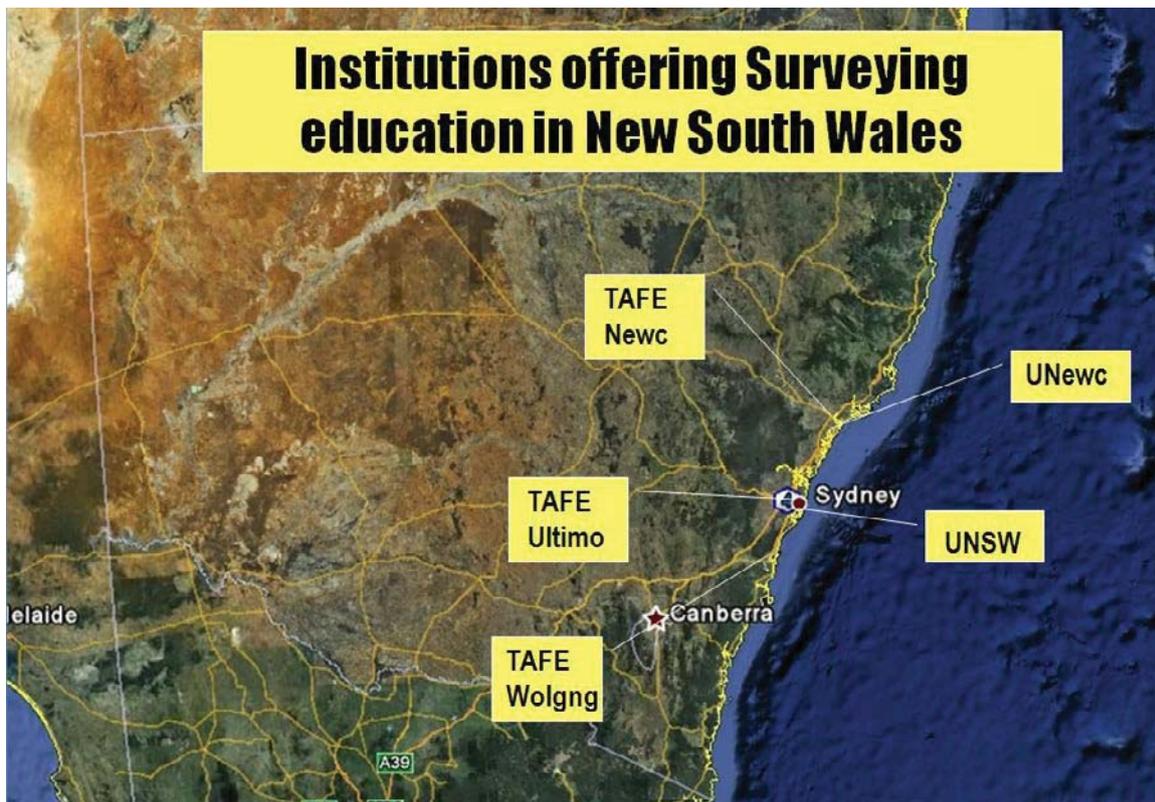


Fig 2 – Institutions offering Surveying degrees in New South Wales

High performing TAFE students can articulate into the degree programs offered at UNSW and UNewc and progress toward Registration in NSW. However with the pressures on the two universities in NSW to maintain their sustainability and with many NSW-based survey companies encouraging their staff to study by distance instead of locally, the future of the NSW surveying graduate is under threat.

10 reasons to study a degree in Surveying at UNSW

As stated above, UNSW is sometimes perceived as inaccessible or elite. The following section seeks to address these concerns and present UNSW as a flexible alternative for Surveying education in NSW. 10 Reasons are presented.

Reason 1 – Two new programs

The restructured Surveying program offers a new Surveying degree which leads to registration and allows more land management, cadastral surveying, town planning, engineering and mining surveying courses to be taken. Our new GeoInformation Systems degree includes about one third of computer science courses, and also focuses on GIS, spatial analysis, satellite imagery and earth observation.

Reason 2 – We welcome TAFE articulators

Apart from school leavers and “gap year” students, our largest intake is TAFE graduates, who we find to be well trained and committed students. All of our graduates who articulated from TAFE are now Registered Surveyors in NSW or approaching full registration. We offer 20 - 30% exemption from courses in our program and if structured correctly, students can finish

after 3 years of full-time study. We also offer mid-year entry into the programs. More recently we are in negotiation with TAFE to try to encourage those students keen on articulation to university to complete 3 unit maths during their TAFE studies. This is a pre-requisite for entry into the UNSW program and often a stumbling block for TAFE articulators. A clearer path for other exemptions is also being determined as part of this initiative.

Reason 3 – Flexible options for studying during session

We recognise that most of our students work part-time, so we structure our timetable to allow at least one free day per week during the teaching session. Formal teaching comprises 2 x 13 week sessions face-to-face, plus exam periods. This allows at least 20 weeks full-time work per year, plus some part-time work during session. Students can also study part-time if that suits better. Mid-year entry is an option and we do offer some night lectures.

Reason 4 – Online resources

All student notes are online, lecturers email regularly with students, assignments can be submitted by email and enrolment at UNSW gives students access to one of the best library resources in the country, accessible from your own home. Some courses are offered on “Moodle” which is the software used for distance education.

Reason 5 – Course material relevant to NSW

Our Cadastral Surveying and Land Development courses cover material that is specific to the state of NSW, which facilitates easier progression through to Registration.

Reason 6 – On campus accommodation

For students from rural and regional areas, the University now offers 1000+ extra beds on-campus for fully catered student accommodation. This accommodation is not cheap, but there are many rural scholarships available and many are not even used as students simply do not apply for them.

Reason 7 – Prestigious University with strong research record

The Good Universities Guide rates UNSW as the top Faculty of Engineering in Australia and recently we were voted the best University in Australia for Learning and Teaching. Our School has Australia’s strongest research programs in Navigation and Earth Observation. We are engaged in worldclass research in GPS/positioning, InSAR, Earth Observation and have been funded to establish the new Australian Centre for Space Engineering Research. We have an enviable international research reputation. This international connection flows down to our undergraduate education and introduces students to cutting edge ideas which can fuel opportunities for their careers after graduation.

Reason 8 – More likely to finish in 4 years of concentrated study

Undertaking full-time study, even if in a flexible structure where you choose how many courses you will do each session, is arguably the most efficient way of gaining a University education.

Reason 9 – Face-to-face learning offers a richer university education

Distance Education is not offered by our School. We enjoy close links with the Surveying profession in NSW, provide a range of scholarships, and offer students opportunities to network with their peers and future employers. This is the great advantage of face-to-face learning over a Distance Education alternative. Students report that Distance Learning is lonely and requires enormous self-discipline and motivation. As a consequence there is a considerable attrition rate. Close contact of lecturers and fellow students starts friendships and

professional relationships that last a lifetime. Sydney is a world city and the student cohort from all backgrounds, nationalities and religions offers a truly diverse education which is important for the growth of our profession.

Reason 10 – Many alternate pathways offered for entry into our programs

The ATAR entry score is ~ 90 (!!), but becoming a great surveyor isn't just about doing well in the HSC exams. There are a number of "pathways" to entry for students with the right aptitude or background for work in these fields. In summary:

- 1) HSC+ gives students who choose 3 unit Maths and Physics "bonus points".
- 2) We interview students to profile their aptitude for Surveying or GIS under the Faculty of Engineering Admission Scheme (FEAS).
- 3) Students who haven't done the right courses, but are keen to enrol in our degrees can apply for entry to the Diploma of Engineering, Science and Technology (DipSET) with an ATAR of 80, and then transfer to our degrees upon its successful completion.
- 4) We typically accept TAFE Diploma graduates with a credit average or above.
- 5) The University also offers pathways for Mature Age entry.

What has research ever done for us?

UNSW is a research intensive university. However, the benefits of university research is not immediately obvious to industry.

CORS research was first developed at UNSW in the mid 1990s with network RTK algorithm development and combinations of observations from permanent GPS stations. This led to the development of SydNET and now CORSnet-NSW, with unquestioned benefits to the surveying community. Most of the CORSnet-NSW team were educated at UNSW.

Airborne LiDAR and radar remote sensing research conducted at UNSW and in partnership with the Land and Property Management Authority has been underway for almost 10 years. This work has produced deformation maps used by emergency management authorities in China in response to the Sichuan earthquake in 2008. Imagery produced by researchers in the school was also used to assist in efforts during the 2009 Victorian bushfires.

More recently, imagery for flood monitoring has been produced by the School's researchers in response to both the Victorian and Queensland floods. The response time from image acquisition to map production was 6 hours. Based on this success, a temporary ground receiving station will be located in Bathurst to improve data download times from orbiting satellites and, it is anticipated, will produce flood mapping products in under 2 hours.

The continuing work of researchers at Curtin University produced AusGeoid 93, AusGeoid98 and the new AusGeoid09 which will be ready for operational use to give GNSS users AHD heights in real time.

The initialisation algorithm used in Ashtech GPS receivers was developed by a PhD student from UNSW.

AUSPOS v2.0 is almost complete thanks to the efforts of a UNSW graduate. AUSPOS v2.0 will be of great benefit to many GNSS precision users, of which surveyors are the largest group.

The new Asia Pacific Reference Frame is being developed by Geoscience Australia. This is like a regional IGS network and UNSW along with Curtin University is an analysis centre.

This research culture exposes students to cutting edge, international developments in their discipline and pushes them to think beyond their undergraduate lectures, which in turn enhances the profession as these graduates take their places in the workforce. A research active school is of great value to the profession.

Concluding remarks

The number of institutions offering surveying degrees in Australia is probably too high. The style of graduate produced by the various institutions also differs. Some are practical, some are more theoretical or scientific, some focus on more on civil engineering, whilst others offer more GIS. Perhaps in order to survive, all institutions will need to identify their “niche” and provide graduates accordingly.

In NSW, it is fairly clear that TAFE diploma students are well trained and will become survey technicians, U Newc graduates are practical with skills in civil engineering, whilst graduates from UNSW have a more international degree, strong GNSS skills and given the top 4 status of UNSW, produce the future leaders of the profession.

Are NSW Surveying Graduates an endangered species?

If funding pressures at TAFE continue, if succession planning at U Newc are unresolved and if undergraduate numbers continue to drop at UNSW, then yes. NSW, the most populist state in Australia, with over 900 active Registered Surveyors will not have a local tertiary institution to support the profession.

This paper contends that the UNSW School of Surveying and Spatial Information Systems offers a premium degree with a diverse, highly-skilled and relatively young staff and despite the high ATAR, it is accessible to many school leavers, TAFE articulators and career changers.

It is hoped that members of the profession will encourage new students to apply to the School in an effort to sustain the surveying profession in NSW.

References

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