

# Evolution of Surveying at TAFE NSW to Meet the Needs of Industry During the COVID-19 Pandemic and Beyond

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## ABSTRACT

*Most surveying organisations or individuals have a connection to TAFE NSW. Whether as a former or existing student themselves or working with someone who completed a vocational qualification. Surveying delivery has been occurring for over 50 years, with TAFE NSW delivering Certificate III, Certificate IV and Diploma qualifications to hundreds of surveyors throughout NSW and interstate. It is pivotal that TAFE NSW engages with industry to ensure we are meeting their demands and keeping abreast of the technological changes. There is complexity associated with training students who already work in the industry, students who have not yet found work in the industry, working with a declining number of teachers, and trying to remain effective amidst a global pandemic. In recent years, TAFE NSW has undergone structural changes, which has now resulted in a collaborative approach to delivery across the campuses of Ultimo, Wollongong, National Environment Centre (Albury) and Newcastle. Born out of this collaboration is a model of delivery incorporating face-to-face, online and connected (MS Teams) sessions. This model is scalable, allowing it to accommodate growing enrolment numbers, student location and available teachers. This paper demonstrates that TAFE NSW is able to meet the demands of industry, while working with and better utilising that industry.*

**KEYWORDS:** *Training, TAFE NSW, qualifications, teachers, surveying.*

## 1 INTRODUCTION

TAFE NSW has existed for over 130 years and is the leading provider of vocational education and training in Australia, with more than 470,000 students enrolling in our courses and training each year (TAFE NSW, 2022a). Surveying delivery has occurred for over 50 years, with TAFE NSW delivering Certificate III, Certificate IV and Diploma qualifications to hundreds of surveyors throughout NSW and interstate. TAFE NSW has a great reputation for industry and business partnerships, which are crucial to providing a high-quality, job-ready workforce. The same emphasis on industry engagement applies to the industries of surveying and spatial information services. TAFE NSW maintains relationships with various industry bodies to ensure we are meeting their needs, keeping up with technological changes and learners are graduating job ready. TAFE NSW is going through structural changes, while the ongoing COVID-19 pandemic has also forced the organisation to modify the way it delivers its training and how learners interact with their teachers. This paper outlines these changes and demonstrates that TAFE NSW remains adaptive to meet the training demands from this key industry sector.

## **2 HOW TAFE NSW IS CHANGING**

### **2.1 One TAFE Restructure**

Until January 2017, TAFE NSW comprised 130 campuses across 10 institutes. Each institute had its own main campus and operated quite independently from each other. From 2017, TAFE NSW returned to a centralised model which abolished the 10 institutes and instead created five regions covering the state: South, North, West, Sydney and South-West Sydney. The 100% online part of TAFE NSW is called TAFE Digital and is the largest online education provider in Australia (TAFE NSW, 2022b). From 1 January 2019, the organisation started operating as one Registered Training Organisation (RTO) called TAFE NSW or One TAFE NSW. The impetus for this reform was a growth in competition from other smaller, more agile providers, as well as the advent of the NSW Smart and Skilled entitlement funding model. Among other things, TAFE NSW has a vision of increased capacity to support more students in those qualifications that lead to jobs, as well as being a significant provider in regional NSW and to people facing disadvantage.

### **2.2 Australian Skills Quality Authority (ASQA) Governance**

TAFE NSW is regulated by the Australian Skills Quality Authority (ASQA). The role of ASQA is to protect the quality and reputation of the Vocational Education and Training (VET) sector. It utilises a risk-based approach, acknowledging that no RTO can be perfect (ASQA, 2022a). Its approach of proportionate compliance and enforcement supports quality through engagement and support. To ensure there is confidence in the outcomes delivered by RTOs, ASQA regularly engages with:

- Industry regulators and licencing bodies.
- Peak industry and employer groups.
- Other government agencies.
- Industry associations.

The Standards for RTOs 2015 (ASQA, 2022b) have been developed by ASQA to guide all RTOs, including TAFE NSW, to understand their obligations. These include:

- Trainers and assessors must hold a Diploma or higher-level qualification in adult education, or the latest Certificate IV TAE40116 (or equivalent).
- Providing national consistency in regulation of the VET sector.
- Providing clear and accurate information about the training an RTO offers, including duration, cost and RTO expectations of students.
- Protecting students from pre-enrolment through to course completion or withdrawal.
- Ensuring students are protected through their educational journey through adequate support and access to a complaints and appeals process.
- Ensuring teachers and assessors are both vocationally and educationally current.
- Ensuring RTOs adequately engage with industry.
- Ensuring training and assessment strategies are relevant, current and meeting the intent of the training package.

### **2.3 Australian Qualifications Framework (AQF)**

The Australian Qualifications Framework (AQF) was introduced in 1995 to structure a national system of qualifications in Australia (AQF, 2022). This encompasses schools, higher education and VET. One of the key objectives of the AQF is to facilitate an effective pathway through

formal qualifications. In the case of TAFE NSW, teachers and training and assessment resource developers will use the detail in the AQF to prepare educational material that meet the qualification level. For example:

- Level 1 – Certificate I: Graduates at this level will have knowledge and skills for initial work, community involvement and/or further learning.
- Level 3 – Certificate III: Graduates at this level will have theoretical and practical knowledge and skills for work and/or further education.
- Level 5 – Diploma: Graduates at this level will have specialised knowledge and skills for skilled/paraprofessional work and/or further specialised learning or training.

## **2.4 Training Packages and the Transition to Industry Clusters**

A training package is a bundle of units of competency that combine to form a qualification that complies with the AQF. For example, the ‘CPP – Property Services Training Package (Release 15)’ includes:

- CPP20121 Certificate II in Surveying and Spatial Information Services.
- CPP30221 Certificate III in Surveying and Spatial Information Services.
- CPP41721 Certificate IV in Surveying and Spatial Information Services.
- CPP50121 Diploma in Surveying.
- CPP50221 Diploma in Spatial Information Services.
- CPP60121 Advanced Diploma in Surveying.

A Training package is important to an RTO because it provides a structure to develop training curriculum. Similarly, it is important to employers as it assists with workforce design and structure (ASQA, 2022c). Training packages are developed by industry and then endorsed by the Australian Industry and Skills Committee (AISC). Industry Reference Committees (IRCs) are the key industry advisory bodies to the AISC. For example, two members of the Property Services IRC are Consulting Surveyors National and the Surveying and Spatial Sciences Institute (SSSI). The IRC is supported by Skills Service Organisations (SSOs) whose role is to engage with industry to drive development and review of the training package. There are 6 SSOs covering all training packages. For the Property Services training package, the SSO is Artibus Innovation.

From 1 January 2023, the SSOs and IRCs will be replaced by industry clusters to better engage with industry as well as strengthen outcomes for both learners and employers. One chief result from this change will be a better alignment of training product development with industry skills requirements. This should lead to increased workforce productivity. Industry clusters will work with RTOs to develop improved resources for teachers, assessors and employers. The process to establish the new industry clusters is now underway and will be built around a recommended operational structure (Australian Skills Reform, 2022).

## **2.5 Smart and Skilled and Training Services NSW**

The NSW VET system introduced ‘Smart and Skilled’ as a reform to offer people in NSW the opportunity to get the skills they need to advance their career. Funding is available to applicants aged 15 years or older, who are no longer at school, live or work in NSW and are an Australian citizen. There are two options to the funding (Smart and Skilled, 2022):

- Entitlement: Government-subsidised training up to and including Certificate III.
- Targeted priority: Government funding for Certificate IV and above.

Training Services NSW is a division of the NSW Department of Education and is responsible for government-funded VET in NSW. It controls the implementation and compliance of funded programs including ‘Smart and Skilled’, apprenticeships and traineeships. Central to its operation is offering students the best outcome for their VET studies (Training Services NSW, 2022).

### **3 SURVEYING AND SPATIAL INFORMATION DELIVERY AT TAFE NSW**

#### **3.1 Overview**

TAFE NSW has been delivering surveying qualifications for over 50 years. In the early days, at the Ultimo campus in Sydney, there were two sections: Surveying and Drafting. Enrolments from both the public and private sector were always high, and this was demonstrated by a staff of 15 full-time teachers. In time, Cartography evolved as a third section. Many TAFE graduates transitioned to university. These learners were always readily accepted as universities knew that these students had sound practical skills (I. Pozzato, pers. comm.). Roberts and Harvey (2019) stressed the importance of all surveying graduates from university having the practical skills necessary to contribute to the industry and society, i.e. being job-ready.

In 2022, TAFE NSW offers the following surveying and spatial information qualifications:

- CPP30221 Certificate III in Surveying and Spatial Information Services: To fulfil the role of a surveying or spatial information services assistant who works under supervision.
- CPP41721 Certificate IV in Surveying and Spatial Information Services: To fulfil the role of an entry-level technician who works under supervision to assist a surveying or spatial information services team.
- CPP50121 Diploma in Surveying: To fulfil the role of a skilled survey technician.
- CPP50221 Diploma in Spatial Information Services: To fulfil the role of a skilled spatial information system technician.

These are delivered from the campuses of Ultimo (Sydney), Newcastle, Wollongong and Thurgoona (Albury). Across these campuses, there are over 30 full-time and part-time teachers and additional support staff. Industry demand for surveyors is high with a 5-year projected growth of 13.8% and currently around 600-900 job opportunities nationally. The average age of surveyors is in the mid-50s, so opportunities will continue to rise (Seek, 2022).

#### **3.2 Importance of Assessing a Student Before Enrolment**

TAFE NSW students can be broadly classified into two groups: those working in industry and those not yet working in industry. For this reason, it is mandatory for prospective students to be assessed prior to enrolment to ensure they are given the best educational journey. Students who have enjoyed many years in industry are not expected to commence at Certificate III level. Similarly, we cannot expect a school leaver to start at the Diploma level. It is a balancing act of ascertaining a student for:

- Industry experience, currency and knowledge.
- Foundation skills, especially English and numeracy.
- Digital literacy.
- Access to the latest equipment to hone practical skills.

It is important to offer these students a pathway through TAFE NSW, and then onto university for those who aspire to become registered land surveyors. In most cases, at university, credit will be given to students with a Diploma in Surveying qualification. The pathway is not always a one-way street though. Some students who commenced at university have withdrawn and come to TAFE to develop their practical skills and underpinning knowledge first. In many cases, a VET qualification is enough to gain them a rewarding and well-paid job in industry. As mentioned, those graduates who aspire to become registered must complete a recognised qualification from university, undertake prescribed training and work experience under the supervision of a registered surveyor, and undertake prescribed examinations by state boards such as the Board of Surveying and Spatial Information (BOSSI) in NSW.

According to the Organisation for Economic Co-operation and Development (OECD), an estimated 3 million Australians have low basic skills. Although our literacy levels are above other OECD countries, our numeracy levels are average (OECD, 2022). Similarly, the National Foundation Skills Strategy for Adults (Australian Government, 2012) suggests that Australians will need to strengthen their foundation skills to function in an increasingly complex workplace and contemporary life. This is reflected by what TAFE NSW surveying and spatial information teachers note in the classroom. Not all students are equipped for the computations and digital literacy required by industry. One of the key attractions of completing the Certificate III – Certificate IV and Diploma pathway is that students can build upon the foundation skills at each AQF level, equipping them to be functional workers upon course completion. Following enrolment with TAFE NSW, all students undertake a Language Literacy Numeracy (LLN) assessment to ascertain course suitability and possible needs. Given LLN forms part of the ‘Certificate IV Training and Assessment’ teaching qualification, every TAFE NSW teacher has LLN skills. In addition, several support services are available to students, e.g. Aboriginal student support, learning support, multicultural support, and accessibility and disability services.

### **3.3 Models of Delivery**

As previously mentioned, there are two broad categories of TAFE NSW learners: those in industry and those that are not. Students are scattered across NSW and beyond, and everyone has different learning styles. This all means that delivery to students must be flexible, adaptable and contemporary. Each of the four campuses delivering surveying and spatial information qualifications uses a mix of face-to-face, online (called Moodle) and connected (generally Microsoft Teams). The relative mix of each of these components depends on:

- Industry experience and exposure to using surveying equipment.
- LLN levels and whether additional support is required.
- Qualification level – generally, the higher the qualification the more self-directed a student is.
- Whether the training is theoretical or practical.
- Where the student is located – generally, students within the catchment of the four campuses are more able to attend campus than those that are not.
- The willingness of employers to allow staff to attend campus or have designated study days at work.

Wollongong, Newcastle and Ultimo have traditionally provided a predominantly face-to-face delivery. This enables learners who are not yet in industry to attend classes during the day sessions. For those students who are working in industry, night sessions are offered. Given the relative lack of available teachers at these campuses, it is anticipated that a blended delivery

model will be offered in the future. This means that students do not have to travel to campus – for theory sessions they can participate via connected technology at home or remotely work on their computer, tablet or phone.

The Thurgoona campus caters to those learners who are working in industry across the state and interstate. The majority of delivery is online or connected with a small number of week-long practical block-release camps on campus. This enables students to continue working with the occasional release to attend camp. Even though there are students with many years industry experience, TAFE NSW requires mandatory attendance for these face-to-face sessions. This provides teachers the opportunity to ascertain practical competence via observation. It is also acknowledged that some surveyors can have narrow areas of expertise. Attending camp broadens that experience, creates networking with other students and exposes them to equipment they may not be familiar with.

One of the most important factors contributing to effective training is access to and use of current industry equipment. This can be difficult for an RTO when the discipline you manage undergoes continual technological change and the equipment used is expensive. Thankfully, TAFE NSW understands the importance of ensuring students use the latest equipment to make them industry ready. Each of the four campuses uses equipment that is stipulated in the training package. TAFE NSW has also made a conscious effort to vary the manufacturers of equipment so that students either experience what is available in industry or use equipment they are familiar with in their workplace. In the latest training package update in 2021, the unit ‘CPPSSI5061 Survey Subsurface Utility Information’ was added to the Diploma in Surveying qualification. This was the result of industry (Transport for NSW) approaching TAFE NSW and discussing the need of including this capability in the skillset of surveyors. From there, this organisation participated in the training package process managed by Artibus Innovation. Inherent in this unit is the need to use electromagnetic locating equipment, ground penetrating radar, Global Navigation Satellite System (GNSS) technology and total stations. Some of this equipment was donated by industry, further exemplifying the important relationship between industry and RTOs.

## **4 OUR TEACHERS**

### **4.1 Experience**

Currently, TAFE NSW employs over 30 full-time and part-time surveying and spatial information services teachers across the four campuses, including several registered surveyors. Given that delivery includes online and connected components, some of our teachers are located interstate. The breadth of experience includes:

- Cadastral surveying.
- Mining surveying.
- Engineering.
- Monitoring.
- Subdivision.
- Construction.
- Drafting.
- Spatial analysis.
- Spatial data capture.
- Remotely Piloted Aircraft Systems (RPAS) or drones.

- Subsurface utility mapping.
- Project management.
- Hydrographic surveying.
- GNSS.

In conjunction with the support staff within the campuses, TAFE NSW ensures that students have an enriching educational journey, catering to all elements of the industry.

#### **4.2 Individual Delivery Profile (IDP)**

As part of ASQA obligations (ASQA, 2022d), TAFE NSW has instigated the Individual Delivery Profile (IDP) for each teacher. Before a teacher starts delivering any training, they must demonstrate:

- Vocational competency at least to the standard being delivered and assessed: This could mean holding the unit of competence that is being delivered or demonstrating through other relevant qualifications and industry experience or currency that a teacher is compliant and competent to deliver the unit.
- Current industry skills relevant to the training and assessment: Currency activities need to be collected every year, e.g. via returning to industry, engaging with industry meaningfully or self-directed learning.
- Current knowledge and skills in vocational training and learning: This means holding the latest 'Certificate IV Training and Assessment' qualification.

Each semester, teachers must update their IDP to ensure compliance. In addition, when there is a training package update, teachers must ensure they are mapped against the latest units of competency.

## **5 THE IMPACT OF COVID-19 ON TRAINING SURVEYING STUDENTS**

### **5.1 TAFE NSW During the COVID-19 Pandemic**

In January 2020, Australia became aware of the COVID-19 pandemic. It quickly became apparent that this would disrupt every Australian, whether directly or indirectly. TAFE NSW halted most programs from 30 March until 27 April 2020, although nursing and aged care continued. Given TAFE NSW is an essential service, the priority in that short period of shutdown was to be innovative in developing online or connected delivery to ensure our students' educational journey could continue. In some cases, such as surveying and spatial information qualifications, this was straight-forward as these modes of delivery were already being utilised. In other cases, including most trades areas, this was a significant shift from traditional face-to-face delivery. Teachers needed to be taught how to use the various technologies, and similarly resources needed to be transferred across for remote delivery. In most cases, TAFE NSW was able to continue the theory component of delivery without too much disruption. Not surprisingly, it was the practical side that became problematic. Throughout the pandemic, the organisation followed the public health orders, trying to maintain delivery where it could. TAFE NSW understood the importance of trying to keep a semblance of normality to students who could continue learning even though their social and working lives were severely impacted.

## **5.2 Virtual Classroom Experience**

Although there were obvious downsides to the COVID-19 pandemic, one positive for TAFE NSW was the development and utilisation of virtual classrooms. Primarily, this was enabled through Microsoft Teams and/or Moodle. Teachers and support staff quickly realised the advantages and efficiencies that connected delivery offered. As flagged already, not all qualifications were suitable as the lower AQF levels that were practically focussed found it difficult to keep students engaged. Similarly, some employers did not embrace the technology as they believed TAFE should maintain face-to-face delivery. Everything was a balancing act.

Teachers found that completing a ‘Certificate IV Training and Assessment’ qualification did not prepare them for connected delivery to large numbers of learners connected via a computer, laptop or tablet. Face-to-face cues from students were missing, understanding the etiquette of a virtual classroom was unknown, and promoting collaboration and engagement amongst teachers and students became difficult. TAFE NSW, through its ICT and digital capability support unit, was able to develop a suite of resources for both teachers and students. Given an element of connected delivery is now part of nearly every TAFE qualification, virtual classrooms are becoming the norm.

Over the past 5 years, TAFE NSW has developed a network of Connected Learning Centres (CLCs) across the state. These state-of-the-art facilities have been custom-designed and built in some of our more remote campuses (TAFE NSW, 2022c). They enable learners from across the state to attend a digitally enabled facility and participate in a connected session where the teacher is invariably located elsewhere. Practical training is also possible through the advanced technologies available (simulations and virtual reality). In 2021, as a direct result of the success of virtual classrooms, TAFE NSW has now established 200 Connected Learning Points (CLPs) at campuses across the state. These are set up to enable teachers to deliver training via advanced hardware and software technologies, and for students to attend a smaller room where they can participate in the class remotely from the teacher. These CLPs are basically a cut-down version of a CLC.

## **6 THE FUTURE**

### **6.1 Industry Engagement is Key**

The future success of TAFE NSW hinges on its relationship with industry. This paper highlights how effective industry engagement leads to effective training that will meet the needs of a rapidly advancing world. As already mentioned, industry clusters will replace IRCs and SSOs in 2023. This is a response to the fact that industry needs to work together with all RTOs to create responsive and relevant training meeting the demands of today and tomorrow. A small example of this was the inclusion of the unit ‘CPPSSI5061 Survey Subsurface Utility Information’ into the latest Diploma in Surveying qualification.

Currently, TAFE NSW interacts with industry across multiple fronts:

- At individual teacher level through annual currency activities captured through the IDP process.
- TAFE NSW and the Surveying and Mapping Industry Council (SMIC) meet regularly through general meetings and the annual Training and Assessment (TAE) scholarship recruitment.



- TAFE NSW must seek industry verification as part of ongoing training and assessment validation.
- TAFE NSW has industry leads who are staff designated to liaise with the industry sectors in their portfolio.
- Some TAFE NSW teaching staff belong to industry body committees, such as the Surveying and Spatial Sciences Institute (SSSI).

## **6.2 Attracting the Best New Teachers from Industry**

One of the key limiting factors in growing TAFE NSW surveying and spatial information services enrolments is a lack of teachers across the four campuses. Even though a total of 30 teaching staff may seem high, the reality is that most of these are part-time teachers and therefore restricted with their time. The upside to this is that these same teachers are continuously working in industry and are therefore providing our students the very best of contemporary training.

There are a few incentives available to attract the next surveying teacher at TAFE NSW:

- SMIC TAE scholarship: SMIC will pay the student fee for a successful candidate. Study can be undertaken through any relevant RTO.
- TAFE NSW TAE scholarships: TAFE NSW will pay the student fee for a successful candidate. Study must be undertaken through TAFE NSW.
- Remote working (can be located anywhere): With the online and connected components of delivery, in theory teachers can be based anywhere. There is no need to travel to one of the four main campuses.

## **6.3 Full Qualifications or Skill Sets / Micro Credentials**

A future direction of training are micro credentials. These are smaller industry-recognised, skill-specific certifications that suit a student with a busy lifestyle (TAFE NSW, 2022d), with the option of having these nationally accredited. Rather than studying a full qualification, students can pick and choose the skills they require. TAFE NSW has experienced success with these in the past with a drone-related skillset targeted at surveyors. Similarly, a spatial information skillset utilising the three main Geographic Information System (GIS) software packages on the market was popular. It is envisaged that the surveying of subsurface utilities will be in similar demand in the future.

## **6.4 Working with our Competitors to Support Industry**

Even though TAFE NSW is the biggest provider of VET training in Australia, the market must support other RTOs. In the case of surveying and spatial information training, there are not many providers across Australia. During the 2021 CPP training package update, these providers all worked together to ensure the new qualifications were meeting the needs of industry as well as the RTOs. As a result of resource development requirements with the new training package, some of these RTOs are working together or sharing their learning and assessment resources. It is envisaged that some RTOs may specialise in micro credentials only.

## **6.5 Taking the Training to the Students: Mobile Training Units (MTUs)**

A final option is to take the training to the students. Mobile Training Units (MTUs) have been created since 2018 to enable training to be undertaken anywhere around the state. The MTU

can range from being a truck with full classroom on the back, through to a small trailer that contains relevant tools and accessories to run practical training where the students are located (Figure 1). The original concept was that MTUs would travel to CLCs to deliver the practical training that augments the theory component of what students have been studying. This quickly morphed into the realisation that properly constructed MTUs can travel anywhere and be totally self-sustaining. If the cohort of students exists, then the MTU can travel. As discussed earlier, having a network of remote teachers across the state enables the MTU to travel to them also. This mode of delivery would have been ideal to offer on-site to surveyors associated with the Pacific Highway upgrade.



Figure 1: Remotely Piloted Aircraft System (RPAS) Mobile Training Unit (MTU) set-up in Western NSW.

## 7 CONCLUDING REMARKS

This paper has outlined the structural changes TAFE NSW is going through and demonstrated that TAFE NSW has remained adaptive during the COVID-19 pandemic to meet the training demands from industry. A Registered Training Organisation (RTO) cannot survive without effective industry engagement. The very nature of VET is intrinsically tied to its industry. This ensures that training is relevant and current to meet the workforce demands of today and the future.

TAFE NSW also demonstrates that an RTO needs to be adaptive to changes that may be encountered. The COVID-19 pandemic created worldwide disruption, but TAFE NSW was able to quickly upskill its teachers and assessors to utilise connected delivery to keep training going. When a student's social and sporting life was thrown into turmoil during the pandemic, it was sometimes their studies that allowed their life to retain some structure and have a positive impact on their mental health. The demand for surveyors continues to grow, and TAFE NSW is confident to meet that demand by using a blended approach to its delivery, a better utilisation of its existing staff, and a reputation to entice new teachers who are keen to give back to the profession they love.

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