Training the Other Surveyor

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SUMMARY

The education and training of surveyors is well documented and structured through the various learning institutions in Australia. Not so well known and developed is the training regime required for those not wanting to be professional surveyors but more attuned to being a technical officer or assistant to a surveyor.

The role of the survey technical officer and/ or assistant is every bit as important as that of the surveyor. Some may disagree with this statement although knowing that you have a competent assistant adds considerably to the ease of undertaking a survey, adds to the enjoyment of the survey and makes reductions and finality very much easier.

This paper is about setting up training regimes for those who wish to take on this role of a survey technical officer and/ or assistant. It came about by a desperate need to have staff trained in various areas of surveying in order to provide the required assistance to professional surveyors. It also came about by a need to provide training in country centres for those who did not want to migrate to the capital cities, preferring to retain a rural lifestyle. Finally it came about by a need to provide an indenture style training regime that would provide a combination of in house and classroom arrangements. To date the cooperation of the employers to the scheme has been successful and students are finding the course material and lectures a positive reinforcement to their on the job learning.

Apart from the learning achievements, students graduate with a certificate which they can then use to negotiate more favourable arrangements in the employment process. The qualification will ensure that the survey assistant will have a more rounded understanding of the nature of the business in matters of safety, quality assurance, data interaction and client relationship.

Setting up a new study arrangement within the TAFE sector, employers and student groups has been a heavy task for all those involved, although it has been a rewarding one. It is not always easy to have people persist to the finale in training, particularly those who have been in employment for many years or those who see no significant advantage in furthering what they already have. The emphasis placed in this learning process has been the changing face of surveying in the light of technological change and the importance of the surveying industry in furthering that change.

Surveying is a specialist role although the magnitude of the role is expanding and exciting to the professional and assistant. Therefore ongoing education is fundamental to maintaining a constant grasp on training though formalised structures, conferences and on the job training.

My experience with a significant number of surveyors is their need to pursue further studies and training.

Colleagues have been involved in the preparation of this paper and are actively involved in training students. We are using our own experiences to transfer knowledge to our younger colleagues.

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I note that this paper has been scheduled in the Knowledge Sharing arena and I believe that this is appropriate as it is about sharing knowledge and experience from the professional sector to technical sector within the surveying industry. From my own perspective it is about giving back what I have received over my professional life.

Giving back Time and Experience

1. Introduction

‘’Behind every good man is a good woman’’. Can the same can be said for a good surveyor; “behind a good surveyor is a good survey technical officer/ technician’’? That certainly is the belief of the writer who has had the experience of some excellent survey technical officers/ technicians who are always 10 steps in front of your meticulous planning of the survey. Malcolm Fraser said ‘life was not meant to be easy’ although these people certainly make it easy for carrying out a survey.

However, as time has marched on, the skilled technical officer/ technician is becoming a diminishing commodity as they retire or seek other types of employment that might be less rigorous than that of survey. So what of those undertaking the same role these days, when the nature of the surveying business has changed and electronic gadgetry has taken up a significant role in the profession. Do we still require the ever thinking technical officer/ technician? The answer is yes in my opinion although finding them is at times a mystery, even more so if you practice in the country environment. Rare as hen’s teeth is an apt expression!

Some years ago the frustration grew so over bearing that the Goulburn Ovens TAFE (Tertiary Accredited Further Education) was approached to investigate the level of interest in developing a certificate level course for those wanting to be part of the survey profession at the technical officer/ technician level. Surprisingly, the level of interest was very high from the management and academic members and since then progress has been positive.

But who is making up the course in terms of lecturing staff and more importantly students? Old surveyors never die; they just move on from one task to another, in this case, that of lecturing. And students have come from a variety of back grounds and locations to undertake studies in one of the oldest professions in the world.

This paper and presentation is about the origin, what has been achieved, the course content and where the education program is going and how to broaden the community in the role of surveyors.

2. What started it?

Managers are always on the look out for key staff to help develop the business whether it is government or private. Time and time again advertisements would be placed in newspapers and on the Internet seeking qualified staff to fill positions. Time and time again limited applications came in and those who did apply were not qualified or had limited experience which was not going to be beneficial to the organisation.

Figure 1

‘’Hit the ground running’’(Figure 1) is very much the qualification required for technical officers/ technicians, so that surveys can proceed at the rate demanded by industry, especially in engineering focused organisations. We are all aware of the importance of “on the job training’’ although functioning at 100% and training at the same time can be very difficult and frustrating and work progress is slowed to sometimes unacceptable levels. Enhancing this on the job training with specific tuition has proved to be a productive method of enhancing operations.

Thus frustration started the process!

As indicated in the Introduction, an approach was made to GOTAFE at Shepparton in northern Victoria to discuss the introduction of studies in surveying with the intent of providing a basic qualification for students. Management and academia listened to the concerns raised and reflected on them with positive interest in being able to set up such a course at Shepparton. The result of this initial meeting proposed that another meeting be

planned at which industry representatives would be invited to attend and to gauge the level of interest for the development of such courses.

Thus what was a very simple idea turned into another job of seeking interest from industry. Fortunately management at GOTAFE immediately rose to the occasion and made contact with all industry representatives and this set forth the planning for the course development. At the time I believe that the universities and TAFE were competing for similar students at the Professional and Para-Professional level and opportunities like this were encouraged as much as possible. In addition having the right people at the right levels and enthusiasm is vital for this to work.

After the euphoria of perceived success wore off it was then down to "how the hell is this going to happen''. As a student it just happened; the course was at the university, had been for a long time and looked like it was going to be around for a long time. Starting from scratch with little experience was another matter. However, if enough people perceive a need then things will happen and this is what took place. Very soon it was a case of where we would get the students and what facilities and funding would be available. After all if you can offer funding then getting students becomes a much easier task.

To understand funding in the education sector is similar to understanding the finer points of superannuation or world fiscal policy; it is not easy. Funding for a Traineeship is available at a state (remove and federal) level depending on certain criterion being met. The main criteria seemed to be that the student will have been with the relevant company for a period of less than three months on a full time basis or less than 12 months on a part time basis. This of course can and has presented some interesting challenges for employers who wanted to send staff to the course although they had been with the company for a period greater than three months. Two options: retrench them and reemploy them as new employees or the employer pays the fees. This is a hurdle that we will face through out the course now and into the future and the answers will vary according to the funding model at the time.

At a number of industry meetings run by GOTAFE funding, course make up and necessary protocols were explained in detail and gradually started to make sense. As a professional starting a course was more about the content, students and teachers and less about funding. Of these content took up the main component of preparation.

Figure 2

Figure 2 shows exactly what happened. Industry representatives listed their wish list for areas to be covered and GOTAFE staff faithfully listed them on the whiteboard. Coming from different areas meant that different needs were required to meet requirements of the industry. Local government wanted pipelines and subdivisions, private practice wanted cadastral surveying and levelling, government departments wanted everything, especially the water industry that wanted surveillance, cadastral, hydrographic and more. As you know surveying is a profession that covers an enormous area and in a course structure as proposed at GOTAFE it was never going to be possible to cover all areas.

Somehow we came up with a course that met the interests of the industry representatives and met the criteria of the TAFE system. Which was the more difficult to achieve?

Another obstacle has been obtaining equipment for undertaking the training. The Industry Reference Group (IRG) highlighted the need to commence training at Certificate III level so that students could gain an insight into the basics of Surveying. Training commences with Optical Theodolites prior to progressing to Total Stations and GPS. Funds to purchase equipment have been limited, and the courses have relied on industry providing a loan of equipment in many instances. A number of companies have also generously donated equipment to aid the training of students.

3. Course Structure

Everyone has heard the expression “suck and see”. In starting up a course this is very much the expression that is used or at least was used in this instance. Would the students be happy to undertake subjects determined by a group of surveyors? Would industry be happy with the structure? More importantly would the TAFE sector be happy with the course and structure? Only one way to test it and that was to commence the course and “suck and see” the result.

As we were commencing with a Certificate III in Spatial Information Services (SIS) it was important to be able to match the surveying topics with the TAFE topics so that the language matched.

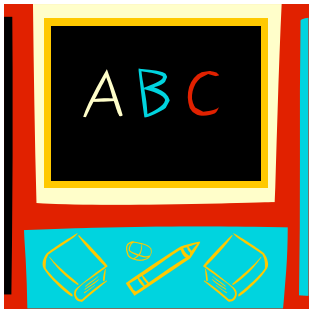

Figure 3

We all know that if A does not equal B + C then the equation may be wrong. If academia language does not equal TAFE language then the prospects of proceeding are not all that strong. Thus it was important that subject areas were able to be cross matched with the existing TAFE language in order for the course to proceed as it has. GOTAFE staff involved seemed to have a magical finger in being able to do the cross match with relative ease and I am eternally grateful to them for undertaking this task.

The result was the set of units shown in Figure 4 below, these being the initial Certificate III subjects in Spatial Information Services at GOTAFE in Shepparton.

CERTIFICATE III UNITS

CPPSIS3001A	Apply map presentation principles
CPPSIS3002A	Store and retrieve basic spatial data
CPPSIS3004A	Respond to client spatial enquiry
CPPSIS3005A	Collect basic spatial data.
CPPSIS3010A	Perform basic spatial computations
PRMCMN301A	Contribute to workplace safety arrangements
FPIFGM147A	Read and interrupt maps
BSBFLM303A	Contribute to effective workplace relationships
THHGHS03B	Provide first aid
CPPSIS2001A	Prepare for work in the spatial information services industry
CPPSIS3007A	Select, operate and maintain equipment and supplies

Figure 4

Duration & Delivery

Duration is over 1 year, delivered with a combination of on and off the job training. It involves 20 days training at GOTAFE over 12 months and on the job training within industry. In addition to completing the approved subjects students could also complete the certificate by:

Recognition of Current Competencies (RCC)

RCC is an assessment process that involves re-assessment of a previously gained accredited qualification that may no longer be recognised by official bodies. With your current industry experience, the RCC process will involve an assessment against the current qualification.

Recognition of Prior Learning (RPL)

RPL is an evidence gathering assessment process where an individual's skills and knowledge in a specific vocational area are assessed against a unit or units of a nationally accredited training package; thus enabling them to gain part or all of a formal qualification. The process requires an interview with the student, third party verification and the candidate presenting evidence of their proficiency.

In the case of the Certificate IV the following array of subjects were offered (Figure 5). Again these will be modified as the course takes hold and employers require new and different skills to be obtained. An Industry Reference Group (IRG) has been established to advise GOTAFE staff industry training requirements.

CERTIFICATE IV UNITS

CPPSIS4002A	Store and retrieve spatial data
CPPSIS4005A	Collect basic GPS data
CPPSIS4006A	Read and interrupt basic image data
CPPSIS4009A	Collect and set out basic surveying data.
CPPSIS4010A	Operate surveying equipment
CPPSIS4011A	Perform surveying computations.
CUVCRS03A	Produce computer aided drawings
ICAITU006C	Operate computing packages
BSBADM404A	Develop and use complex spreadsheets
CPPCMN4002A	Implement and monitor environmentally sustainable work practices.
CPPDSM3009A	Maintain workplace safety in the property industry
CPPSIS4007A	Organise field services
CPPSIS4008A	Organise equipment and supplies
CPPSIS4012A	Plan and conduct survey expeditions
MNQGEN400A	Apply site risk management system

Figure 5

The Certificate IV in Surveying has been developed to provide information on Surveying. Surveying is the measurement, management, analysis and display of spatial information describing the Earth, its physical features and the build environment

Graduates may be employed in the spatial information industry as an assistant to land surveyors, a survey technician, GIS/GPS operator or computer draftsperson. Graduates could initially work in areas such as land management, civil and structural engineering or asset management for local government or mining companies.

Entry Requirements

Participants must be employed within the industry or be prepared to gain work experience with a surveying company. Satisfactory completion of the Certificate III in Spatial Information Services is a pre-requisite.

Duration & Delivery

Duration is over 2 years, delivered with a combination of on and off the job training. It involves 30 days training at GOTAFE over 18 months and on the job training within industry.

Assessment

Participants are assessed via completion of required tasks and a demonstration of skills, e.g. written and verbal assignments, practical work, classroom participation, projects and/or written tests.

Qualifications

Both the Certificate III in SIS and the Certificate IV in Surveying are nationally recognised qualifications.

Recognition of Current Competencies (RCC) and Recognition of Prior Learning (RPL) are also available at Certificate IV level

With the course structure setout and the approval of the industry gained it was then a matter of working out how the course was going to be delivered and by whom.

4. Teaching staff

Regardless of what teaching structure you are in gaining suitably qualified staff is always a problem. In this particular case obtaining staff specializing in surveying in a country location was even more challenging. Fortunately a number of surveying professionals, some of whom had recently retired or were about to retire, put up their hands up to take on various aspects of the course.

All surveying professionals are license surveyors with a combined professional life in excess of 100 working years, mainly working in the water industry but well recognised for professional skills and competence. The other member of the team has been in the surveying and drafting area for over thirty years and has been involved in mapping, GIS, computing, OH&S and running a business in the government sector, private sector and large company environment.

TAFE staff also provided input into the course through the running of the more generic units such as Excel and People Skills.

The danger in using this type of teaching arrangement is that it is solely reliant on people's goodwill and commitment, even though they are paid to undertake the teaching. For those working full time it means taking time off to teach and making the time up or taking leave to progress the courses. Thus this is an important area to develop for the future so that this is not a constant concern for the TAFE organiser.

Often the classroom time can be a debrief of the work environment and clarification of work processes. Students talking to their peers enable an exchange of stories and experiences which is beneficial to all involved. On one occasion the whole day was spent talking about the requirements of the course, the requirements of individuals and where they would like to place themselves in the workforce.

5. Current Situation

The current situation with the certificate courses is as follows:

- Two classes have graduated in the Certificate III in Spatial Information Services and a third one is currently in progress.

- The first group of Certificate IV Surveying students graduated in 2009, a second group will graduate in 2010 and the third course is currently in progress.

- The Diploma of Engineering Drafting course which has specialization areas in both Civil Design and Civil Drafting commenced in 2009.

- Initial work has begun on the Diploma in Surveying as those who have completed the Certificate IV are very keen to advance to the Diploma. Unfortunately some employers are not keen on this. Major limitations to running the Diploma is development of teaching and assessment resources and finding suitably qualified and experienced staff with sufficient time to teach the course.

- Australia wide discussions have been taking place in relation to Surveying courses and the adoption of a standard structure for the industry.

The last point is a very interesting one as interest in the course has been widespread and there is a certain amount of sharing between some of the national TAFE institutions and GOTAFE in developing a national course that would allow students to transfer from state to state without losing already completed subjects.

6. Timetable

The timetable has been arranged in order that it has a minimal impact on the employee and employer and teaching staff. This has been achieved through having a three day session every two months over the life of the course, so that the student has a full grounding in the field and office environment and reinforcement through the classroom activities and subjects.

The timetables for the Certificate III and Certificate IV are shown below. Flexibility has been built into the timetable in the event the circumstances take over. An example of this happened this year when one of the teaching staff had an unfortunate heart attack and has been confined to quarters until 2010. On other occasions class dates have been altered because of tutor workloads within industry.

Certificate III Spatial Information Services

Date	Day	Code	Unit	Room
21/04/09	Tuesday	PRMCMN301A	Contribute to workplace safety arrangements	E001
22/04/09	Wednesday	CPPSIS3005A	Collect basic spatial data	E001
23/04/09	Thursday	CPPSIS3010A	Perform basic spatial computations	E001
24/04/09	Friday	THHGHS03B	Provide first aid	E001
26/05/09	Tuesday	CPPSIS2001A	Prepare for work in the spatial information services industry	E001
27/05/09	Wednesday	CPPSIS3005A	Collect basic spatial data	E001
28/05/09	Thursday	CPPSIS3010A	Perform basic spatial computations	E001
29/05/09	Friday	FPIFGM147A	Read and interrupt maps	E001
07/08/09	Wednesday	CPPSIS3005A	Collect basic spatial data	E001
08/08/09	Thursday	CPPSIS3010A	Perform basic spatial computations	E001
09/08/09	Friday	BSBFLM303A	Contribute to effective workplace relationships	E001
14/10/09	Wednesday	CPPSIS3001A	Apply map presentation principles	E001
15/10/09	Thursday	CPPSIS3005A	Collect basic spatial data	E001
16/10/09	Friday	CPPSIS3010A	Perform basic spatial computations	E001
14/10/09	Wednesday	CPPSIS3007A	Select, operate and maintain equipment and supplies	E001
15/10/09	Thursday	CPPSIS3002A	Store and retrieve basic spatial data	E001
16/10/09	Friday	CPPSIS3005A	Collect basic spatial data	E001
04/11/09	Wednesday	CPPSIS3004A	Respond to client spatial enquiry	E001
05/11/09	Thursday	CPPSIS3005A	Collect basic spatial data	E001
06/11/09	Friday	CPPSIS3010A	Perform basic spatial computations	E001

Figure 6

Certificate IV Surveying

Date	Day	Code	Unit	Room
25/02/08	Monday	ICAITU006C	Operate computing packages	E001
26/02/08	Tuesday	ICAITU006C	Operate computing packages	E001
27/02/08	Wednesday	BSBADM404A	Develop and use complex spreadsheets	E001
28/02/08	Thursday	CUVCRS03A	Produce computer-aided drawings	E001
29/02/08	Friday	CUVCRS03A	Produce computer-aided drawings	E001
16/04/08	Wednesday	CPPDSM3009A	Maintain workplace safety in the property industry	E001
17/04/08	Thursday	CPPSIS4002A	Store and retrieve spatial data	E001
18/04/08	Friday	CPPSIS4011A	Perform surveying computations.	E001
04/06/08	Wednesday	CPPSIS4010A	Operate surveying equipment	E001
05/06/08	Thursday	CPPSIS4009A	Collect and set out basic surveying data	E001
06/06/08	Friday	CPPSIS4011A	Perform surveying computations	E001
23/07/08	Wednesday	CPPSIS4007A	Organise field services	E001
24/07/08	Thursday	CPPSIS4010A	Operate surveying equipment	E001
25/07/08	Friday	CPPSIS4011A	Perform surveying computations.	E001
24/09/08	Wednesday	CPPSIS4010A	Operate surveying equipment	Bendigo
25/09/08	Thursday	CPPSIS4010A	Operate surveying equipment	Baseline
26/09/08	Friday	CPPSIS4011A	Perform surveying computations.	E001
12/11/08	Wednesday	CPPSIS4009A	Collect basic GPS data	E001
13/11/08	Thursday	CPPSIS4009A	Collect basic GPS data	E001
14/11/08	Friday	CPPSIS4006A	Read and interrupt basic image data	E001
25/03/09	Wednesday	CPPSIS4008A	Organise equipment and supplies	E001
26/03/09	Thursday	CPPSIS4009A	Collect basic GPS data	E001
27/03/09	Friday	CPPSIS4011A	Perform surveying computations.	E001
20/05/09	Wednesday	CPPSIS4007A	Organise field services	E001
21/05/09	Thursday	CPPSIS4012A	Plan and conduct survey expeditions	E001
22/05/09	Friday	CPPSIS4010A	Operate surveying equipment	E001
21/07/09	Tuesday	MNQGEN400A	Apply site risk management system	E001
22/07/09	Wednesday	CPPSIS4010A	Operate surveying equipment	E001
23/07/09	Thursday	CPPSIS4011A	Perform surveying computations.	E001
24/07/09	Friday	CPPCMN4002A	Implement and monitor environmentally sustainable work practices	E001

Figure 7

7. Where to from here?

From where we are at present we need to:

- Continue to ask organisations to support the courses by sending candidates.

- Seeking ongoing financial support from Government by way of subsidies.

- Providing valuable courses for industry.

- Providing valuable opportunities for employees to undertake studies in a local environment.

- Promote the Industry.

In addition it would be an advantage to undertake a review of the courses and to determine what improvements need to be made to continue its enhancement. Thus we need to undertake a SWOT analysis to access:

Strengths

The training has been undertaken by motivated and dedicated tutors with relevant and current industry experience and qualifications. Teachers have spent countless hours assisting in the development of the courses and advising GOTAFE staff on unit requirements.

An enthusiastic Industry Reference Group (IRG) who have met on a number of occasions to advise which courses and Elective units are most appropriate for local requirements.

GOTAFE is an active member of a National Surveying Registered Training Organisation (RTO) network.

Good facilities and plenty of open space to conduct the training.

Tutors with a large number of contacts within the local Surveying community.

Weaknesses

Heavily reliant on borrowed equipment from Industry.

Heavily reliant on the same busy people from Industry to conduct the training.

Low student numbers undertaking the training.

GOTAFE staff members with sufficient expertise and time to further develop course resources and assessments for current and possible future courses.

Lack of interest from local Secondary schools to undertake training in Certificate II Spatial Information Services (SIS) as a Vocational Education and Training in Schools courses.

Local Secondary school Careers Teachers have little knowledge or understanding of Surveying and Civil Engineering, and are confused about career paths and opportunities available

Opportunities

Certificate level training is only offered at one other (Metropolitan) TAFE in Victoria.

Shortage of Surveying Assistants throughout the GOTAFE footprint.

Expansion into the Diploma of Surveying.

Expansion into Certificate II courses, if there is sufficient interest from local Secondary Schools.

These courses are an ideal way to promote the Industry at local Secondary Schools.

Threats

Heavily reliant on borrowed equipment from Industry. GOTAFE has limited Surveying equipment.

The courses are heavily reliant on Surveyors to undertake the training on GOTAFE's behalf.

These tutors are approaching retirement age and to date GOTAFE have not been able to find additional people willing to conduct training in the Surveying (or Civil Engineering) fields.

Lack of GOTAFE staff with surveying experience or expertise.

Economic downturns limiting future student numbers.

Inability to attract young people to the profession.

8. Conclusion

This paper gives a brief overview of the struggle to set up an industry based course that will provide employees to gain a new skill set that can be taken to employers as a means of increasing productivity. To date, the courses presented and the students attending have gained significant recognition in the industry and professional bodies such as the Institution of Surveyors Victoria and the wider TAFE sector. This is very encouraging for those involved in

the development and running of the course. However, more needs to be undertaken and accomplished.

The analysis of the **SWOT** reveals the perilous position the courses are encompassed in, with the heavy reliance on industry for support in teaching, provision of students and the "lending" of equipment. Also in any downturn the surveying industry is always affected as it is largely dependent on the building and engineering sectors for its work loads.

Having the right people at the helm is very important in promoting, organising and delivering the courses to the industry. Thus it is fundamental that we keep these people in the continuing development of the courses as well as developing a mentoring approach to maintain industry strength in the program.

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