

# Teaching Surveying in the Digital World

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**Key words:** Surveying, Teaching, Online, Student

## SUMMARY

The evolution of the electronic age sees volumes of people, from young to old, watching their phones for anything from the latest information updates to telephone conversations. It is not uncommon to be on public transport and observe most people travelling somewhere engaged on their phones: talking, texting, playing games or listening to music. We are rapidly training our minds to accept electronic information in its many different forms.

So what about on line educational training in its purest sense. We are not talking about texting or playing games or listening to music. We are talking about learning our next qualification online with no or little attendance at university or TAFE (Technical and Further Education) and building this qualification around our day to day lives. For those who have attended university, it may mean missing out on flying paper planes in our first year or having fun at the university “pub”. But remember “the times they are a changing”.

This paper is about the changing environment of education in the tertiary arena, where it is possible to learn through on line teaching and to work at the same time. As education becomes more expensive to consider, many have to face the reality of working to make ends meet. It is about discipline in learning as on line study is difficult, make no mistake about it.

The paper will also review the types of courses being offered on line, the types of students engaging in such courses, employer reactions and will provide some statistical analysis of those coming into the courses and completing the courses in a scheduled timeframe.

Surveying is one of the many courses being offered online and is also a very practical course, as technology has played and continues to play a significant role in the changing environment. Thus one of the main issues in the digital age of teaching is how educational institutions manage the necessary hands on training required to complete the qualification. Imagine medical students learning everything on line and then getting the practical experience once they have completed the degree. Practical training during the teaching period is fundamental to complete learning.

However, the most significant advantage of online training is that it allows students to work in a full time basis whilst studying, thus maintaining an acceptable quality of life whilst learning on the job and academically. This is a winner with various employers who want to maintain high levels of

work but at the same time have their employees qualified in surveying at the certificate, diploma or degree level. These days in Australia it is important for employees to have a qualification for insurance purposes and for gaining work in various sectors of the industry.

This paper is the view of the writer(s) who have been involved in the surveying industry for over forty years and involved in teaching surveying since early 2000. It all started as a result of those involved in the surveying industry not having “formal” qualifications, but who totalled hundreds of years in experience which needed to be recognised and passed onto others wanting to become part of the industry.

## 1. INTRODUCTION

I recently commenced a three day training course for a group of six students undertaking the Certificate IV course in Spatial through the Riverina TAFE, located in New South Wales Australia. As an introduction, I placed on the floor a “*Gunther’s chain*” and asked the question what is it. As expected no one knew the answer, which I believe is relevant in that very few people know of the history of surveying and hence the methods used in bygone days. Whilst this paper is not about history, it is relevant in the sense that I believe it important to know the advances in surveying from history to today. That way we can understand the fundamentals of surveying and at the same time appreciate these advances in practical use.

Similarly and it is much easier to describe, it is possible to review teaching in any discipline from a historical aspect to teaching today; in particular teaching online with minimum contact with students (in theory at least). Teaching has come a long way since the “quill pen and ink” with advances in technology allowing a wide range of teaching methodologies to be employed for educating the population. Figure 1 below will be familiar to many teachers in the TAFE sector.



**Fig 1**

That is not to say that traditional teaching methods are no longer as valuable as they might have been in the past. There is and always will be a frontline approach to teaching, although in professions such as surveying, online services are providing a valuable service for those needing to work. And to the writer that is one of the key fundamental aspects of online learning.

Students enrolled in the various spatial studies at Riverina TAFE are all employed either full time or part time and so having the opportunity to engage online is essential. Without online studies they would have the choice of working or studying. Not much of a choice!

However, it is important that online studies produce a fully defined professional and not just one who has increased their skills in a particular area. To illustrate this let me refer to students who may have full time jobs on highway upgrades for example. They will be undertaking surveying tasks day in and day out, such as setting out pavement works or bridges. They have become experts in these

areas because they do it every day. What about the many other areas of surveying that makes the whole professional person and not just a particular expert?

Thus it is important that those undertaking online studies whilst full time working, understand the importance of other areas of surveying and/ or spatial to complete the picture. Students may not realise the importance of this at the time and so it is fundamental that those teaching progress this philosophy. Any gaps need to be filled, so leave your mind open to them, figure 2 below.



**Fig 2**

This is the tricky and more difficult area to compete in, and requires both teachers and students to understand and meet these extra needs. For every student who works in the road construction arena there will be an equal number of students seeking qualifications in cadastral/ engineering/ hydrographic/ GIS arenas who may not have that construction experience and vice versa.

In face to face teaching these can be addressed quickly and it is important to call on experience sharing. Online is a bit more challenging.

## **2. COURSE STRUCTURE**

Having introduced the online concept let me quickly set out a typical course structure for the Certificate IV in Surveying being offered.

Students are required to complete fifteen units of study; seven core units and eight elective units as shown below. At this stage the teaching staff select the electives, although as online courses develop students may find themselves making the selection.

### **Core**

**Store and retrieve spatial data**  
**Collect basic GNSS data**  
**Read and interpret image data**

### **Elective**

**Develop teams and individuals \*.**  
**Manage projects**  
**Promote team effectiveness \*.**

<b>Operate surveying equipment</b>	<b>Implement and monitor environmentally sustainable work</b>
practices. *	
<b>Perform surveying computations</b>	<b>Facilitate effective teamwork *</b>
<b>Produce computer aided drawings</b>	<b>Facilitate effective workplace relationships. *</b>
	<b>Maintain workplace safety in the property industry. *</b>
	<b>Organise field services. *</b>
	<b>Organise equipment and supplies. *</b>
	<b>Plan and conduct survey expeditions. *</b>
	<b>Participate in spatial process improvement.</b>
	<b>Operate spatial software applications.</b>
	<b>Prepare and present GIS data.</b>
	<b>Design a database.</b>
	<b>Apply site risk management system. *</b>

At first glance of these units the reader may ask the question: How can these be undertaken online as most clearly need to have face to face interaction or if in a work place, they need to be covering a wide range of surveying and spatial activities.

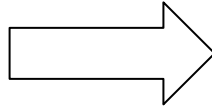
Therein lies one of the major issues in online teaching and developing the whole professional person. However, it can be completed using the skills of the teacher, the student, the student's employer and the online software and communications available.

Reviewing the units above will allow readers to understand that some of the units can be relatively straight forward in teaching on line. In particular many of the elective units will be focusing on and sharpening up skills that the student is engaging in on a day to day basis. Those units marked with an asterisk \* above are ones that many people in industry, regardless of the industry, are engaged in on a daily basis. In many cases we may not be aware of it as it is part of our daily routine.

However, if assignments are set in such a way as to challenge some of these routines it can disclose shortfalls in particular areas which need to be improved. Thus calling on students experience is fundamental in any sort of training and online study enhances this training as it is necessary to write about it. Workplace mentoring is also very important in these processes as it is important to continually enhance these and other areas in the workplace.

Where particular vigilance needs to be undertaken is in the core unit area, where emphasis is on the improvement in the practical area of surveying. Emphasis on procedural processes is very important and this is where online access is important either via chat rooms, email, phone conversations and Facetime/ Skype applications take over. Even as a surveying practitioner these are important as from time to time contact with equipment companies is vital to the success of a survey.

### 3. ONLINE STUDY. WHAT AM I DOING?



**Fig 3**

For those who have taken online studies does Figure 3 ring a bell? Late night sessions trying to finish off assignments before getting up to do a full day of work. Having done it myself it is not a lot of fun, but it may be necessary from time to time.

Let me refer to the following article from “**bcs The Chartered Institute for IT**” and eight leaning experts in the area of e-learning (<http://www.bcs.org/content/conWebDoc/33378>).

“November 2009

**Can e-learning today really deliver what it promises? Eight learning experts discuss this question at the Oxford Union. Jutta Mackwell reports.**

‘This house believes that the e-learning of today is essential for the important skills of tomorrow’. This was the motion put to eight e-learning experts for a debate at the prestigious Oxford Union, organised by e-learning company Epic.

E-learning has become one of the buzz words in training and learning and development. It has been praised for its flexibility, cost-efficiency and its ‘greenness’. But does it really do what it promises, and does it help to impart the essential skills of tomorrow? Or is it simply ‘computers instead of books’ (as Rory Cellan-Jones, BBC’s Technology Correspondent who chaired the debate, learned from his taxi driver) or ‘what employers do when they don’t want to pay for proper training’?

According to Professor Diana Laurillard, who holds the chair of learning with digital technologies in the faculty of culture and pedagogy at the University of London, ‘no sane person can say that e-learning is not essential.’ Rather, e-learning is ‘the most exciting thing to have come our way since the invention of writing’ as it helps to present ideas and knowledge in a new and different way.

#### **Practical advantages**

E-learning also makes sense on a pragmatic level, as Major General Tim Inshaw, Director of Training and Education, explained. It can increase the speed of gaining knowledge and reduce the time and money spent on training significantly – Inshaw even said he was hoping to achieve a time

reduction of up to 25 per cent. In a time of recession, figures such as these are essential if an organisation wants to continue training - which in turn is essential in order to survive and come out of the recession and 'not be defeated in the value for money arena,' as Inshaw put it.

.....” - <http://www.bcs.org/content/conWebDoc/33378>

Putting aside the comments about recession, the important concept of online learning is the reduction in training costs, increase in knowledge transfer and the disruption to works programs by going to training facilities. My experience is that some employers want staff to be qualified for insurance purposes, but are reluctant to have them be off line and reduce output. However, there are other employers, such as the students I referred to in the introduction that are given a day off at work to undertake their TAFE studies. As an employer what model do you follow?

“Jean Roberts wrote on 2nd Dec 2009

When you have a distributed cohort of students, in full-time work, with family commitments then e-learning is a real opportunity. In our Health Informatics courses at both undergraduate and post-grad levels we use structured coursework, test assessments for checking progress in understanding, assignments where the mgt processes of briefing, submission, feedback, marking and internal/external audit are all done by the VLE. We deploy chatrooms and discussion fora and tutorial support by email and upload source docs and expert commentary as they become available keeping the courses 'live'. We also do have blended options that use short block residentials but periodically not on a routine 'every Tuesday' basis. We have found this way of working provides flexibility for students to be able to have a better work-life balance; and as our courses require application of work-place environments to the assignments they exit from academic study with skills they can practically deploy immediately.

Our main challenge is getting over the 'traditional' idea, held by some, that face to face is the only valid mode of teaching and that we work less hard because we do not see our students regularly. We would argue that we are potentially interacting with our students more often and when they need us to; thus they gain more from the advice / knowledge given as they are receptive to it. From e-learning they also gain the ability to refresh their knowledge as and when they need to, not wait for the 'Monday morning lecture' session.”

(<http://www.bcs.org/content/conWebDoc/33378>)

This is the type of model that is employed at Riverina TAFE and, for the vast majority of students', works in their favour. The block residentials are fundamental to following up and enhancing students' practical skills in areas that they might not be strong in. also it exposes students to different types of equipment to that used in their own workplace. This is important because too often we are not able to transfer skills from one area to another. Residential days are long as it is important to infiltrate the students' minds as much as possible. However, they seem to appreciate it

and develop other work relationships which help with their own work. Sometimes other work opportunities arise from these training schools.

The IT (Learning Management System (LMS)) program **MOODLE** is used to facilitate the process and it was pleasing at the recent FIG conference in New Zealand that the same (LMS) software was being used by Aune Rummukainen, principal lecturer, D.Sc. (Tech.), Lapland University of Applied Sciences. However, we all use it in different ways, as a way of distributing knowledge or as a way of collecting and marking assignments.

Thus consistent and reliable software is fundamental for the smooth operation of online teaching. If this fails then students are effectively cut off and potentially miss out on receiving relevant information and other course material. Teachers need a reliable system to upload material, engage in chat rooms and track students progress.

Having worked in the area of document management the writer is acutely aware of the importance of providing a secure environment for storing information and having the ability to share that information with many other staff members. This is similar to sharing with students as well as other teachers.

#### **4. IS ONLINE STUDY FOR EVERYONE?**

Clearly online study is not everyone's choice, as many students need the face to face experience to maintain motivation and to have a practical hands on solution. This however, presents a real challenge for those who have to work to maintain a particular lifestyle, as it is necessary to find courses that can be accessed out of normal work hours and not disrupt the lifestyle too much. In most cases this involves working during the day and attending classes at night, a not unfamiliar model that many still undertake.

The difference between this model and that of online study is:

- Online is undertaken at home or workplace. In the workplace mentors are available.
- Online is not restricted to certain hours as many students arrange online chats for different times of the day.
- Teachers can be available on a wider time frame.
- Assignments can be checked, marked and potentially back to the student much quicker.
- Material can/ is being updated on line on a regular basis and referred to students quickly.
- Online is available anywhere provided you have Internet access and a computer.

This in no way is being detrimental to those teachers and students undertaking part time studies out of normal working hours, whatever they might be. There will always be a place for this type of teaching arrangement. Take for example First Aid training which typically takes place at nighttime to facilitate workers and needs to be hands on. It is a practical course.



Thus it is important when undertaking a course of study that students are aware of their strengths and limitations and how might these be addressed in any one process. Location is also very important as it may restrict access to direct learning facilities whilst online is available everywhere, at least in theory (Figure 4).



**Fig 4**

## **5. WHAT CAN GO WRONG?**

Without trying to fool ourselves, students and administrators, things can and do go wrong in this type of teaching environment. Things go wrong in face to face teaching so it is up to teachers and mentors to assist in minimising this effect.

Below is a list of issues that have been encountered:

- Students asking other people to do their assignments. Tough one to monitor in an online program.
- Students not being able to attend training camps because they cannot afford to travel to the site, their employers will not allow time to attend or they think they know it all.
- Students not being able to enrol quickly and effectively.
- Students not being able to access assignments, materials, etc.
- Equipment failures during training camps.
- Lack of equipment for training camps. Funding issue.
- Part time teachers; not their quality but having commitments elsewhere.
- Small numbers of teachers is an issue in that they need to take leave, unable to attend due to illness.
- Having to cover a wider part of the course than they have experience or qualifications in.
- Students wanting to start a course at times other than at enrollment time. If they are willing to study then it is the writer's belief that they should be taken aboard.

*Gosh, that's a lot to consider. Yes it is but it is not insurmountable. If you consider each issue on its merits then it is possible to plan a course of action. Figure 5 below:*

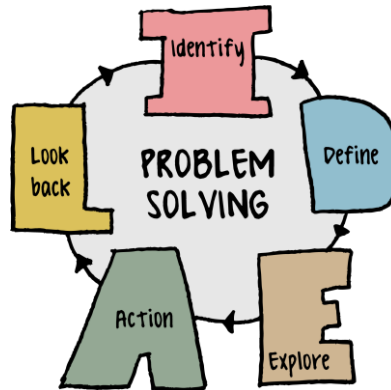


Fig. 5

The issues stem around the three components; Students, teachers and our favourite **IT**. If you are having troubles with anything blame IT as they are always lurking in the background like spies. However, let's be practical.

Students have many reasons for studying and that needs to be respected. Therefore it is important to err on the side of responsibility and fairness and accept them for what they are and what they present. In the writer's view there have only been a few students who have gone down the wrong path and used other people's work. One was easily caught out but in reality was not able to understand basics and so was never going to graduate.

Teachers in the TAFE sector have generally come from industry and once they have gained their Certificate IV in Training and Assessment can teach and train others. Mostly this works but there are occasions it does not as everyone with a serious qualification does not make a good teacher. Also teachers in most environments can be heavily criticised for not passing students because they are not competent. Dammed if you do, dammed if you don't!

Finally IT and the vagaries of computer systems, programs, the Internet, meltdowns, etc. students not having access to MOODLE for example causes major problems as everything they need is supplied through the software. Gone are the days when CDs were sent out to students and send information back. Online means online 24/7; i.e. 24 hours a day 7 days a week. As a practicing surveyor access all day every day is essential. Why, because I believe I need to know everything constantly. The world of surveying will not stop if I do not have access on a Saturday/ Sunday!

Yes, we encounter problems and we determine pathways to solve or minimise them. We want students to have access to information as much as possible, but we as teachers and students must understand that issues do arise and need to be addressed.

## 6. GOVERNMENT VIEWS ON ONLINE STUDY

Study in the TAFE arena will always have the backing of the government of the day, although the direction from a particular government will differ over time. Essentially it will involve money and

where to get the best value for that money. As a teacher it is easy to become cynical about the amount of cuts to TAFE funding and where this type of teaching/ training is going in the future.

However, online training is being pushed because it does not involve active classrooms/ offices and reduces the need to have full blown campuses. It seems that physical assets are like poison to government who want to cut back on expenditure at every possible opportunity.

Whilst this is not a paper about the rights and wrongs of government, it is important to note that there have been significant financial cuts to the TAFE sector across Australia in recent years. Delivering quality education opportunities is dependent on good funding models and it would seem that online study is a model that government would like to see more of. However, there is a cost in developing online studies and so there has to be a significant cross over from face to face to online.

Therefore it is necessary to provide sufficient funding to enable near faultless communication with students, strong computing power for transferring data and information, and a strong commitment to ongoing software development for staff and students. Thus funding is fundamentally important for online studies as it is for face to face.



**Fig 6**

The players (Figure 6) in this show are:

- Government management and funding.
- Teaching staff skilled in professional areas.
- Students willing to commit to online study.
- Employers willing to commit to mentoring and funding training.

## **7. WHERE TO FROM HERE?**

At Riverina TAFE a clear commitment has been made to provide online courses in a number of professional areas as a way of advancing education for those in the working sector. It is based on demand within certain areas, particularly the surveying and spatial areas, but also in other areas such as engineering and water management. Combined with residential schools throughout the year it suits those in various industries wanting a qualification whilst remaining in the work force.

However, like most new ventures it is important to be continually reviewing the current situation and looking forward as a way of improvement. Areas of improvement include:

- Continually updating material as new concepts are developed in various professions.
- Developing short courses to meet industry needs, and value-add the full qualifications that are on offer.
- Ensuring industry is involved in the development and validation of training.
- Improvements in communication through IT solutions.
- Site visits as required to meet students and employers in order to gain ongoing knowledge into the various industries.
- Running face to face sessions to enhance online training.
- Teachers maintain skill sets through professional training and application.
- Adequate funding provided to maintain necessary equipment for face to face training sessions.
- Improved online registration of students.
- Ongoing improvement of websites for promoting online courses.
- Industry participation in promoting online courses.
- Management buy in of courses.

Wish lists can go on and on and if you have more please send to the writer for inclusion.

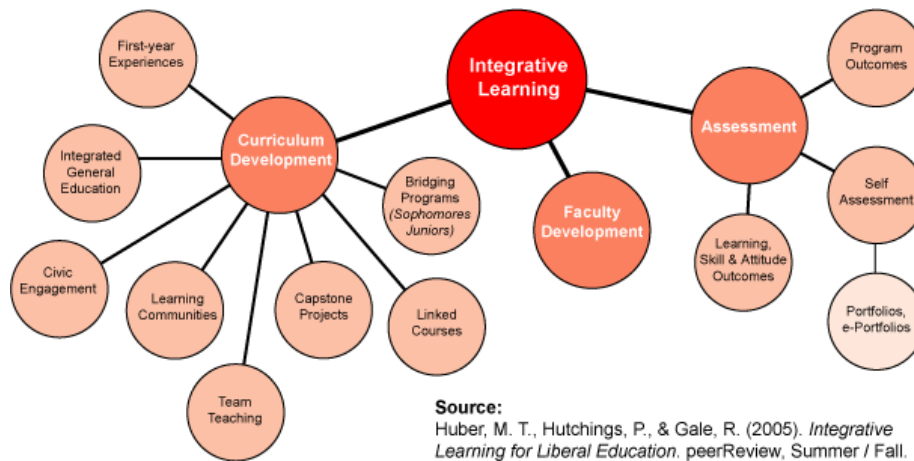
Currently Riverina TAFE has over 150 students enrolled in their online Surveying and Spatial Information Services full qualifications. These students come from various parts of Australia and Riverina (NSW) has had a number of inquiries from overseas, so demand is strong. It will remain strong only if there is a strong commitment to delivering required courses in a timely fashion.

We do not need to have students in a whirlwind (Figure 7) who are not able to cope with the demand of online study. **“Failure is not an option”** was delivered in the movie Apollo 13, but is true of training in this type of environment. Going that extra step is very important in delivering quality programs to the relevant industries.



**Fig 7**

In New South Wales, the government is moving towards a One TAFE, that is, there will not be multiple TAFE's (NSW Institute's) as there are now. This might mean one overall administration, funding model, rationalization of campuses, no overlapping of courses, etc. surveying teachers from various TAFE sectors in New South Wales have come together this year in January to review existing courses and work towards integrated learning (Figure 8).



**Fig 8**

This is an ideal opportunity to mix and match student and industry needs in the TAFE environment and to use the existing skills, equipment and resources to provide an excellent educational experience.

## 8. CONCLUSION

Has the goal of the Abstract been achieved in this presentation and delivery? This question can only be answered in the end result and the feedback of students and employers. Students will be pleased if they gain a qualification and an increase in their pay packets; employers will be pleased if the qualification meets the needs of the Insurance industry and the employer increases production significantly; TAFE staff will be pleased if they provide quality education in the tertiary sector and provide valuable knowledge transfer to the employment sector.

These courses will continue to develop and ongoing input is essential between teaching institutions and the like. If you have any comments/ suggestions I would be more than happy to discuss/ recommend and expand on. Feel free to contact me at [ppkenny@aapt.net.au](mailto:ppkenny@aapt.net.au) . If there are points you might be concerned about also contact me as I am only one person in the world of teaching and surveying.



**“Develop a passion for learning. If you do, you will never cease to grow”  
Anthony J D'angelo**

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