

Supervising Surveyors and their role in Professional Training Agreements

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Abstract

Professional Training Agreements are currently being used in Australia to educate and assess candidate surveyors for registration purposes. This paper discusses the educational background to teaching and supervision methods, communication aspects and some problems that can occur in Professional Training Agreements. Recommendations are particularly aimed to help supervising surveyors fulfil their role in the Agreements.

1. Introduction

This paper is written for surveyors who supervise graduates in Professional Training Agreement (PTA) programs but it may also be applicable to other surveyors and to academics. The paper offers some guidelines and thoughts on training new recruits and student surveyors. The authors aim to give a balance of educational theory and practical application. Both authors are members of the NSW Board of Surveyors and are involved in PTA assessments.

A PTA provides an opportunity for a surveyor to be involved in the training and the assessment of a graduate. With this opportunity comes a responsibility to prepare the candidate for registration and to determine when the candidate has met the required standards. Failure under these responsibilities affects the candidate, the surveying profession, and the reputation of the supervising surveyor.

In this paper we use the term registration to refer to registration, licensing or accreditation, we use the terms candidate or student to refer to the graduate who is a candidate for registration with a Board of Surveyors, and the term supervisor to refer to the Supervising Surveyor, teacher and mentor in the PTA.

2. Professional Training Agreements

PTAs were adopted in principle by the Reciprocating Boards of Surveyors of Australia and New Zealand in 1996 and subsequently introduced by individual Boards of Surveyors. The purpose of the PTA is to provide a structured training program to assist a candidate with continuing education, training and development of skills. This program includes suitable technical and professional activities that are structured to enable the candidate to become a professional surveyor. It is a component of the responsibility to protect the integrity of the cadastre by ensuring competent and professional surveyors are registered.

The PTA includes a range of core activities that are essential competencies needed by all professional surveyors seeking cadastral registration. These core competencies should be capable of being provided in most survey practices. Each competency module lists several learning topics or skills to be developed by the candidate with the guidance and assistance of the supervisor. The supervisor also assesses the competency for each topic.

The role of Boards of Surveyors in a PTA is to set and monitor standards and to provide surveyors and candidates with documents and guidelines for Professional Training Agreements. For example, in NSW there are modules for Generic Skills, Cadastral, Engineering, Town Planning and Professional Practice Management and the PTA normally lasts two years. Other Boards of Surveyors have different requirements. The specific requirements and details of each Board's PTA can be obtained from the appropriate Board.

According to the Land Surveyors' Licensing Board of Western Australia, Guidelines for Supervising Surveyors and Boards of Surveyors of Queensland, New South Wales and Australian Capital Territory, Guidelines for the Operation of Professional Training Agreements, a

supervising surveyor's responsibilities in a Professional Training Agreement are to:

- develop, in conjunction with the candidate, a program for the Training Agreement;
- regularly report to the Board as required by the Training Agreement;
- ensure that reasonable resources are available to undertake the training;
- provide supervision, leadership and tutoring (both technical and professional);
- give effective feedback to the candidate on every job; and

consider that:

- a candidate's training is as important as successful completion of the surveys being undertaken during the PTA
- the training should be balanced and general, and not concentrate only on an area of the firm's specialisation
- supervising surveyors are responsible for surveys carried out under their supervision

The supervising surveyor has the responsibility for determining the amount and level of supervision to be provided to the candidate. The extent of supervision will vary according to the experience, skill and ethics of the candidate. As a minimum level of supervision the supervising surveyor should be fully aware of the site and constraints of each survey and should fully brief the candidate on the purpose and detail of the survey before the candidate commences involvement in that survey; and should discuss all aspects of the survey with the candidate at the completion of the work.

A necessary element of the training agreement is the monitoring of the candidate to enable assessment to be carried out on a continual basis. Monitoring involves:

- informal discussions between the candidate and the supervisor,
- the candidate's Work Portfolio which reflects the degree and complexity of work and responsibilities,
- brief self-assessment where the candidate summarises their own perception of progress, and
- comment by the supervisor on the progress of the candidate.

Two important questions arise when surveyors supervise candidates in a PTA, though the answers are not simple or easy. Firstly, how much supervision is required and how should it be carried out in practice? Secondly, at what level is a candidate deemed to be competent? These questions will be discussed in the following sections of this paper.

Early in the training the supervisor should endeavour to always be on site and oversee related office work rigorously. Later, as the candidate develops, supervision may reduce and the candidate may work as a party leader or project manager. There is a range of options between the extremes, from watching the supervisor do surveys through to the candidate being party leader without the supervisor. The extent and timing of supervision is up to the supervisor's discretion, remembering that the supervisor remains responsible for the

work but that candidates need to experience the freedom and responsibilities of making their own decisions.

If the standard of competency, as monitored by the supervisor and the Board, is too low it may produce a Registered Surveyor whose work is so poor as to be a problem for the community and clients and to the new surveyor. However, if the standard of competency is too high it will require candidates to spend too many years in training to become registered. Perhaps one approach is to aim at a level of competency that we expect the majority of candidates can achieve within a few years of graduation (given the right ingredients of motivation, opportunity, circumstances etc).

In a PTA, both the supervisor and Board assess the candidate. This raises some additional matters. The supervisor cannot merely assume the role of friend, trainer and mentor of a candidate in preparation for assessment by other people. The supervisor is now also one of the assessors. Some candidates may then be somewhat reluctant to ask their supervisors questions and thus admit their weaknesses.

3. Educational background

This paper summarises some of the educational literature on practical aspects of supervision and training, and some principles of communication with minimal associated jargon. The main reference is Schon (1990), but Brown & Atkins (1988), Brown (1978) and Gibbs & Habeshaw (1989) are also relevant. Schon (1990) recommends that education in a professional vocation such as surveying should combine teaching and coaching, learning by doing and reflection.

There is a need for mutual respect between supervisors and their students. No matter how the supervisor may regard the candidate's university learning, the supervisor should acknowledge that it may have some benefit and should blend it with his or her own guidance and experience. Candidates also need to respect the abilities of the people they are working with, including survey technicians and field hands etc.

Learning from our own experiences can be a valuable resource. However some supervisors over use this resource, they expect candidates to learn in the same way as they did, or that their particular experiences and methods are crucial to the candidate's learning. It is important to remember that different people learn differently and have different aims, objectives and values.

3.1 What are we trying to teach?

Boundary definition surveys, planning and engineering designs all have standard implementation rules, but there is considerable discretion on how they are performed. When survey tasks involve applying facts, rules and procedures to 'straight forward' problems then a student needs technical training. For example, a supervisor would talk and demonstrate while students listen, read and study. The supervisor can then watch a student attempt the problem, detect any errors and show the student what is correct. Do supervisors want to produce surveyors who can only use the

instruments, do the calculations and drawings or do we want more? Do we want candidates to think, be creative, and perhaps find better methods?

When a survey task is an unusual case with no standard solution surveyors have to improvise, invent and test their own strategies based on experience in other tasks and experimentation within this task. Value judgements may be required. The range and variety of past experiences help to make a surveyor successful at solving new tasks. Each new task, and reflection on it, adds to this repertoire. Our proposal is for supervisors to help students learn to work competently in situations where there are no right answers or where standard procedures are not applicable. This means that to 'think like a surveyor' students need to learn not only facts and methods but also forms of inquiry (research, trials, testing, thinking) to be able to develop new methods to solve individual problems.

Candidates need to appreciate the standards, care and attention required of professionals. If candidates are trained in only technical skills their training will probably become out dated. So candidates need to learn the technical aspects of surveying, to learn design aspects of surveying and to value reflection.

4. Teaching and Coaching methods

On the job training has a long tradition in surveying with Master Surveyors and articled pupils. Some of the teaching methods have been passed on through their pupils. However, Schon (1990) says there are no all-encompassing rules for this type of teaching that can be learnt and applied, but we can improve by experience and reflection. He also advises not to have 'unrealistically high aspirations'. Similarly, Gibbs and Habeshaw (1989) say "There is no one way to teach effectively" and "see if it works for you". There are different methods of coaching, each or a combination of them is appropriate for different contexts.

Consider the following two teaching ideas. Firstly, it is possible to improve teaching by a better understanding of the underlying communication processes. Secondly, students are not all the same - they learn in different ways. Clearly, it is important to try a variety of teaching and coaching methods as described below. Then, from your own experiences, decide how to coach for the particular student and circumstances involved.

4.1 Coaching

Supervising surveyors can coach candidates by exposing them to the customs, methods, standards and traditions of surveying. Coaching requires interaction with students - it is not lecturing. An example of one-to-one coaching is in field or office work where the expert supervisor and student work as a team. Most of the coaching in the early stages is done in the follow-me mode, where the student does the technical work and the supervisor makes the decisions.

The dialogue between student and supervisor is important. However, some 'help' offered by supervisors can be destructive. Supervisors should say *why* they do something a certain way (including reasons, feelings and uncertainties).

To coach effectively we have to think about the process more and identify any automatic actions. For the same reason, asking candidates to supervise 'younger' students may help the candidates to learn better.

Skilful work depends on the person's ability to recognise good work. If the differences between good and bad aspects of a survey are too subtle for a beginner then they will probably not perform similar surveys well. A student can be helped in this regard by being shown examples with variations in quality and by being asked to discriminate between the examples.

A supervisor must balance between too much supervision and not enough. When candidates have plenty of talent, supervisors should not supervise too closely. A disadvantage of working too closely with candidates is that when a problem arises (even small ones) or they have to make a decision, they often ask for help instead of solving the problem themselves. Confident students usually want some supervision but not too much, knowing that their supervisor can be contacted if necessary. Students often want the supervisor to help when they (the students) detect a problem. Overconfident students often do not see a need for the supervisor to be present to point out any errors or problems in their work.

4.2 Practice

A supervisor may be able to do a survey task but not able to explain it in a way that students can understand, until the students have actually experienced doing the task. That is, some things can't be taught but are learnt by experience. Students learn by practicing, by doing tasks themselves and gaining experience. A student has to see the relationship between what they do and what results. It is not enough for students to suggest solutions to a task - they should be asked to implement their ideas, to observe, think about and judge their results. In this way supervisors can help candidates as they do tasks. But the students need motivation - the desire to learn and to experience or discover things themselves. As well as wanting to learn something they have to be able to recognise good results.

In this teaching mode, students are allowed to try different approaches according to their own judgement. The supervisor may suggest alternatives and let the candidate experiment. It is helpful to encourage students to unlearn the idea of "proper or best or correct solutions" as given in textbooks. So, help students to experiment and do it their way rather than merely adopting the supervisor's preferred way.

One way students can learn about surveying is by working on their own. Learning on their own by, for example, leading a field party or managing a project, allows students to experiment, forces them to solve their problems and to take responsibility for their work. However, it also means many things they learn will be 'reinventing the wheel'. Candidates may not realise that there are better ways to do the task than the way they have chosen, and a remote supervisor may not notice some weakness or flaws in the student's work.

Another idea is to give students freedom to learn in a setting with low risk, with access to good supervisors. However, lowering students' anxieties in this way might also remove some of their motivation for doing the work.

4.3 Reflection

Some of our judgements are made spontaneously without logical thoughtful processes. Decisions require skills and experience but are applied automatically, like driving a car for an experienced driver. Competent professional surveyors often generate this ability through reflection, by thinking about the processes involved, by doing unusual surveys, as well as hearing about the experiences of other professionals. Supervisors can consider their own surveying ability and the skills that are now automatically or unconsciously applied, to help them recognise what needs to be attained by new students. If we can teach students to think about (reflect on) their actions when doing them then they become reflective practitioners. The thinking builds their knowledge base, skill level and ability to practice. Some tasks can be done by routine application of rules and procedures. But there are also new tasks with no obvious method of solution. To solve new and unusual problems surveyors often have to use educated trial and error, not random trials. Thus thinking about past actions can shape our future actions. Reflection is the accumulation of survey wisdom, not merely information.

One way to get students to do more reflection is to ask them to suggest alternative methods or improvements to a survey. Ask them questions while they work, or ask them to write journals or reports. A journal is not only a logbook or report describing their actions, but also the thinking that goes with doing the work. Documenting thoughts clarifies and preserves them. Students often get new ideas or understanding while they are in the process of writing (Nightingale, 1988). An advantage of requiring written reports is that it helps students clarify their thoughts so they learn and understand better. (They also have a record for their Board of Surveyors). However, if a report is written too long after the actions it may not be an accurate record of what was learnt. Also, ask students what they have learnt, not only what they have done.

As well as getting students to reflect on their actions and supervisors to reflect on their coaching, there should be discussions between supervisor and candidate, especially about the unusual, difficult or controversial aspects of the job. Group work also allows discussion between candidates of alternative ideas. If there is more than one supervisor for a job then students should get to hear the discussions between the supervisors about the survey.

4.4 Demonstrating and Imitating

The ability of supervising surveyors to describe their work depends on how much they have reflected on their actions, more than on how skilful they are at doing surveys. Even when an expert has made a good description of methods or procedures, novices may not understand them because of the jargon used, and the lack of experience of the circumstances. Supervisors can improve this situation by demonstrating what they are describing and then asking students to attempt the task.

One way to learn surveying is for students to observe experienced surveyors in practice and to study their work. Using demonstrations and asking the student to imitate the work is a useful teaching method when a technique is new to a student. A supervisor can break the problem into smaller tasks, demonstrate each task and show how to put the parts together.

Demonstrations shouldn't be too refined, too subtle, too complex or given too quickly. A demonstration by a skilled person is valuable if the student then imitates the supervisor's actions. A problem with demonstrations is that it is easy to observe one and think (incorrectly) that you understand and have learnt what it was meant to show. So students should be encouraged to do more than simply watch a demonstration. The results of the student's attempts will reveal what the student has learnt. Reflective imitation requires thinking about the action as well as copying it. The supervisor can comment on the student's attempt at imitation.

One disadvantage of this method is that the supervisor shows the way and seems to have no interest in the student's own ideas or values.

4.5 Joint experimentation

Joint experimentation is where the supervisor and candidate work together. To use this method a candidate has to have some ability and willingness, so it is not always appropriate for beginners. Then the supervisor may have to break a problem into smaller tasks that are within the bounds of the candidate's ability. The supervisor should resist the temptation to solve the problem for the candidate, but could offer several solutions and let the candidate choose. One useful extension of this method is to have the student perform the role of surveyor and the supervisor to perform the duties of the assistant. In this way the student learns by doing and takes some initiatives, and the supervisor can closely monitor the student's attempts and ensure the quality of the survey.

Allowing students to learn from their own experiences is a valuable teaching method. However, simply watching students work can be boring and unproductive for the supervisor, so the supervisor may need to seek questions from the candidate or be involved in the work through joint experimentation.

4.6 Practicums

Schon (1990) discusses the use of practicums in the education of professionals. These practicums are similar to university survey camps. They are artificial, simulated approximations of the real world that have the essential features of a survey practice. Practicums often simplify the problem and avoid some real world pressures, constraints and distractions. Students experiment at low risk and there is a variable pace and focus of work. Student actions can be reversed, repeated or improved and errors corrected. If practicums involve real work, then they are closely supervised. A practicum fails if it overloads students or if it leaves out too many important aspects of real world practice.

However, practicums take a lot of effort to prepare properly and few firms may have the resources to implement them.

4.7 Further coaching considerations.

This section briefly lists a few further coaching matters for supervisors to consider.

When tackling a new problem candidates may be confused, they are at risk, lose confidence, competence, control and familiarity. They may not know what they are supposed to do, or may not understand the supervisor. Some things may be too subtle for them. Students must be willing to undergo the experience, then they can decide if they want to continue to learn. The costs of commitment may seem greater than the expected rewards.

Supervisors can teach in the conventional sense occasionally giving information, describing theories and methods. But they also demonstrate, advise, question and criticise. Often it is better for students to learn as they go rather than be told lots of details. Background learning also happens by being exposed and involved in the process of doing surveys. However, the quality of training is the essential element, not merely the number of years of experience.

Students may reach dead ends when working on a task. To help them a supervisor could reframe or reword the problem, tentatively explore possible actions and consider the consequences and implications. Gradually they decide on what action to take. This helps a student, by discussion and reflection, to look at the task in a different way or come across a new idea.

Encourage students to help each other. Good students who can easily complete their task will learn even better if they can teach their peers as well as doing the job themselves.

Some people think students should be "thrown in the deep end". Others say the supervisor should direct students to the main or specific points. Roe (1975) says it doesn't matter whether we adopt an extreme or middle ground, provided it is done well. He suggests we give students just enough direction to save wasting energy in fruitless areas, and to encourage free exploration of the subject without "reinventing the wheel".

Continuing Professional Development (CPD) plays an important role during and after the PTA.

5. Communication between supervisor and candidate

The dialogue between candidate and supervisor is important. Some 'help' offered by supervisors can be destructive. Even with good clear descriptions by a supervisor, students may not understand the process until they have "been through it". So at the start communication may be difficult. Gradually, by talking and working with each other the communication becomes more effective.

Effective communication between supervisor and student involves talking about the student's work with both student

and supervisor thinking about what the other is doing and why. The supervisor tries to find out what the student understands, what difficulties there are, and what the student does know. The supervisor can show, tell, ask questions, instruct, advise, criticise, draw sketches and so on. When a supervisor gives the student instructions or criticism or suggestions for further or alternative work, it should be in the context of what the student is doing and should happen while the student is doing it. An ideal situation is for both the supervisor and the student to feel free to say what they think.

The actual communication may not be quite what we think it is or want it to be. There may be a communication gap between an instruction and the action it describes. How does one detect this gap? By listening to the student, seeing what the student does and asking them what they think the supervisor means.

Some supervisors and their candidates tend to avoid dialogue in a coaching mode. There are several possible reasons for this, including: the student may be shy; they do not want the supervisor to think they are incompetent; or they fear it may affect their assessment. Conversely, the supervisor: may prefer to wait for students to ask for help; may lack confidence in their ability to help; would rather be using the time more productively; or may find the supervision unrewarding.

It is possible to improve supervision by a better understanding of the underlying communication processes. Consider the following:

- Communication is essential for teaching and learning.
- Communication is a personal matter that depends on the individual style of the supervisor and the learning style of each individual student.
- People's cultural background and their experience in surveying affects how they communicate.
- We can learn what is good and bad about supervision techniques from our own experiences as students.

For clear explanations a supervisor needs to:

- Know exactly what they want to explain.
- Structure the explanation, highlight and emphasise key points, and connect various sections together.
- Identify what is interesting about the topic.
- Decide what the student should know about the topic.
- Use simple questions to focus attention on what you want to explain.
- State each key point or principle in one simple sentence, without the fine detail of elaborations and qualifying statements.
- Choose one or two brief examples or illustrations.
- Repeat the key point using different words and a slightly longer form.
- Summarise the main points.

To give good instructions or explanations think about the task, try to make explicit the automatic and spontaneous procedures, try to anticipate and clarify any ambiguities a

listener might have. The best instructions are "custom made" for the listener.

6. What can go wrong?

In this section we list a few examples of problems that sometimes, unfortunately, occur in the supervision of candidates.

- Some supervisors protect their special skills and expertise for various reasons. They may withhold some of their knowledge, perhaps unconsciously, to preserve their superiority. If the supervisor's expertise is held in awe and the students feel incompetent, the apparent size of the learning task is amplified.
- Some students may be over confident or they may apply short cut methods in cases when they should not be used.
- A supervisor should not treat a candidate in a PTA as "cheap labour" or just another employee.
- When a supervisor criticises or disagrees with a student the student may feel it is personality problem or fault of the supervisor. Each criticism or assessment becomes another battle. Also, a supervisor or student may communicate so poorly that each completely fails to understand the other. In these cases both student and supervisor have to think about their communication as well as the survey problems. To avoid or rectify communication "binds" each should: say what they think about the situation; say what is confusing them; explore what the other person means and values; and explore and comment on each others actions.
- It is important to be aware of the student's workload as well as their learning styles, motivations and interests. If supervisors flood students with too much to do, the students don't learn well.
- Another aspect of interactive teaching to consider is the anxiety of students. The fear of failure or embarrassment can produce anxiety, which hinders learning. So the supervisor should be careful with the atmosphere and environment in the workplace. It is easy to place pressures on students to trigger them to do more work or try harder. However, this might also raise the student's anxiety level to a point that hinders their learning.

7. Conclusions and Recommendations

No supervisor will ever be perfect, but this paper has suggested ways to improve the quality of learning during the professional training period. These ideas can be summarised and listed, but we believe the attitudes of supervisor and candidate are more important than following a list of recommended methods. Professional attitudes to supervision include providing support, encouragement, positive feedback and rewarding good performance.

A supervisor can do more than answer questions and assess candidate competency. For example, the supervisor needs to select suitable projects and involve the candidate in a variety of types of surveys. The quality of experience is more important than the quantity. Remember that a Professional Training Agreement aims to develop a professional surveyor in a broad range of ways, not only field and office surveying skills. So allow candidates to work on jobs from start to end, not only the survey component of the job.

To improve your supervision, remember the good and bad features of your own learning. Generally, implement the best features and avoid the worst. However, people learn in different ways, what was best for you may not suit everyone. Avoid making clones of yourself. All candidates have some ability and knowledge, use it and build on it.

Candidates learn by experience but they learn more by thinking about what they are doing (before, during and after). Candidates learn from their mistakes, but only if they are aware that they have made a mistake and know how to avoid it next time. A supervisor can assist by telling a candidate what mistakes they have made, or demonstrating better or alternative survey methods. However supervision can be improved by asking the student to say or demonstrate what they have learnt and by working with the candidate on some survey tasks.

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