

Doing your project

Aims

To introduce the skills needed to manage yourself and your project effectively as it is progressing.

Learning objectives

When you have completed this chapter, you should be able to:

- understand the main elements of projects that require managing and controlling;
 - control your project as it progresses;
 - understand problems that can occur and be aware of ways of dealing with them;
 - manage your time more effectively;
 - know how to make effective use of your supervisor;
 - work efficiently in a project team.
-

5.1 Introduction

Although you may have proposed an interesting and worth while project and planned it well, once your project is under way it needs to be carefully managed and controlled or it *will* fall apart. You cannot assume that, having completed a detailed project plan and a solid literature survey, the project itself will be plain sailing and you can relax. You need to be aware of problems that might arise, you need to remain motivated, you need to manage your time effectively, and you need to make effective use of your supervisor. This chapter deals with these issues.

5.1.1 Managing five project elements

In any project, be it a large industrial development or your own academic computing project, there are a maximum of five elements that need to be managed

and controlled as the project is progressing;

- Time
- Cost
- Quality
- Scope
- Resources

Within academic projects students will often argue that *time* is the most important of these elements. It is an element which you will always seem to be in need of. In virtually all academic projects you are limited in the amount of time you are allocated and, consequently, it has limited flexibility that you can control. All you can really do with respect to this element is to manage the time you have more efficiently – generally speaking, you cannot increase the amount of time you have available.

Cost is another factor over which you have little control. However, in most academic computing projects cost is not usually a concern. All the facilities you require are generally available; if they aren't, then your project would probably not have been accepted in the first place. If you require additional hardware, software or literature material you will either be provided with these or not – it is probably beyond your control.

The next two project elements – *quality* and *scope* – are those over which you have most control and, appropriately, have the greatest responsibility for. Quality refers to the quality of your project itself. How good is it? Is it at the right level (postgraduate or undergraduate level)? Is it of an acceptable standard for your course? Is it worth an Honours degree or just a Pass degree?

Whereas quality can be measured by the depth of your project (for example, how well you develop or investigate a particular aspect of study), *scope* is an indication of its breadth. In some ways scope is often viewed as an attribute of quality. It represents the final outcome of your project, what it actually achieves, its contribution, limits and magnitude.

The last element in the list, *resources*, is probably the most important one of all. Without resources there will be no project. In this case interest falls on the human resources that are available – that is you, your supervisor and possibly a project team. Making effective use of your supervisor is discussed in Section 5.4. In some cases you might be working in teams where colleagues need organising, tasks need to be assigned, and people's contributions drawn together. Working in teams is the subject of Section 5.5. For individual projects, organising yourself boils down to your ability to manage your own time. Managing time is discussed in Section 5.3.

Figure 5.1 emphasises the leading role resources play with all these five elements – shown at the crown of the diagram. It is through your own organisation that the elements within your project are balanced with respect to each other and with respect to your project's aims and objectives. The figure emphasises the fact that each of these elements is related to all the others in some way and

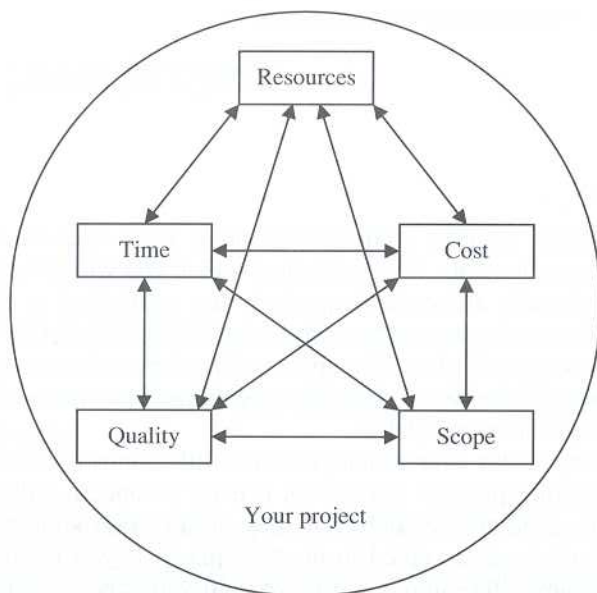


Figure 5.1 *Balancing the five project elements against one another*

tradeoffs can be made between them. How these tradeoffs are made as you monitor and control your project is discussed in the following section.

5.1.2 **Project control**

The five project elements require managing and controlling through the five main project stages identified in Chapter 3: definition, planning, initiation, control and closure. Focus on these five elements will change as your project progresses through these stages. For example, at your project's inauguration you won't be too concerned about time and will probably concentrate on your project's scope. During this stage you will feel that there is an eternity before the final report is due to be handed in. You may have many ideas you want to pursue and you might wish to investigate and develop various aspects within the field of computing. However, two weeks before you are due to submit your dissertation, time will suddenly become a very rare commodity and a real concern to you.

As your project progresses into the initiation and control stages emphasis moves from project management activities to product oriented activities. In other words you will begin to focus on the actual work of your project itself and direct your efforts towards investigating, developing and producing your project's deliverable, whatever you have identified this to be.

As your project progresses through these working stages you will still need

to perform certain project management activities. You should, for example, monitor and control all your project's elements with respect to your project plan. You will control time by checking to see if you are completing tasks in line with the times planned on your Gantt chart. If you are, you are on schedule and should have no worries. If not, you might be falling behind schedule and you will need to do something about it. Not only should you monitor time as your project is progressing, but you should also keep an eye on your project's scope and quality. Are you, for example, meeting the objectives of your project satisfactorily or have you had to make some compromises along the way?

Project management will often involve deciding how to trade each of the five project elements off against one another as your project progresses. For example, you could reduce the scope of your project in order to improve its quality. Conversely, you may decide to expand the scope of your project (for example, by increasing the functionality of a program you are writing) at the expense of some quality (by introducing more bugs). Time is always limited so you will often find yourself trying to trade it with other elements – for instance, saving time by reducing quality and/or scope, particularly towards the end of your project. However, you must always ensure that you do not compromise your project and submit, on time, what you feel has been your best effort.


5.2 Dealing with problems

If your project progresses to completion smoothly, without any problems, you are probably very lucky indeed. Virtually all projects encounter problems at one stage or another, whether they are performed by leading academics at the cutting edge of science, first-year undergraduate students pursuing a small assignment, or large industrial project teams whose work can last for several years. It is not really the nature of the problem that you encounter that can lead to project failure, *but how you deal with the problem that counts*.

The key to successfully overcoming any problems is not to panic, tackle them objectively and professionally and make the best of the situation. Problems don't necessarily solve themselves and will often require some action from you in order to be resolved. The following five points encapsulate perhaps the most likely problems you will encounter when performing your academic project, with suggestions on how they might be overcome.

5.2.1 Weakening

Weakening is something that can happen at any stage of your project. It can stem from a lack of motivation, losing your direction, or the feeling that you have attempted to do far too much in the time available. Weakening is something that can usually be traced right back to the first stage of your project – its *definition*. Did you decide to pursue a project you weren't really interested in? When you planned your project did you plan to do too much? Were the aims

and objectives of your project a little vague, leading you to lose faith in what you are doing because you don't appear to be heading anywhere? 

The first solution to dealing with this problem is clearly to address its root cause, i.e. tackle it at your project's outset. Make sure that you select a topic which you are really interested in, define and plan it thoroughly and ensure that you have planned some flexibility into your project so that you can expand or contract its scope depending on the time that is available. This last point can also help to address weakening that is caused because you feel you are trying to do too much. Think about ways to reduce the scope of your project without compromising its quality. Alternatively, deal with large chunks of work by breaking them down into smaller more manageable pieces.

Another way to overcome a lack of motivation towards your work is to move on to something different. It may be that you are getting bogged down with a particular part of your project and working at too fine a level of detail. Try to identify from your project plan other areas of work you can do. You may then return to the area you are struggling with later when you are refreshed from your break. Other ways to deal with weakening are addressed in Section 5.3, on time management, where *procrastination* is discussed.

5.2.2 *Personal problems*

Over the period of your project, be it six months, a year or whatever, the chances are that you will experience a personal incident of one kind or another. This can range from happy occasions such as getting married, having a baby and so on, to sadder, more difficult events to cope with such as illness, family bereavement, splitting up with your partner etc. Other personal 'problems' you might encounter include moving house or changing jobs. These kinds of changes might be good or bad but one thing is certain, they will be a drain on your time and your emotional energies. Although it is beyond the scope of this book to discuss how you deal with these problems from an emotional level, their impact on your project and what you can do to deal with this impact is of concern.

The most important thing to do in any of these situations is to tell somebody what has happened – your supervisor, personal tutor, course leader etc. Your own institution should have guidelines on who to approach first with problems of different natures and you should try to follow these suggestions. You may then be guided towards other departments within the university which can deal more effectively with your difficulties: the students' union, counselling services, local doctors, hospital, chaplaincy and so on.

The chances are that your institution will also operate some form of 'extenuating circumstances' procedures. These procedures enable you to inform your institution officially of what has happened, enabling them to consider how to deal with you and possibly how to help you with your project. This will probably involve completing a form and providing evidence of some kind, such as

a doctor's note. Note, however, that your institution will have guidelines on what is an acceptable reason for claiming extenuating circumstances – such as illness – and what is not – for example, going on a holiday with your friends for two months.

By following your institution's procedures you are at least going some way to dealing with your problem. Not only will they be able to help you on an emotional level (for example, with counselling services) but you may well be awarded extensions to complete your work. Above all, remember that if you do not let anyone know what has happened then nothing can be done to help.

5.2.3 *Computer failure*

In almost all projects these days, computers are used to a greater or lesser extent. They might be used simply to word process your final report or they might be used throughout the entirety of your project as you develop a program or use them to analyse data. Whatever the case you may well find that the computer you use fails and that data and files you are using are lost or erased forever.

The only answer to these kinds of problems is to make numerous and frequent backups. These can be made onto floppy disks, so you can take them away with you, or onto your institution's own file server. These days, other media, such as CD-ROMs and Zip drives, can also be used. It is up to you how often and how many backup copies you make – you know how reliable the system you are using is. However, to make no backups at all is ill advised. Certainly, towards the end of your project, daily backups will be essential. Losing an entire week's work at the start of your project is not too serious, but at the end it would be disastrous. Take the example in the box as a cautionary tale.

John was a final year undergraduate student on a computer studies course at the time when network accounts were rare and everyone kept their work on floppy disks which they carried around with them. He was reasonably well organised and as such made three backup copies of his work every day. One day when he was working on his dissertation he found that he couldn't read any data on one of his disks. Fortunately, he had his backup disks with him and loaded one of these into the machine he was using. Once again the computer claimed the disk was unreadable.

What had happened was the disk drive itself was broken and was erasing any disks that were inserted into it. Had John made only one backup of his work he would have lost everything. Fortunately, with three backups, all was not lost and he was able to complete his project on time.

5.2.4 *Data availability*

Data availability is often a problem with computing projects. Either a journal or a book you require is unavailable, you can't get hold of some data, you lose your contact in a local company where you hoped to perform a case study, or you receive a poor response from some questionnaires you issued. Whatever the problem, your project looks as though it will suffer from a lack of available data.

In a similar vein to *weakening*, discussed earlier, problems with data availability can often be traced back to your project's early stages. If you had thought about your project more thoroughly during its inauguration, you might have identified that a book or journal was difficult to obtain, questionnaires were likely to prove unreliable and so on. Bearing these things in mind you might well set up contingency plans at an early stage – for example, changing your project's direction so that it doesn't require data x, y or z.

If, however, data availability problems only become apparent well into your project they must be dealt with there and then. Simply put, either the data are available or they are not. In other words, can you obtain the information you require from any other source? If not, then move on without them. Is there another company you could use as a case study? Have you time to chase up the questionnaires or send out new ones? You should try to think of as many alternatives as you can and your supervisor should be able to help you. If not, you will have to proceed without these data and adjust your project accordingly. This is, perhaps, easier said than done. However, if at the end of the day the data are unavailable, you cannot conjure the data from nowhere and the sooner you accept this, adjust and proceed with your project the better.

5.2.5 *Other things taking priority*

Your computing project will never be (and shouldn't be) your only interest. You will have other subjects to deal with – coursework, your part-time or full-time job, a social life, a personal life and so on. All of these things take time and often you will find that your project takes second place to all of them at one stage or another. The only way to deal with this problem is through better time management. This is the subject of the following section.

5.3 *Managing your time*

Everybody is limited in the amount of time they have available – there are only 24 hours in a day and 7 days in a week, no matter who you are. Although everyone needs to use some of this time for essential activities such as sleeping, eating and dressing (referred to here as *essential* time), some people make more effective use of the remaining *serviceable* time than others. How

you become more efficient in your use of serviceable time is the focus of *time management*.

Although there are some specific techniques you can employ to save time, the only way to make dramatic improvements in your use of time is to approach time management from a fundamental analysis. This fundamental analysis is a process that involves three stages and is summarised in Figure 5.2:

1. Decide what you want to do;
2. Analyse what you are currently doing;
3. Change what you are doing to achieve your aims.

Many people might try to improve their use of time by employing specific techniques that are identified in the third stage of this process. However, failure to comprehend your existing use of time, by omitting stages one and two of this process, will lead to only minor improvements in your time usage.

Each of these stages is now addressed in turn before presenting a summary of some specific ideas that can help you improve your use of time.

5.3.1 *Deciding what you want to do*

The first stage of successful time management is to decide exactly what you want to achieve in terms of goals and objectives. Most time management texts and courses will recommend that you identify both your short-term and long-term goals as part of this process. Short-term goals represent those things that you want to achieve during the following year. Long-term goals stretch much further into your future, such as five, ten or twenty years hence. For the purposes of this book the main focus is your short-term goals and it is assumed that completing your computing project is one of these goals.

It is far easier to categorise your goals according to their different types, rather than just attempting to identify broad objectives you are aiming for. Ferner (1980: 11) defines four categories you can use to identify your goals: *work goals*, *family goals*, *community goals* and *self goals*. Thus, if you were to

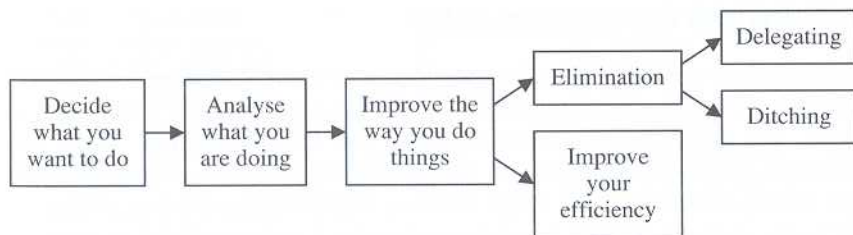


Figure 5.2 *The time management process*

categorise your goals for the year ahead, they might include targets such as:

- Work goals Complete my degree with at least an upper second
- Family goals Start a family
 - Teach my children to swim
 - Decorate the spare bedroom
- Community goals Help out at the local youth club
 - Train the local football team
 - Do a sponsored walk for charity
- Self goals Achieve grade 5 piano
 - Get my golf handicap down to 10
 - Learn to swim
 - Join a local quiz team
 - Complete a marathon
 - Go on holiday to Hawaii

The goals you identify should be as specific as possible. For example, rather than just identifying a self goal as 'be happy', you should identify how you will achieve this, for example, 'go on holiday to Hawaii', 'get married' etc.

In Chapter 2, when project planning was introduced, how you should identify objectives that are steps towards your project's ultimate aim or goal was discussed. The same is true here. For example, one of your goals for the following year is to complete your degree course successfully (i.e. with at least an upper second). To achieve this goal you need to complete a number of objectives: complete your computing project successfully, pass your exams in subjects x, y and z, complete assignments a, b and c and so on. You are thus identifying that your computing project is something that is important to you. Just like all the other activities and events on your list of goals, it is identified as something to which you wish to commit yourself and something that you are willing to spend your time pursuing.

In this stage of the time management process you have identified the things that you hope to achieve. The next stage of the process involves checking to see what you are doing to see if you are really spending your time efficiently on the things you should be in order to achieve these goals.

5.3.2 *Analyse what you are doing*

Analysing how you are currently spending your time is achieved through two activities. First, you need to identify *how* you are spending your time and, second, you need to *categorise* the time you have identified. There are a number of techniques that you can use to identify your use of time, each technique doing much the same thing but in a slightly different way. *Time logs*, which are probably the most popular technique for recording time usage, are introduced here.

Time logs are simply lists that you make during the day of how you spend your time. They identify the activities you perform during the day, how long you spend on them, how efficient you were at performing them and, perhaps, ways in which you can improve your use of that time in future. You should continue making time logs for about a week to see if any patterns emerge. An example of a 'typical' day's time log is shown in Table 5.1.

This is perhaps an extreme example of a 'day in the life of'. You should also remember that this is just a snapshot of one day; this student may well be doing other things differently on other days of the week. This is why you should use time logs for a full week as individual days may provide spurious indicators of your time use.

Having a look through this time log can certainly help to identify some room for improvement (depending on the person's goals). If this student's main goal is to socialise then their use of time is probably quite effective. However, if they wish to do well in their exams and assignments, then some adjustments need to be made.

Table 5.1 A 'typical' daily time log

<i>Time</i>	<i>Activity</i>	<i>Effectiveness</i>	<i>Comments/improvements</i>
7.00–8.00	Get ready for university	50%	Could probably do this in 30 minutes but I'm always tired
8.00–8.30	Walk to campus	80%	Could get the bus but I need the exercise
8.30–9.00	Meet friends in canteen	10%	Need to socialise
9.00–10.00	Lecture	70%	Quite good today!
10.00–10.15	Coffee break	10%	I need a break
10.15–12.00	Tutorial/seminar	50%	Could have done this in half the time
12.00–1.30	Lunch – students' union	20%	Far too long but I need to eat
1.30–2.00	Library hunting for books	40%	Couldn't use the OPAC
2.00–2.30	Meeting with project supervisor	80%	Useful
2.30–3.00	Coffee with friends	20%	Need to socialise
3.00–4.00	Library hunting for books	20%	Not finding what I want
4.00–4.30	30 minutes on assignment	30%	Wasted time getting started – should spend longer on this
4.30–5.00	Walk home	80%	As before
5.00–5.30	Have a coffee	0%	No comment
5.30–6.00	Watch 'Neighbours'	0%	No comment
6.00–7.00	Get tea	50%	I need to eat
7.00–8.00	Work on assignment	90%	Get a lot done
8.00–11.00	Go to pub	40%	I need to socialise but should have done more work first
11.00–1.00	Work on project then go to bed	50%	Too tired to achieve much – must tackle this kind of thing earlier in the day

One important outcome from your daily time analysis is to identify your work performance. During the course of a day you will find that there are times when you work more effectively than others; for example, early in the morning, late at night and so on. You can plot these daily 'rhythms' on a work performance chart such as that shown Figure 5.3. Figure 5.3 shows that this person works more effectively during the morning and early in the evening than at any other time of day. Thus, it would be better for this person to schedule difficult tasks during these peak periods (for example, reading journal articles), and schedule easier tasks for other times. You can extend this concept to weekly work performance charts. For example, you may find that you work more effectively on Tuesdays and Wednesdays than Friday afternoons. Consequently, you will schedule your weekly work to coincide with this performance.

Having identified how you are spending your time, you should then categorise your use of serviceable time. Time is categorised, according to the goals you identified earlier, into the following two components: important/unimportant and urgent/non-urgent. Table 5.2 summarises these categories.

Important activities are those activities that are important *to you* based on

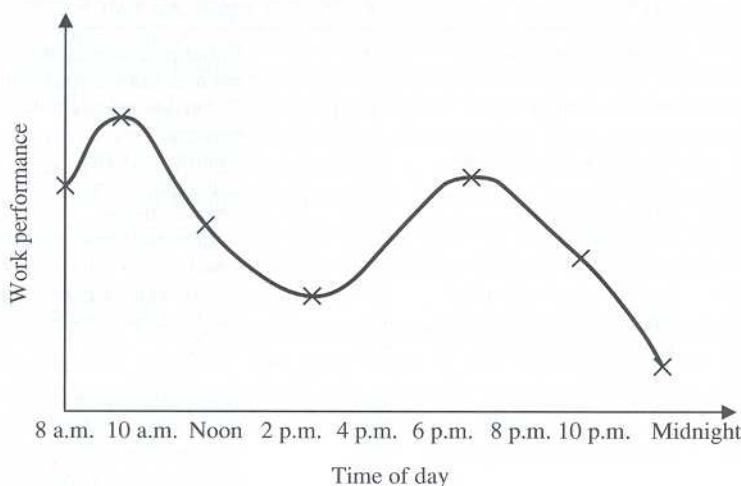


Figure 5.3 A daily work performance chart

Table 5.2 Categories of time use (adapted from Jones, 1998: 62)

	Important	Unimportant
Urgent	Do	Minimise/avoid
Non-urgent	Don't ignore	Abandon

your own goals and objectives, while unimportant activities are those that will not affect your goals and objectives if you don't do them. Urgent activities are those that must be done now and will not wait, while non-urgent activities are those that you could put off until tomorrow without causing any serious consequences.

Note that Table 5.2 only covers serviceable time. *Essential* time, which is time that you need to spend on essential day-to-day activities such as sleeping, eating, washing, dressing and food shopping, is not covered by these categories. Essential activities must be performed in order for you to function properly and to sustain you for everything else. However, although quite a number of activities you perform may appear essential, you might find that you could reduce the time you spend on them to some extent; for example, by taking shorter lunch breaks or getting someone else to do your shopping for you and so on.

All the activities you identify in your daily and weekly time log will fall into one of these categories. For example, completing an assignment that is due the following day would be important *and* urgent. At the start of the year your computing project would be important but at that stage it wouldn't be urgent. However, it would certainly become urgent towards the end of the year as its deadline approached.

An example of unimportant and non-urgent activities might be surfing the Internet or sorting your books into alphabetical order. Urgent and unimportant activities might include answering the phone, being interrupted by visitors, attending a meeting and so on.

Important and urgent activities are those which you must do and you must do now. If none of these activities is pending then you should focus on important and non-urgent ones. You should certainly avoid any activities that are unimportant and non-urgent and you should try to minimise, as much as possible, activities that are urgent but unimportant.

5.3.3 *Change the way you do things*

What you can't dump, *delay*. What you can't delay, *delegate*. What you can't dump or delay or delegate, *do*.

Turla and Hawkins (1985: 63)

There are only two ways to improve your use of time to achieve the goals you have set yourself:

1. eliminate activities you don't need to do;
2. be more efficient doing the things you have to do.

You can only eliminate activities in one of two ways. First, if they are unimportant, you can ditch them and should do so straight away. Second, if they are important, you might be able to delegate them to somebody else. For

example, you may be able to persuade your partner or a friend to proofread your dissertation for you or help you trace some references in the library.

If you cannot eliminate tasks, you are left with only one option – become more efficient in doing the things you have to do. This is achieved by planning how best to use your time and dealing effectively with any problems that do arise. Planning how to use your time is usually done at two levels: weekly and daily. The first stage to time planning, however, is to set your priorities. The activities you need to perform on a daily and weekly basis are prioritised according to the categories introduced earlier (adapted from Ferner 1980: 118):

- High priority – must do – urgent and important;
- Medium priority – should do – important but not (yet) urgent;
- Low priority – nice to do – unimportant and non-urgent;
- Scheduled – low/medium/high priority scheduled activities – for example, meetings.

Weekly planning is best done either first thing on Monday morning or last thing on Friday. When planning what you want to achieve during the week ahead you will focus on high priority activities. You should schedule time during the week ahead to deal with high priority work and identify what you want to complete by the end of the week. Only when these activities are completed can you think about medium priority work. During the course of a week and during each day you will have scheduled events to deal with. Once again, only attend to these if they are medium or high priority. Try to avoid attending scheduled low priority events if you can.

Having decided what you want to achieve during the week you should plan what you want to achieve each day. Make a list of things you must do, scheduled activities for that day and things you can do if you find you have some free time available. Make sure that you allow plenty of time for high and medium priority tasks and schedule your day according to your daily work rhythms (see Figure 5.3). Try not to be too rigid with daily plans as unexpected events always arise and you should allow flexible time to deal with these things.

Although you may plan your weekly and daily time commitments thoroughly, there are always problems and unexpected events that occur. These are addressed in the following section.

5.3.4 *Dealing with problems*

Procrastination

Procrastination means that you put off until tomorrow what you can or should be doing today. The same might happen tomorrow and things that you ought to be doing never get done properly. There are various reasons why you might procrastinate – you have lost your motivation, the task appears too great, you

don't want to trouble somebody, you are nervous of the response you might get, and so on.

There are various ways you can deal with procrastination. The first thing to do is to decide that you really do want to deal with it. If this is difficult you can make a list on a piece of paper of the reasons for and against dealing with it. By breaking it down in this way you often convince yourself that the benefits of dealing with the task outweigh the negatives. If the task appears too great then the obvious answer is to break it down into manageable chunks and deal with each of these in turn.

Other ways you can deal with procrastination include the carrot and stick approach. Get somebody to monitor your progress – a colleague, your partner, a friend, your supervisor – and ask them to keep prompting you for progress reports on your work. Quite often, if you can't do work for yourself, knowing that someone else is interested in your progress does help. Another alternative is to reward yourself. Promise yourself some kind of treat if you complete the work – a trip to the cinema, a meal out or whatever.

Grains of time

Grains of time are those small periods of time you gain during the day that you don't use effectively – for example, waiting for someone to turn up to a meeting, finding your tutorial has been cancelled, sitting on the bus to college for half an hour, and so on.

Make sure that you don't waste these grains. Have something that you can pick up quickly and do to fill these periods – for example, some revision notes with you that you can read on the bus, a notebook so that you can jot down some ideas, the morning's post that you can sort through etc.

Unfinished business

It may appear obvious, but until a task is completed it is never actually finished. Don't start things that you will not finish. All the time you commit to half completing a task is wasted unless you finish that activity off.

Interruptions

Everyone is subject to interruptions to their work of one kind or another – people calling in to see you, the phone ringing, people asking you to do things, and so on. Some of these are unavoidable but it is how you deal with them that counts. One way to deal with interruptions is to avoid them by finding a 'hide away'. This might be a quiet place in your university's library where you know you won't get disturbed. You might want to put a notice on your door saying 'do not disturb' or go away for the weekend to get away from it all. If you do find that you are constantly being asked to do things you also need to learn to say 'no'. Don't deal with junk mail – just bin it. Remember your priorities, and if your computing project is due in, you must avoid doing other things and focus all your energies on it.

Perfectionism

Don't fall into the trap of trying to be perfect at everything you do. It can take a lot of time to improve something you do from 'good enough' to perfect. This time is wasted. For example, if you need to reply to a letter, don't waste two hours drafting out and redrafting a reply on a complex word processor with figures, clever fonts and letter heads. If you can, write a brief reply on the letter itself and post that back. If a brief reply is all that is required, do it.

Losing things

You can often waste a lot of time through your own inefficiency with data and files. Keep things in good order, references up-to-date, and have a means of managing all your paperwork. Gather together things you will need for a task before you start work. This will stop you interrupting your concentration and wasting time getting back 'up-to-speed' when you return. An additional tip here is to make a note of where you are up to and what you intend to do next when you have finished your work for the day. This will save time later when you try to remember what you were intending to do next.

5.4 Using your supervisor

5.4.1 *What is a supervisor?*

A supervisor's principal professional responsibility is to help his or her research students to develop into individuals who think and behave as academic researchers in the field of study concerned.

Cryer (1996: 59)

One of the main resources of your project is your supervisor and, as such, your relationship with him or her and your use of him or her needs managing effectively. Chapter 2 discussed some ideas on how you should choose your supervisor (if this is possible within your own institution) and what to look for in a supervisor. The purpose of this section is to discuss ways in which you can make effective use of your supervisor during the course of your project.

Although most institutions have similar guidelines for the supervisor/student relationship at postgraduate level, at undergraduate level institutions have quite different rules, expectations, roles and responsibilities for supervisors. Some institutions will expect you to work very closely with your supervisor, perhaps meeting with him or her regularly each week during the course of your project. Other institutions prefer to emphasise the independent nature of undergraduate project study and would only expect you to see a supervisor on rare occasions for advice and guidance. The role of your supervisor can also differ. Blaxter *et al.* (1996: 124) identify two roles that a supervisor can

perform:

- A manager
- An academic advisor

As a *manager* your supervisor is responsible for managing your project in 'a more general sense'. He or she will be concerned with your overall progress. Are you meeting the milestones you have set for yourself? Are you coping with and balancing your project with other commitments? Your supervisor will also be concerned with ensuring you are following institutional guidelines as part of this role. For example, are you aware of all the guidelines and regulations relating to your project? Are you producing the right documentation at the right time? As a manager you may want your supervisor to encourage you when you are weakening, advise you on which procedures to follow to submit your dissertation, arrange access to particular hardware and software for you and so on.

As an *academic advisor* your supervisor is more concerned with the 'academic' content of your project. Are you reading the right journals and books? Are you following the correct research and data gathering methods? Are you performing the right analyses? Are you developing your software in the correct way? You may need your supervisor's academic expertise to advise you where to go next, what areas to develop further, to clarify particular topics and advise you which techniques and tools to use.

Blaxter *et al.* (1996: 126, citing University of Warwick 1994: 24) list the following areas which your supervisor should be able to advise you on when acting in an academic capacity:

- research design and scheduling;
- literature surveys;
- theoretical and conceptual development;
- methodological issues;
- development of appropriate research skills;
- data collection and analyses.

Sometimes you will also need your supervisor to act in a *pastoral role* for you. Under this role your supervisor will be more concerned with your emotional and general well being. Are you maintaining your motivation? Are you under pressure from other work? Have you any personal problems that he or she can help you to deal with?

Combining academic expectations with managerial requirements, Phillips and Pugh (1994: 148–154) list the following expectations students have of their supervisors:

- 'Students expect to be supervised';
- 'Students expect supervisors to read their work well in advance';
- 'Students expect their supervisors to be available when needed';
- 'Students expect their supervisors to be friendly, open and supportive';

- ‘Students expect their supervisors to be constructively critical’;
- ‘Students expect their supervisors to have a good knowledge of the research area’.

While your supervisor has responsibilities towards you, he or she will also expect some obligations from you in return. According to Blaxter *et al.* (1996: 126), some duties expected by supervisors of their students are:

- to arrange regular meetings;
- to maintain a regular work pattern;
- to discuss progress and problems fully.

In addition, Phillips and Pugh (1994: 93–99) identify the following obligations of doctoral students, which are also relevant to undergraduate projects:

- ‘to be independent’;
- ‘to produce written work that is not just a first draft’;
- ‘to be honest when reporting on their progress’;
- to follow advice that is given;
- ‘to be excited about their work’.

5.4.2 *Using your supervisor effectively*

The main contact you have with your project supervisor will be through pre-arranged meetings. These meetings may be at a regular time each week or more infrequent, perhaps only occurring every four or five weeks or more. As academic staff tend to be extremely busy, they are often difficult to find at other times and unlikely to be able to see you. You therefore need to make optimum use of the time you do see them during these meetings.

- Prepare for your meetings. Don’t just turn up to a meeting with your supervisor without any ideas on what you want to get out of it. Think about what you want to discuss, decide what advice you want from your supervisor on which aspects of your project, and go prepared to present some of your own ideas and plans.

Ricketts (1998: 17) suggests using the minutes of your previous meeting as a starting point for discussion each time. This helps to remind everyone of the current state of your project and identifies the work you were expecting to complete since the last meeting.

- As part of your meetings you may well want to discuss the following topics each time:
 - what progress you have made since the last meeting – work you have done, articles you have read, literature found, interviews conducted, programs developed, plans made, and so on.
 - what problems you have encountered – how you overcame them or whether you need help.

- who you have met – what did you discuss with them?
- what you intend to do next – is this suitable? Has your supervisor any other suggestions?
- Make notes during your meetings. It is unlikely that you will be able to remember everything that is discussed. Make notes as you go along and clarify things that you are not sure about before you leave. If you don't understand something that your supervisor is saying you must tell him or her. It is far better to get things clarified at an early stage than six months later when you realise you haven't investigated an important topic and perhaps omitted something vital from your project.
- Arrange your next meeting. It is usually a good idea to arrange the time and date of your next meeting before you leave. Agree some goals and targets with your supervisor that you intend to complete before your next meeting. This will give you something to work towards and will provide some motivation as you know your supervisor will be checking up on your progress at the next meeting.
- Follow your supervisor's advice. There is no point in going to meetings with your supervisor if you are going to ignore any advice given. Clearly, there are times when your supervisor will make *suggestions* that you might not want to follow. However, your supervisor will generally provide you with invaluable advice that you would be unwise not to take on board.

5.5 Working in teams

Due to increasing numbers of students within higher education, group working for projects and assignments is becoming more and more common. However, it is also recognised that group work has a number of educational and practical advantages for students, as Blaxter *et al.* (1996: 46) identify:

- It enables responsibility to be shared;
- You are able to specialise in areas you are comfortable with and good at;
- It provides experience of teamwork;
- You can perform much larger projects than you could achieve on your own;
- You have a 'support network' of colleagues.

Above all, working in teams will provide you with an invaluable experience in interacting with others, sharing work, overcoming joint difficulties and introducing you to the working practices of the 'real world'.

Many students resent working in teams as they feel their grades may be adversely affected by other people over whom they have no control. Others

enjoy the experience and feel their team achieves far more than they could have done as individuals. Whatever the case, at one stage or another you may well find yourself conducting a computing project as part of a team on your course. This section discusses the issues involved in teamwork and presents some tips to help you complete team projects successfully.

5.5.1 *Team roles*

Whether you can choose your own team or whether your group is assigned to you at 'random', all your team members will bring two kinds of skills into your group: *personal* or *team skills* and *technical skills*. An imbalance within either of these skill areas in your group will probably lead to a poor team performance. Consequently, it is not always a good idea to form a group with your friends, who may all have similar interests, personalities and technical skills to you. If you can, take careful note of the following skill types and select a group with a good balance of these skills.

Belbin (1993) identifies nine personal or team skills:

- Plant: creative people with imagination who can solve difficult problems;
- Resource investigator: extrovert communicators – good for making contacts;
- Coordinator: good managers, delegators, chairperson;
- Shaper: dynamic people who thrive under pressure and overcome obstacles;
- Monitor/evaluator: see all options and maintain a strategic view of the project;
- Team worker: cooperative, diplomatic and good listeners;
- Implementer: disciplined, reliable, and efficient;
- Completer: conscientious, attend to detail well and finish work on time;
- Specialist: narrow specialism and viewpoint but dedicated.

Chances are that you will not be working in a team of this size. However, individuals within your team may well possess two or three of Belbin's team skill traits, giving your group a reasonable skills balance. Having a good cross-section of team skills within your group is, however, no guarantee of project success. Having said this, the more of these skills that are present within your group, the higher the chances are that the team will succeed. Individuals will work together well and the team will not suffer from clashes between the egos of several like-minded people.

These skill traits should be kept in mind when team roles are assigned. Three team roles that are common to all project teams, irrespective of the project, are:

- *Team leader*: chairperson, coordinator. The team leader is responsible

for timetabling the work, assigning it, chasing team members' progress, chairing meetings.

- *Librarian/secretary*: minutes meetings, coordinates paperwork and all literature.
- *Team contact*: liaises with external bodies – the client, supervisor etc.

When assigning these roles you might, for example, elect your team leader as the person possessing the skills of a *coordinator*. A *resource investigator* would perhaps be a good person to assign as your team contact, and the team's librarian/secretary may be best assigned to a *completer*.

Sometimes you may find that no one naturally fits into any of these roles or you may find that no one is willing to take on a particular role. In these cases the role might have to be divided so that different people are responsible for it or different people take on the role at different stages of the project. For example, team leadership could be split into coordinating team contributions, chairperson, planner etc. This is not an ideal solution as projects should ideally have a single leader, but it is a compromise.

Technical skills are particularly important within computing projects. Depending on the nature of your course, and the type of project you are undertaking, you will need team members with some of the following technical abilities:

- Programming – high level, low level, 4GLs, visual programming etc;
- Databases – analysis, design, development;
- Systems analysis;
- Systems design;
- Information systems;
- Human–computer interaction;
- Networking;
- Computer systems architecture;
- Graphics;
- Mathematics (including statistical analyses etc).

O'Sullivan *et al.* (1996) suggest using a SWOT analysis to identify team responsibilities. A SWOT analysis identifies everyone's Strengths, Weaknesses, Opportunities and Threats. For example, your own personal SWOT analysis might look something like this:

Strengths

Strong leader
Technically sound
Good programmer

Weaknesses

Relating to people I don't know
Writing skills

Opportunities

Project is a chance to
improve my systems
analysis skills

Threats

Field trip clashes with
project presentation

Not only must your team be well balanced with respect to technical skills and the team skills identified earlier, but your team must also *link* well. In other words, there must be good communication between team members in order for the project to succeed. This boils down to people's ability to get on with one another and is the main benefit of being in a group with your friends.

5.5.2 *Managing the team*

You have 'selected' your team and the project is under way – how should the group and its communications be managed? Group coordination will clearly rest on the shoulders of the team leader. It is his or her responsibility to co-ordinate effort by breaking a large project down into manageable chunks and assigning these chunks appropriately.

The main coordinating link that should be maintained within a group project is through frequent team meetings. These should be minuted, everyone should be in attendance, and work should be agreed and assigned. When work is assigned you should all agree on what should be done *and* by when. Work should be assigned to individuals based on their technical skills, and sometimes subgroups might form to work on particular parts of the project. The Gantt charts and activity networks introduced in Chapter 3 can help you assign work to team members, as they provide a strategic view of workloads and responsibilities. It is useful to get people to sign up to their obligations at this stage so that everyone knows who is responsible for what. If problems do arise later, and the team falls apart for whatever reason, individual contributions can be identified for assessment purposes.

Frequent meetings also provide a useful means of project control. They enable progress to be monitored and provide a time and place for team members to meet and discuss ideas. Motivation of team members also becomes clear at frequent meetings and any problems can perhaps be dealt with sooner rather than later.

5.5.3 *Teamwork tips*

- Have a single project manager/team leader. It is often tempting in group work to have a rather democratic, leader-less structure. However, somebody *does* need to be in charge of your project's management, he or she needs to coordinate the effort of everybody involved, keep a strategic view on your project's progress and make 'unpopular' decisions. If the group has two or three members who would like to lead the team then perhaps this could be achieved on a rotational basis. This could be managed by rotating the team leader based on each team member's technical contribution and effort, which will vary during the course of the project. Alternatively, as mentioned earlier, the team

leader's role could be divided among those wishing to lead the group but this is less satisfactory.

- Maintaining everyone's interest and motivation throughout the course of a large project can be difficult. For example, systems analysts would be busier at the earlier stages of a project than the end when, perhaps, programmers become overburdened. To overcome these problems try to plan into your project's schedule team responsibilities as well as technical activities. For example, the systems analyst might take over the group's secretarial/library activities as the project progresses, a programmer may relinquish the leader's role etc.
- In line with the points made above, it is important to ensure that people aren't overburdened with technical *and* team roles. It can take a lot of time to manage a group alongside other activities. You should ensure that team roles are accounted for when work is assigned to each member of your group. For example, a good team coordinator, who can motivate and coordinate everyone's contributions, may be assigned this task as his or her only role.
- Make sure that all meetings are fully documented and people 'sign up' to work commitments. Not only does this provide people with a 'contract' which they feel obliged to fulfil but, also, if things go wrong, arguments won't start over claims that 'X said they would do this' and 'Y promised that'.
- Maintain good communication between all team members. Make sure that a contact sheet for every team member is produced at the project's start with everybody's home address, telephone number and email address. Hold frequent short meetings, not long infrequent ones. Try to make full use of all the communication tools available to you. These can include facilities such as electronic diaries to plan meetings, and email to support team communication. Email can also be used to transfer documents and files between team members as attachments. Also try to set up shared directories on your institution's computer servers so that all team members have access to the latest project files (but ensure that some form of configuration management is in place).
- Try to create a team spirit. Create an identity with a team name and try to arrange some informal, social meetings as well as your formal ones.
- Try to maintain a single person to act as a liaison with external bodies such as your client, technical support staff, supervisor etc. Even if two or three of you attend client meetings it should be made clear who the contact person is within the group. This ensures that a consistent message is presented to external bodies and contradictions are avoided. It also avoids contradictory information passing into your group from two or three team members who may have approached the client on different occasions and received contradictory requests.

5.6 Summary

- All projects have five elements that require managing to some extent as the project progresses: *time*, *cost*, *quality*, *scope* and *resources*. These elements need to be balanced against one another so that you achieve your project's aims and objectives.
- Of these five elements, cost is something over which you probably have little concern or control. Quality and scope are the two elements you have most responsibility for and control over. Resources are those that are available to accomplish your project – you, your supervisor, your project team. The time you are allocated to complete your project cannot usually be extended so you need to employ time management techniques to manage this time more effectively.
- Time management consists of three stages: decide what you want to do, analyse what you are currently doing, and change the way you do things. There are only two ways to reduce the time you spend doing things: ditch them (perhaps by getting somebody else to do them – delegation) or use the time you have more effectively.
- Your supervisor is an invaluable resource. You will probably only see your supervisor at prearranged meetings so these must be planned for and used effectively.
- Working in teams brings a number of advantages and disadvantages. Each team member contributes two kinds of skill: team skills and technical skills. When work is assigned to team members try to balance team roles with technical duties and assign work and responsibilities according to people's strengths and weaknesses. Meet regularly and maintain good communication.

5.7 Further reading

- Bliss, E.C. (1976) *Getting Things Done*, Futura, London.
- Ferner, J.D. (1980) *Successful Time Management*, John Wiley and Sons, New York.
- Garratt, S. (1985) *Manage Your Time*, Fontana/Collins, London.
- Goodworth, C.T. (1984) *How You Can Do More in Less Time*, Business Books, London.
- Haynes, M.E. (1987) *Make Every Minute Count*, Crisp Publications, Los Altos, California.
- Turla, P. and Hawkins, K.L. (1985) *Time Management Made Easy*, Panther Books, London.

5.8 Exercises

1. Identify how the five project elements (resources, time, cost, quality, scope) relate to your own computing project. Which of these elements is your main focus/concern at the moment?
 2. How could the student have managed his or her time more effectively in Table 5.1?
 3. Put together a time log for yourself during the coming week.
 4. Categorise your use of time into important/unimportant, urgent/non-urgent, and essential types. How can you reduce the time you spend on unimportant activities?
 5. Plan for a meeting with your project supervisor.
 6. If you are working on a group project try to identify which of Belbin's (1993) team skills each of your group possesses. Have you assigned roles based on these skills? Are technical tasks and team roles balanced logically and evenly among your team's members?
-