SECTION ONE: PERSONAL EFFECTIVENESS

Chapter 1

Effective Organisation and Time Management

by Professor Steve Webb
Head of Radiotherapy Physics Research, The Joint Department of Physics, The Institute of Cancer Research and the Royal Marsden NHS Foundation Trust
and Professor Bob Ott
Head of Radioisotope Physics, The Joint Department of Physics, The Institute of Cancer Research and the Royal Marsden NHS Foundation Trust

Introduction

At the start of your PhD, you may feel like you have all the time in the world, but it's amazing how quickly the years can pass. Before you know it you will be sitting in front of your computer trying desperately to remember how you performed that experiment 18 months ago, and what the result was. So, from the outset, your main aim should be to manage your work and your time as effectively as possible.

This chapter provides practical advice on organising your work and the successful management of your time while you work through your PhD. You will find some tips on reducing stress and maintaining a balance between the demands of work, social and family life, which is important and often overlooked.

Before you embark on the chapter, take some time to consider how you currently work. Doing a simple activity like the one below can help you to identify ways in which you may be working inefficiently – most people have habits and routines that prevent them working as effectively as they could.

ACTIVITY

Keep a diary of your daily activities for a week and see how you are ACTUALLY using your time. And, try to identify any personal traits that you think prevent you working effectively, for example, you might be:

- a procrastinator – putting off tasks and letting them pile up
- distracted – by interruptions or other demands on your time
- disorganised – surrounded by mountains of papers or flitting from one task to another

- a perfectionist – missing deadlines to perfect work
- too optimistic – taking on too much or setting unrealistic deadlines
- impatient – needing to do everything immediately even if it means working excessive hours.

All of these problems can be avoided with good planning and organisation, coupled with the ongoing advice of your supervisor.

Organising your work

Good organisation is fundamental to your PhD studies. Going hand-in-hand with effective time management, organisational skills help you to get the most out of your time.

Keeping track of events in a work diary, knowing where you've put all those references and how you've named your computer files will give you more control over your day-to-day activities. You will also feel the benefit in the longer term, especially when you come to write your thesis.

Your institution may suggest a portfolio approach to organising your work and time. This can be used to set out the objectives of the project, which are planned and agreed with your supervisor, and then details any further developments and activities as a sort of extended diary of events. This will help you and your supervisor to follow the progress of your project and highlight any missing elements. Much of the practical advice in this chapter is applicable if you are producing a portfolio.

Maintaining a good lab book

A lab book is your course notebook and will become an invaluable resource to you during your PhD. As you carry out experiments, it is vital that each is precisely recorded to help trouble-shoot any problems as you go along. It is also important to date your lab book, make note of any observations and to keep track of batch numbers of any materials you use. Writing everything down in a lab book not only gives you a permanent record of your experiments and results, but will also act as a prompt when you come to write your thesis.

Maintaining a written record is also important if, for example, you make a ground-breaking discovery. If this occurs you will need to be able to prove that you carried out the experiment and provide exact details of the methods and equipment you used.

Although it may seem like a chore, writing up as you go along (experiment by experiment or day by day) will actually benefit you in the longer term as you

won't have to take time trying to remember what you did last week/month/year.

Don't worry if your book isn't neat – it is not meant to be a masterpiece. The book is a permanent record of your research, and you should write down any thoughts, ideas or plans there and then, before they slip your mind. Avoid using 'post-it'™ notes or scrap paper as these can easily be lost.

Tips for keeping a good lab book

- Always keep lab books for as long as you are continuing your work:
  - at least until you have successfully defended your thesis
  - your institution may keep them for longer
- Date everything:
  - this is useful if you are relating a particular experiment to another piece of work
- Keep lab books in a suitable form, so they can be shown and explained to someone else:
  - this is particularly important for collaborative work
- Stick in graphs, gel photos, images:
  - loose items can fall out and be lost
- Use one book per project or sub-project where appropriate:
  - mixing projects can be confusing
- It is good practice to write a summary of the progress of the project every now and then:
  - particularly after a long period of day-to-day recording
  - if you are producing a portfolio, these records are useful for project reports and reference material
- If you write a computer program to make some calculation, document changes that are made and ensure that any output stays linked timewise to the appropriate source code. If you do not do this then it will be hard to relate data that you generate to the source which generated it. (This problem did not arise in the old days when line printers were used and the source code program and its data stayed physically attached.) It is also a good idea to make a note of which variables in lab book mathematics correspond to which computer variables.
- Don't feel disappointed if you don't appear to have many results:
  - they often come in fits and starts and can be cumulative – sometimes progress only becomes apparent on review of the information in your lab book
- Extract results from your lab book into small reports before meeting with your supervisor:
  - give your supervisor a copy a day or two ahead of the meeting
  - after the meeting, document what was discussed and action to be taken, and note it in your book

Keeping your computer files in order

The computer files you generate during your PhD will grow in number and size beyond your expectations. It is therefore important to establish directories and subdirectories at the beginning of your work, and add new ones as and when they are needed.

It saves time if you can easily locate the file you need. This will be particularly important when it comes to writing your thesis.

Valuable work (e.g. your thesis/reports/research papers) should ALWAYS be backed up. Back up your work onto a floppy disc, zip disc, CD or your network drive area, or all of the above! Such files are precious, and you can never be too careful – make sure you do this regularly.

E-mail also needs organising – keep folders of e-mails relating to the same person or topic. An e-mail can be used as written evidence of a communication, since it is now more common to e-mail than send a letter.

Tips for maintaining organised computer files

- Use subdirectories:
    - keep one project separate from another
- Use a name for each program/file that gives some idea of what it does or contains
- Review your files and e-mails regularly and delete anything that is no longer useful:
    - this will reduce the number of files and e-mails you have to trawl through to find the one you're looking for
- **ALWAYS** back-up your files, on floppy or zip discs, or CD:
    - never keep all your files on one computer ('eggs in one basket')
    - keep a copy of files somewhere physically away from your department, just in case there's a fire or robbery that could prevent you from accessing the computer that stores your work
- **ALWAYS** put your name in the program and the date it was started; record updates in the program (with dates) and relate these back to notes in a logbook
- Keep the main program short and use as many subroutines as possible
- If the program looks nothing like the hardcopy maths, provide a table of symbols that can be related to the program maths:
    - provide lots of comments
- Keep all source code:
    - deleting it could be a hindrance in future work

- Avoid 'knock-on errors':
  - don't get into a situation where, for example, you fix one subroutine but forget it is linked into several main programs that haven't been linked yet

Handling reference papers

You will be overwhelmed with reading materials throughout your PhD. You need an efficient filing system so you can locate papers quickly when you need them, and keep track of where your papers are if you lend them to people.

Reference Manager and Endnote are useful computer databases that allow you to document reference papers and recall them according to topic or author name (see 'Managing your references' in Chapter 3, page 52). You can also write notes to yourself against each reference, so you can record where you found the reference, the main points of the paper or any other details.

Tips for managing reference papers

- Invent a practical system for filing that you understand:
  - alphabetically by author – easy to find a paper but tricky if you want to locate a subset of papers by topic
  - filed by project – good for locating subsets related to a project, but tricky to find by author
- Choose a method of storing your papers that suits you:
  - filing cabinets – can store lots of material, but are not easily transferable
  - buff folders or box files – these store fewer papers, but are easier to transport, e.g. to take home
  - mixture of both – get the best of both worlds, but be careful not to become confused and lose track of your papers
- Keep your own copies of papers:
  - annotate them and highlight important facts/results
  - keep a note of the overall essence/take home message of the paper, for example as computer files or index cards. This is useful for quick reference to papers – attaching the printout or index card to the front of the paper can help you to remember key points
- Start a lending list:
  - if people borrow your papers or books it's quite possible you may never see them again

    - keep a list of where the paper is and who has it, also the date you lent it out
- Make a note of what you're reading in your lab book:
    - this promotes a feeling that your reading is working and aiding your research
    - it records when you read something that may be important
- Keep up-to-date with publications:
    - look at a subset of journals regularly, either by doing database searches or by signing up for current awareness services (see 'Current awareness services' in Chapter 3, page 49)
    - follow up on papers that others suggest are relevant to your studies

Why keep a diary?

As a student you may feel you don't have many appointments to record in a diary. However, a diary can be used as a back up to your lab book as well as to record meetings and appointments. You can use it to plan ahead for the week, and at the end, compare your plans with what you've actually achieved.

Tips for keeping a good diary

- Write down all your appointments:
    - so you can keep track of what activities are due or planned and also what you have done
- Record all deadlines:
    - this will help you to manage your time and plan ahead for deadlines
    - you can also write notes such as 'see five days ahead – report must be ready by then', to jog your memory
- Make a note of any periods of time your supervisor will be away:
    - this becomes particularly important in your final year – there is no point giving your supervisor a chapter of your thesis to read if he or she is going on holiday in three days time
- Divide each day into two parts:
    - you can write major appointments or reminders in one part and use the other part for a two to three-line summary of what you plan to do/have done that day
- Write a summary at major calendar landmarks:
    - for example, Christmas, Easter, before you go on holiday
    - write a 'what I've done since last summary' short account – it helps you to keep up-to-date with your progress; you could plan to do this at the same time as writing your lab book summary

- Have a 'rolling items' list:
  - use a separate notebook or a card for your list
  - the list is intended for items that need to be done but for no particular deadline
  - make sure your list evolves and that you cross things off once you've done them

Organising your time

The key to optimising your use of time is **planning ahead** – from day to day, to year on year – for the duration of your PhD.

An overview of the planning phases

Each stage of your PhD requires planning so that you can allocate sufficient time to each task throughout your years of study, and provide yourself with short-term and long-term aims. You need to think about what you want to achieve on a daily, weekly and yearly basis, for example:

Daily and weekly planning

- Read
- Familiarise yourself with the theory of an experiment; plan and carry out experiments (being aware of specific equipment/materials you may need to book or order)
- Prepare presentations e.g. for lab meetings
- Attend any courses or lectures
- In your first year, ensure that you develop the appropriate skills required to carry out your project

Monthly planning

- Read and prepare the materials to be discussed at your tutorials
- Plan which courses to attend and keep a record of those you have attended or plan to attend; keep up-to-date with any course notes
- Plan which seminars to attend or prepare your materials if you are to present one

Yearly planning

- Plan for annual reports; keeping up-to-date with work throughout the year makes report writing much easier and stress-free

- Have an idea of how your thesis will be written. In your final year, have a firm plan for completion of the chapters of your thesis, to ensure writing-up is not a last-minute rush
- If you are writing or contributing to a research paper, have clear ideas of the milestones to be met in its preparation
- Plan for conferences to attend during the year, preparing poster/oral presentations if necessary and allowing sufficient time to do so
- One way to make sure you keep up-to-date with planning and carrying out the project is to produce a portfolio as mentioned earlier in this chapter

Daily planning

Use a daily plan to record what your daily tasks are, how important they are, and how long you feel they should take. These plans are a useful way of taking stock of what you need to do. They can also help to determine the effectiveness of your time usage in relation to the importance of the task.

Tips on planning your day

As you are devising your daily plan consider the following:

- How and when you work best should affect how you plan your daily tasks. Are you an early riser who falls asleep in the evening, or are you normally half-asleep in the morning but can work into the evenings? The key is to work when you are most alert, and try to plan your day around your optimum hours
- A lot can be achieved early in the morning, in the evenings and at weekends, when there is less pressure on computers and equipment. Be prepared to work the unpopular hours if this gets your work done ahead of time
- Before you start, make sure you have all the information you need. Find a place to work where you are least likely to be disturbed, such as your own lab, office or at home. Also, where possible, try to plan around interruptions
- Find out when your supervisor will be available to provide guidance or answer questions. If you know the best times to see your supervisor, you won't waste time trying to locate him or her
- Additionally, your hours should fit in with:
    - co-workers
    - equipment availability
    - seminars/tutorials/lunchtime lectures
    - reading time

- Try to make sure you include breaks in your schedule for relaxation and contact with other people. Too much out-of-hours working is bad for morale. Strike a balance, work hard but ensure you have time to play and, importantly, to sleep

Remember, if you are working out-of-hours in the laboratory, it is important that someone knows that you will be there alone as there are health and fire-safety issues to be considered. Make sure that you understand the working-alone rules, inform your supervisor when this happens and fill in the appropriate forms if necessary to allow you to do so.

Planning experiments

When planning an experiment, it can be helpful to ask yourself some simple questions to focus your thoughts. The answers to these questions will have a bearing on what you do and when you do it. Such questions include:

- What do I want to achieve this week?
  - how will I divide up the stages of the experiment between the days?
- How many hours do I want to put in?
  - do I have any social engagements that will prevent me working an extra hour or two tonight?
- How do the hours break down into different tasks?
  - for example, how long will it take me to set up, run and get the results of this experiment or how long does it take for the computer program to produce results?
- How important is each of the tasks?
  - prioritise so that you put your efforts where they are most beneficial to the project
- Am I doing anything unnecessary?
  - for example, is there a task that can be done by someone else or left out completely?

Be flexible

You might not be able to stick rigorously to your work plan; sometimes things don't run smoothly, such as the availability of equipment or materials, computing requirements or an experiment takes longer than you anticipated. Where possible, try to allow for such factors when planning your work.

Overall

- It is important to plan your work but don't spend too much time doing it, to the detriment of the work itself

- Make sure that the planned experiments fit the priorities and objectives laid out in your overall plan, meetings with your supervisor or portfolio (if you have one)
- Set realistic deadlines for specific pieces of work – if in doubt, discuss with your supervisor or someone else who has carried out the same kind of work
- Always allow for contingencies, such as equipment breakdown or factors outside your control

You may find it useful, especially in the early stages of your PhD, to make use of a plan that highlights and prioritises your tasks. Figure 1a shows a tabular daily plan with tasks time-limited and in order of importance.

Project planning

There are several stages involved in planning a project, and time needs to be allocated to each of them.

Tips on project planning

- Read in preparation:
  - try to read around a project thoroughly before you start any practical laboratory work – this will save time in the long run, and lessen the chance of having to repeat an experiment because of unforeseen problems
  - it is important to read and write up continuously throughout your PhD – this will help to overcome a last-minute rush in the final three to six months
- Define project objectives:
  - before you start any practical work, devise some objectives and aims for your project. It helps to be clear from the outset how you want the project to progress. Setting objectives should be covered in your meetings with your supervisor
  - as the project evolves some of your objectives may change, or new ones may arise – again, use your meetings with your supervisor to review these
  - some objectives may also be dropped if they become less relevant, or are less useful than others – talk to your supervisor before making any major changes
- Determine facilities needed:
  - precious time can be wasted searching for equipment or setting up an experiment and then finding that the equipment you needed is already in use – plan what equipment you will be needing at what stage of the experiment and book it

FIGURE 1a Example of a daily plan

Page	Day	Date	Month	Year
1	2	22	4	2005

Start Time	Finish Time	Activity	Task Rate	Mins per task A	B	C
9.30	10.30	Read paper to clarify methods for next experiment; book PCR machine	A	60		
10.30	11.00	15 mins discussion with staff member re: ongoing project	B		15	
		15min calculating oligo concentration for next PCR experiment	A	15		
11.00	12.15	Preparing material for tutorial tomorrow	A	75		
12.15	1.00	Lunch	A	45		
1.00	2.00	Setting up PCR, making reaction mixes, run machine, make gel	A	60		
2.00	3.30	Library – find and photocopy papers for reading for tutorial next week	B		90	
3.30	3.45	Coffee break	A	15		
3.45	4.15	Load and run agarose gel with PCR reactions	B		30	
4.15	5.15	Read papers from library and make notes	C			60
5.15	5.30	Take photo of gel and label with reaction names	A	15		
		Hours		**4**	**2**	**1**
		Minutes		**45**	**15**	**0**
		DAY TOTAL	**8 hours**			

KEY

A – high-priority task

B – medium-priority task

C – low-priority task

    - you may need to buy some materials in from outside suppliers, or wait for things to be made for you, for example. The delay between ordering and delivery is beyond your control and should be taken into account when planning an experiment
- Plan the mix of experiment, writing and theory:
    - make sure the balance between these is sufficient to allow optimal time management; you don't want to waste unnecessary time reading when you could be setting up an experiment and then reading about the next stage while it is in progress

Long-term planning

Every year of your PhD will involve deadlines of some kind, related to your annual reports, posters for conferences or contribution to research papers. It is important, therefore, to allow time for incidental deadlines during your PhD, as well as the known deadlines such as reports, tutorials and meetings.

It's often useful to consider the three or four-year duration of your PhD in sections, such as three-month periods, and to allocate an aim for each of the 'Quarters'. For example, in Quarter One you should aim to:

- do a fair amount of reading for your project
- acclimatise and familiarise yourself with staff/facilities
- attend courses that will be helpful to your PhD
- get yourself set up on your institution's computer and network system (e.g. e-mail account and personal folders).

Keep writing . . .

Continue writing throughout your PhD – for example, tutorial notes and essays can become incorporated into your final thesis. Certain sections of your thesis, such as the introduction and materials and methods, can often be written quite early on. You can always tweak them later if necessary. If your supervisor asks you to write a review of the field you are studying in the first months of the study, this could easily form part of the background chapter to your thesis. Your supervisor will then have a chance to assess your scientific writing skills at an early stage, allowing any problems to be rectified.

A general project plan

An idealised three-year PhD plan is shown in Figure 1b. You may not be able to adhere rigidly to a plan like this. The major events shown in bold will be applicable

FIGURE 1b Generalised project plan

Background reading and planning	October–April	Yr 1
Coursework	October–April	Yr 1
Preliminary work	January–September	Yr 1
Skills and technique learning	Before first year report	Yr 1
First year report	September	Yr 1
MPhil to PhD transfer process/ end of first year probation	October–January	Yr 2
Second year report	September	Yr 2
Major laboratory/ research work	October (Yr 2)–December (Yr 3)	Yr 2 & 3
Thesis plan	End of December	Yr 3
Writing-up	Start early February	Yr 3
Submission to university	End of September	Yr 3
Viva	0–3 months post submission	
Corrections	Allow 2 weeks to complete	

to all PhD students, although the timing might be slightly different, depending when you began your studies and whether you have a four-year grant.

Wherever possible, you should aim to reach the milestones in the time suggested to avoid a last-minute rush during your final year – try to write-up as you go along.

This plan is an overview of the milestones in your PhD – they may not apply to everyone, and many are flexible. For instance, it is essential to read about your field throughout the project to ensure that you are up-to-date with the latest developments. It is possible that your PhD might be scooped by someone else or even be proved a waste of time in the worst case, if you ignore what others are doing (see 'Current awareness services' in Chapter 3, page 49).

There is no magic formula for being successful in your PhD studies, but the best way is to keep doing a bit of everything throughout the three or four years – a bit like doing revision regularly rather than leaving it all to the end, but on a larger scale.

Remember, during the course of your writing-up you may need to repeat the odd experiment here and there, but avoid extensive lab work in the last few months when you are in the final stages of writing up.

Stress and the work/life balance

Establishing a good work/life balance is an important part of being a student. Finding the time for work, friends and family and your own interests is important. Each of these aspects should not necessarily get the same amount of time but a good balance of work, play and sleep is needed to make sure that stress is minimised. Continuously working long hours is not the best solution to most problems – it makes you tired and reduces your productivity, often with the result that your work is of a lower standard.

You will probably encounter stress at some point during your project – things do not always go well with the work, people seem to get in the way, things happen outside your work with family and friends. If you experience stress, take action to combat it as early as possible; if you don't, it could seriously detract from the success of your project and cause health problems later.

Tips for avoiding and dealing with stress

- Practise good time management and project planning:
  - preparation takes a lot of the uncertainty out of your project
- Take regular exercise:
  - try relaxation exercises as well as challenging workouts; daily exercise is ideal
- Talk to someone about being stressed out, so that it doesn't become unmanageable
- Eat a balanced diet:
  - avoid quick-fix sugar and stimulants like sweets and caffeine
- Maintain a healthy balance of work, play and sleep
- Be positive:
  - give yourself a pep talk every now and again (see 'Using self-talk to develop assertiveness' in Chapter 2, page 22)

Checklist

- ✓ Keep good lab books, paper and computer files:
  - keeping organised files will help when you come to write your thesis
- ✓ Use meetings with your supervisor to help set aims and objectives, and determine whether you have achieved them
- ✓ Use a diary to keep appointments, record deadlines and plan your work
- ✓ Write up as you go along, wherever possible
- ✓ Read around your project at the start and throughout your PhD
- ✓ Finish a piece of work/experiment and write it up straight away:
  - don't be caught out in two years time with unfinished work
  - materials and methods sections can be added to whenever you try a new experiment
- ✓ Don't spend endless time planning
- ✓ IF IN DOUBT, ASK – make the most of others' experience:
  - tutor/supervisor
  - post-docs in your lab
  - technicians or any others who may be able to help
  - other students who might overlap with your project or are using similar techniques
- ✓ Maintain a good work/life balance
- ✓ Combat stress early

Finding out more

Books

Cottrell, S. (2003) *The Study Skills Handbook*, 2nd edition, Palgrave Macmillan, Basingstoke.

Websites

Taylor, A., Turner, J. and Collier, J., *The University of Reading study guides: Time management – organising yourself and time.* Available at:
http://www.rdg.ac.uk/counselling/studyskills/publish/study%20guides/time.htm