

SMARTER STUDY SKILLS

**HOW TO
COMPLETE A
SUCCESSFUL
RESEARCH
PROJECT**

KATHLEEN McMILLAN & JONATHAN WEYERS

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SMARTER STUDY SKILLS

Instant answers to your most pressing university skills problems and queries

Are there any secrets to successful study?

The simple answer is 'yes' – there are some essential skills, tips and techniques that can help you to improve your performance and success in all areas of your university studies.

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Get smart, get a head start!

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ABOUT THE AUTHORS

Dr Kathleen McMillan was formerly Academic Skills Advisor and Senior Lecturer at the University of Dundee.

Dr Jonathan Weyers was formerly Senior Lecturer in Biological Sciences, Director of the Learning Enhancement Unit and Director of Quality Assurance at the University of Dundee.

Both are now freelance authors and consultants specialising in books on skills development in higher education.

This book represents a synthesis based on over 60 years of combined administrative, teaching and advisory experience. We have supervised and supported numerous students, conducted induction events and led skills workshops covering such diverse topics as thesis writing and personal development planning. Our backgrounds in the arts and humanities and life sciences respectively mean that our support has covered a wide range of subjects – from biology to orthopaedic surgery; information and communication technology to law; as well as political science and English as a foreign language.

Above all, we have spoken to countless students, both individually and in focus groups, and have consulted with fellow academics about research skills that underpin a wide range of disciplines. As well as gaining relevant qualifications ourselves, we have also observed at close quarters our own children taking on project work at university.

Our former responsibilities involved drawing up regulations for academic study, responding to research student feedback and a wide range of university committee work related to learning and teaching. We have carried out a number of relevant tasks, most notably the writing and editing of an extensive website providing guidance for students studying at the University of Dundee. Our collaborative writing has produced ten books on diverse aspects of learning and writing at university level. Most of these have appeared in several editions and they have been translated into a total of seven other languages.

In short, we have read widely, thought deeply about relevant issues and tested many ideas related to the research experience. This book is a distillation of all the best tips and techniques we've come across or have developed ourselves.

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As researchers ourselves, as well as supervisors, trainers and examiners of students, we have gained much from interactions with colleagues, students and external examiners. Our accumulated wisdom from many of these exchanges is expressed in this book. Some of the material was developed during the construction of the website *Advance@Dundee* (internal to the University of Dundee). We thank all of our colleagues and friends who helped us with that project, especially Margaret Adamson. We have also contributed to the training of research students at several different levels, especially in the area of writing up, and we thank both students and academic colleagues for the opportunity to develop our ideas and contribute in that area.

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PREFACE

We're delighted that you've chosen *How to Complete a Successful Research Project* and we'd like to think it's because this book promises insight into the research experience. Our aim has been to provide a highly practical guide to the planning, researching and writing up of a research project. The target audience is primarily advanced university and college students – for example, those taking on a penultimate or final-year dissertation, carrying out an honours project or conducting masters-level research. It should also suit those studying for baccalaureate or professional qualifications where research is required. The outcome of these exercises may be termed differently – for example, dissertation, report, paper or thesis. Readers should interpret our generic phrasing (for example, 'write-up') according to their situation.

At all levels of study, we feel that similar principles apply when conducting research, but at these advanced levels the stakes may be higher and the expectations of lecturers, tutors and examiners rather more demanding. Thus, there will be a need for greater accuracy in obtaining, summarising and presenting results; a requirement for deeper thinking in relation to ideas, positions and conclusions; and more exacting criteria in relation to referencing, editing and presentation. Guidance on these matters will often be valuable, if not essential, to ensure that the best possible grades are obtained.

We have tried to write material that will apply across subjects, although inevitably some of the content will be more relevant to certain subjects than others. This will also apply to its significance for students as individuals, who may have different experiences and training before arriving at this stage. For example, a student studying an arts subject might be quite familiar with the ways of arriving at and presenting a position on a topic (**Ch 17**), perhaps from practise during tutorial work, whereas a sciences student might gain hugely from reading about relevant approaches and methods. Similarly, a student of a maths-based science would probably find the content of the 'number crunching' chapter (**Ch 19**) rather simplistic as a result of their studies for past qualifications or modules, whereas an arts student may

benefit greatly from a ‘refresher’ on this topic. The material is therefore presented so that each chapter is self-contained and the book can be dipped into as needs emerge.

Regarding the writing itself, we have adopted the tried-and-tested approach of our other books in the ‘Smarter Study Skills’ series. That is, we have aimed for a direct and no-nonsense presentation. We’ve tried to avoid jargon, have used devices such as bulleted lists and have kept the main text uncluttered by placing examples and tips in boxes, tables and figures. Our goal is to allow readers to assimilate the key points rapidly and be able to apply relevant guidance to their manuscript.

If we were asked to give one overarching piece of advice it would probably concern the need for compromise during your research project. Put bluntly, your project will never reach perfection – for a variety of reasons, including limitations of time, resources and even bad luck. Only effective planning and time management can allow you to get acceptably close to your ambition for the work, so full attention needs to be paid to these skills. Hence, it is essential that you tone down any perfectionist tendencies and accept certain flaws in your work if it is to be of even quality and presented on time. Do not feel guilty about this; it happens in every piece of research. Our hope is that by reading this book, you will be able to minimise flaws and optimise each aspect of the final report.

We wish you well in your research and would be pleased to hear your opinion of the book, any suggestions you have for additions and improvements and especially if you feel that it has made a positive difference to the way you have approached your studies.

Kathleen McMillan and Jonathan Weyers

HOW TO USE THIS BOOK

Each chapter in *How to Complete a Successful Research Project* has been organised and designed to be as clear and simple as possible. The chapters are self-contained and deal with particular aspects of the subject matter so that you can read the book through from beginning to end, or in sections, or dip into specific chapters as you need them.

At the start of each chapter you'll find a brief paragraph and a **Key topics** list that lets you know what is included. Within each chapter, the text is laid out to help you absorb the key concepts easily, using headings and bulleted lists to enable you to find what you need. Relevant examples are contained in figures, tables and boxes that complement the text. The inset boxes are of three types:

Smart tip boxes emphasise key advice that we think will be particularly useful to you.



Information boxes provide additional information that will broaden your understanding by giving examples and definitions.



Query boxes raise questions for you to consider about your personal approach to the topic.



Finally, the **Action points** section provides three suggestions for possible follow-up activities as you consider ideas further.

INTRODUCTION

1

TAKING ON A RESEARCH INVESTIGATION

How to approach the challenges of project work

Embarking on a research project can be exciting but also challenging. To succeed, you will need to understand fully what's required of you and set about your work with the right expectations and attitude. This chapter introduces the key phases of research, outlines the activities necessary at each stage and covers the skills you will need to develop.

KEY TOPICS

- What's expected in a research project?
- Approaching a research project

We are assuming in this book that you have started or are about to begin what might be termed a 'high stakes' undergraduate or master's research project. That is, one that accounts for a large proportion, if not all, of the grade or degree you hope to achieve, and, moreover, one that will involve an extended period of study and, as a result, a formal write-up. The aim of this book is to assist you in producing the best possible outcome from this period of study, by explaining the

Models of research study

Various models apply to project work. Your project may be carried out alongside lectures, practicals, tutorials (and associated assignments), or you may be allocated a dedicated period of time to carry out your research and write up your account of the project. The length of time allocated to the process may be weeks, months or even a full year. Regardless of the precise details, there are certain principles and approaches that apply in all situations.

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processes, expectations and most effective approaches to project work, while also warning about difficulties you may encounter.

WHAT'S EXPECTED IN A RESEARCH PROJECT?

This is the first question you should ask yourself before starting your study. You may already feel you know part of the answer from information received during your previous studies and assignments, when the techniques used to establish received wisdom in your discipline may have been introduced. You may also have experienced 'tasters' in the form of brief projects or coursework carried out in earlier years of study. However, in all probability, none of this can prepare you for the authentic experience of advanced research. You will have to work at a new, higher level, paying meticulous attention to detail, technique and methods of analysis. Your work will need to be original and, ideally, will make a genuine contribution, however small, to knowledge in your field. You will also have to write up your work to the highest standard. For some, that particular aspect may seem harder even than conceiving new ideas or using advanced analytical techniques.

One way of finding out about the academic expectations for your project is to examine the learning outcomes (or objectives) associated with your programme of study. These can normally be found in the course handbook or within online resources. Typically they will cover general aspects such as:

- planning work and managing time
- making literature searches
- learning new research techniques
- applying theory and/or technology
- problem solving
- conducting research
- working ethically and safely
- adopting professional standards
- carrying out data interpretation and analysis
- evaluating your own and published work
- writing your findings up in a formal account.

Each of these terms means something different in any given field of study and not all will be relevant in your specific subject.

In addition to these academic outcomes, your department, supervisor and, more importantly, those who will assess your completed project will expect to see certain personal qualities, including:

- the dedication of time and energy to complete your project on time
- the application of intellectual integrity to your research task
- active participation in meetings to review the work in progress
- an approach involving a questioning and open mind
- the capability to demonstrate original thinking
- the stamina and application required to be productive in the conduct of your research and its write-up.

All this may sound like research is a demanding experience, and it will be. However, the hardship is balanced by rewards that are worth all the effort. You will, of course, have deepened your understanding of the topic and overall subject area. You will also have developed hugely as a person and, with luck, the work you have done will contribute to a grade or degree that will allow you to move forward towards your chosen career aspirations.

The endpoint of research project work



The most important tangible product of any project is the report that you will submit for assessment (in some cases, it may be called a paper, dissertation or thesis). This document will summarise your findings and it must normally be presented in the standardised format that applies to your discipline or department. In rare cases, your work may even be published in the academic literature (journals) of your field. However, there are other major outcomes that are less tangible. These are related to the development of your intellect, thinking, skills and ambition. In some cases project work can be life-changing – and it will certainly contribute to changing your personality and outlook.

APPROACHING A RESEARCH PROJECT

To be successful, and in particular to report on your investigation on time, you will need to be clear about your overall aims and the approaches required to achieve them. It will not be possible to map out all your work accurately and in detail (if this were the case, then perhaps the research would not be worth tackling). Nevertheless, you should try to anticipate what skills you need to develop. You should also be proactive in arranging the necessary meetings and visits in gaining access to research materials and facilities. Possibly most important of all, you will need to understand the need for ‘closure’ (most research is, after all, open-ended with no ‘right answer’) and be willing to accept the compromises required for completion in terms of the formal write-up. Most students experience highs and lows as they progress through what is necessarily uncharted territory. It will be important to remain upbeat during episodes when things may go less well than you hoped. Recognising this aspect of project work and remaining well-motivated is a vital key to successful research study.



Balancing your effort

No single part of your research effort should dominate over any of the others, or the overall quality of your work will suffer. Typical faults are:

- spending too much time on initial reading before getting down to work
- being obsessed with getting a ‘perfect’ set of results
- heading off down a blind alley that is not relevant to your main theme
- avoiding the writing-up phase.

To avoid these failings, create a work plan (**Ch 5**) and review your progress frequently.

Understanding how a project develops through time is vital if you are to organise yourself and submit high-quality work on the required submission date. Table 1.1 shows some of the key stages in a research project, with typical work activities and the skills required to perform them. With so many component parts, most of which could be open-ended, good time-management and planning are essential. **Chapter 5** provides tips on this aspect of research study.



How can I gain an understanding of the quality of work required?

Firstly, consult the marking criteria for the project and associated write-up (usually published in the course handbook). These may indicate for example, the emphasis placed on originality or on presentation. Submissions produced by students in previous years will help you gain a sense of style and standard – but don't feel intimidated by apparently sophisticated structure and style in these completed examples. Achieving this standard did not happen spontaneously. Your starting point may not be at this level, but the learning process will very likely result in a similarly high standard of document.

ACTION POINTS

1.1 Consider your personal strengths and weaknesses in relation to the challenges of research activity. This self-understanding may also help you to take anticipatory action – for example, by considering how you might need to develop skills such as calculating and interpreting statistics, data presentation, referencing or academic writing.

1.2 Review the timeline for research study shown in Table 1.1 and create a set of targets for yourself. Think about where you would like to be in your research at different times. Some research projects are completed in a hurry at the end of the study period, but you can avoid this by planning your work carefully and giving yourself the best possible chance of completing on time, avoiding a last-minute rush.

1.3 Get yourself organised. Regarding the points made in 1.2 above, one of the keys to meeting targets is being organised in your work, so ensure your filing (both computer and hard copy) is in good order right from the start – and periodically review its status, giving it an overhaul from time to time. Always remember to back up your files.

Table 1.1 Timeline for a typical research project. This is a generic model and so the nature of events and their order will differ according to individual contexts, disciplines and institutions. In particular, development in thinking and writing will depend on the individual.

| Event and milestones | Focus of work activities | Development of thinking and skills |
|--|--|---|
| Selecting or identifying a research project | Scoping possible areas of research | Decision making and critical thinking (Ch 16) |
| Choosing and/or meeting supervisor | Researching past work | Thinking about personalities and interactions (Ch 6) |
| Writing a research proposal or plan | Writing proposal, possibly in defined format (Ch 4) | Basic review of research area, potential topics and approaches (Ch 7) |
| Carrying out a literature search or survey | Identifying relevant literature and initial assessment of literature | Information literacy (Ch 7); analytical and critical thinking (Ch 16) |
| Standardising information regarding sources | Deciding on a referencing system or following the recommended referencing system (Ch 24); organising materials and records (Ch 11) | Grouping resources thematically, thinking critically about content (Ch 16); learning how to use referencing software if appropriate |
| Planning research | Designing a research strategy including methodological approach (Chs 3, 12–15) | Clarification of research topic and related thinking (Chs 2–4, 12–15) |
| Seeking ethical approval | Using the formal application process as appropriate (Chs 4, 18) | Considering ethical aspects of the topic (Ch 18) |
| Undertaking experimental work or conducting a survey | Designing and testing (Chs 14–15) | Planning ahead; thinking about resources and activities (Chs 5, 14–15) |
| Searching literature and reading | Making a critical appraisal of existing work (Ch 8) | Deeper thinking about the research field, including generation of original ideas (Ch 16) |

| | | |
|--|---|--|
| Continuing observational or experimental work (where relevant) | Carrying out work of high quality, suitable for final write-up | Collecting and analysing data (Chs 19–20) |
| Submitting interim reports on progress | Writing about research and associated ideas | Organising material and writing in appropriate format and style (Chs 22–23) |
| Having meetings with supervisor | Discussing progress, including review of agreed action points, assessment of results, presentation of data/ideas and assessment of their significance | Writing up drafts or conclusions (Chs 21–23) |
| Writing the main literature review | Summarising ideas in context for introduction or main thesis section (Ch 23) | Arriving at a position and supporting it (Ch 17); citation and referencing (Ch 24) |
| Completing the final observational or experimental work (where relevant) | Carrying out data collection and analysis (Chs 19–20) | Deciding on significance and writing provisional conclusions (Ch 22) |
| Writing the report, paper, dissertation or thesis | Attempting to write a near-final version from notes and early drafts | Planning both time for writing and formatting (Chs 5, 21, 23); academic writing skills (Ch 22) |
| Submitting drafts to supervisor | Preparing material to high standard | Learning from feedback (Ch 26) |
| Editing and proofreading the final draft | Preparing material to high standard; following guidelines to the letter (Ch 27) | Checking for consistency and completeness; creating final reference list (Chs 23–25, 27) |
| Submitting the completed work | Arranging for binding if required | Finding and correcting any remaining errors |

PLANNING YOUR

RESEARCH PROJECT

2

CHOOSING A RESEARCH TOPIC

How to decide on a theme for your investigation

The correct choice of project topic will improve the chances of a successful outcome. It is important to weigh up relevant issues as you select among the possibilities.

KEY TOPICS

- Deciding on your personal research interests
- Taking account of the options open to you
- Making a final decision

The precise topic you choose to research has a great influence on how well you succeed in carrying out the investigation and in writing up your work. A crucial factor is whether you have a genuine interest in the subject, as this will motivate you to complete the task to the best possible standard. In addition, many practical matters need to be taken into account, such as the feasibility of the intended investigation, or the availability of relevant resources.

DECIDING ON YOUR PERSONAL RESEARCH INTERESTS

For any research project, it is essential that there is enough about the topic that is novel and challenging for you. If this is the case, then your levels of motivation will be high and may sustain you through any problems you encounter. If not, you will be liable to become bored or disillusioned, and this will hinder your ability to complete and write up your work.

By the time that you're considering a potential research topic, you will almost certainly have an above-average interest in the broader field of study. However, you may never have thought rigorously about

your true underlying interests. Now, when you are forced into making a decision, these will need to be considered quite deeply. For some, stating a primary interest might be easy, but for many, it will be quite difficult to commit their efforts to one highly focused subject, or to settle on which option on a list interests them most. There may be a range of possibilities, each with a balance of attractions and negative aspects.



Rewind your past experiences to focus your views

Reflect on those areas of your course where you found your curiosity and interest being fired. Remind yourself about appealing issues that arose in debate in the lectures, tutorials, seminars or practicals. This may help to give you some direction in selecting a topic.

TAKING ACCOUNT OF THE OPTIONS OPEN TO YOU

In many cases, you may find that the project topics are prescribed or restricted. The decision is not so much what you would like to research, but more which topic you will choose from a list of options provided by academic staff. A variation on this closed-option list is the semi-closed list, where academics provide a list of broad topics but leave the student to choose the detailed perspective that they wish to pursue.

Constraints such as these may feel limiting, especially at first when you do not know the details of the topics outlined. However, they are generally designed to provide you with a degree of freedom within parameters controlled by those who will need to supervise and assess the finished work, and who will have carefully considered the practicalities of each option and the chances of obtaining a successful outcome.

Where your choice is restricted, or from a fixed-menu of options, consider each option in turn. Do not reject any possibility out of hand until you know more about it. Obtain background information where necessary and if a reading list is offered, consult this. Rank the options according to how they appeal to you.

Make your decisions with speed but not haste



If a list of research options is presented, find out the details as quickly as possible, as there may be competition for specific topics or for particular supervisors. However, make sure you take all relevant factors into account in a deliberate decision-making process, rather than hastily choosing under pressure. You should give the matter high priority and allocate time and attention to activities that may help you make a decision, such as library or internet searches and discussions with potential supervisors.

A less restricted approach to the selection of research project topic may occur. In this case, no list is provided and you are asked to choose not only the topic but the specific research question to be addressed. In this open-choice case, you will be expected to make a selection largely on the basis of your personal interests within the discipline. These might have developed from your personal experience or from previous consideration of related topics arising from your course of study – for example, from reading carried out for coursework.

If you have this type of open choice, then one approach might be to brainstorm possible topics and sub-topics within your subject and then to rank these in order of your interest. You could do this in phases, moving sequentially from broader subject fields to more closely specified research areas, until you can narrow down the choices and a set of favourites emerges.

MAKING A FINAL DECISION

While you may have distinct preferences for specific areas of study, you should still consider the options at a finer level before making a final decision. Many factors will influence your ability to complete your studies to a high standard, and they should all be borne in mind as you weigh up different possibilities.

Potential research approaches

Is it possible for you to identify the approach that might be required? Is there a question to be answered, a problem to be solved or an issue to be debated? How will you restrict the potential areas to cover? How exactly will you set about researching the topic? You may alter this ‘research angle’ through time, but refining your thoughts at this stage