

Study Guide

Welcome to Manchester Metropolitan University.

You probably have many reasons for coming to university. You may want to widen your experience and make new friends. You may be leaving home for the first time or you may be wanting to start again and take up missed opportunities. You will also be here because you want to learn. You have decided on a course of study and you want to start on a learning process which will help you to move forward in your life.

This booklet has been written to give you some hints and tips for that learning process. It has been set out so that you can use it as a diary. In that way, you'll dip into it from time to time over the course of the year rather than trying to take in all the information in one go.

It won't tell you everything you need to know about how to study, so we've given you some references to other books and web sites that students have found useful in the past. These are only a small selection and we do not guarantee that all web sites will be fully accessible. Remember, though, if you do have difficulties and you can't find the help you need here, come to see us – our telephone number is at the back of this book.

In the meantime, best wishes for your course!

The Learning Support team
September 2005

Getting Organised

When you start at university there may be approaches to learning which seem new to you. You are here to become an independent learner. Your lectures, seminars, reading lists and assessments are all intended to help you to develop your individual learning skills as well as to gain an understanding of your subject. It's up to you to make the most of your learning opportunities and the best way to start is by getting organised.

Motivation

One of the key factors in organising yourself is to be motivated. You are more likely to succeed if you have a sense of purpose. So before you go any further can you think of the reasons you have for coming on the course. Choose one or two reasons you feel strongly about and work out why they are so important to you. For example you may want a qualification which will lead to a better job. If you are to achieve that outcome you will need to break it down into smaller and more manageable goals. Those goals will then help to give you a structure for your years at university.

Learning Styles

Once you've identified your goals you have to think about how you will achieve them. As an independent learner you can choose to work in the way which suits you best. So it is important to be aware of your preferred learning style. There are many ways of identifying learning styles in different areas. You may like to use one of the web based questionnaires listed in our references to work out your preferred learning style. When you've identified your own personal learning style you should then be able to tailor the way you learn to suit your preference. You may be an active learner and retain and understand information more effectively by doing and applying what you've learnt. A reflective learner on the other hand needs time to think things over. Visual learners remember what they see best, while verbal learners get more out of words.

Conditions for learning

It is important to think about the conditions in which you prefer to work if you are to learn effectively. Think about whether you can study with other people around. You may find that despite the fact that the library is quiet the fact that other people are also studying there is distracting and you may need to study in a room of your own. Consider whether you work best with background music and if so what type. You should make sure that your working space is comfortable but not so comfortable that you are too relaxed to learn. It's also important to make sure that your workspace is well lit and well ventilated.

Managing time

One thing you will find is that you never seem to have enough time when you are at university. It's a good idea to start planning your time from the beginning of the university course. This booklet is set out as a diary. You can make a start by noting in this booklet your key deadlines for the term and adding to them as the year goes on. We've also included a timetable chart. Use this to make a complete record of how you intend to spend your time. Think about the things that need to be fitted into the week as well as lectures, tutorials and study time. We all need time to sleep and eat! Remember that no-one is perfect so do allow some time for slippage as well.

More information

Cottrell, Stella, (1999)
The study skills handbook
London: Macmillan

Mumford, Alan (1995)
Effective Learning
London: Institute of Personnel
and Development

www.adm.uwaterloo.ca/infocs/

www.ucc.vt.edu/stdysk/stdyhlp.html

Learning Styles

www.campaign-for-learning.org.uk/aboutyourlearning/whatlearning.htm

www.surrey.ac.uk/skills/pack/stleq.html

Learning from Lectures

Lectures often have a key role in university learning. They present you with information which will help you to develop your understanding of the subject, present you with ideas for your own research and guide you towards further reading.

In lectures you may well be presented with explanations or clarification of particular topics or you may be hearing a lecturer's interpretation of relevant issues. In general, lecturers have processed a lot of the information you need and are presenting it to you in the form that they think is appropriate for your syllabus. They are also making it relevant to the particular subject you are studying.

Lectures can have drawbacks though. You can't backtrack as you can when you're reading. You have to work at the lecturer's pace and there is very little scope for slowing down or even speeding up depending on how well you understand what is being presented. You also have to get used to different styles of presentation as each lecturer will have very individual styles of working.

Before the lecture

Try to prepare yourself for your lectures beforehand. You may have a course schedule which tells you the title of your lecture. If you know which topic is being covered you can do some advance reading. Try to identify questions you might have about the topic. Write them down and leave space to write any answers. Form an opinion about the topic – it might change during the lecture and it would be interesting to consider why. Do get to your lecture on time. If you arrive late it's very difficult to pick up the thread of the lecture. Take care that you switch off your mobile phone and your alarm watch before you go into the lecture theatre. They can be very distracting.

During the lecture

Try to choose a seat where you will have a clear view of the lecturer and the board or screen and where you will be able to hear clearly. If you do have any difficulties with access to the lecture material try to let the lecturer know, preferably in advance.

In your lectures try to listen actively. You will not be able to soak in material like a sponge so try to analyse the material as you hear it. Don't try to write down everything the lecturer says but take notes of key points and important issues. As you get used to a lecturer you will recognise the structure of their lecture and be able to listen for signposts. Try not to write down things which you can find in your textbook but make a note of their relevance to the topic. Use coloured pens to distinguish the more important points.

After the lecture

Label your notes and any handouts – you will probably need to refer to them again. Before you file them, read through your notes. It is sometimes useful to try to write a one page summary of what you learnt in the lecture. This will also help you to practice your writing skills. Label your summary and file it with your notes. Read through any articles or textbook chapters which were referred to in the lecture. Discuss your lecture with other people. It will help you to link new information to what you already know.

More information

Ashman, Sandra and Crème,
Phyllis (1996)

Taking notes from lectures 3rd ed Oxford: Blackwell's Bookshops.

[www.learningcommons.uoguelph.ca/
learning/fastfax/lectures.htm](http://www.learningcommons.uoguelph.ca/learning/fastfax/lectures.htm)

Finding Information

If you are to be a successful independent learner you will need to develop skills in finding information. You will be given a lot of information by your tutors in lectures and on handouts but they won't always provide you with all you need to know. There will be times, on the other hand, when you will be faced with far too much information and you will have to be selective about what is appropriate and relevant information. Most of your study time, in fact, will be spent gathering and sifting through information so it is important to take an organised approach to finding information.

Identifying relevant information

Before you start looking for information you should try to have a clear idea of what you're looking for. You may need information for an assignment or you may need it to help you understand a concept more effectively. You may be looking for something just out of interest. The purpose behind your information gathering helps you to decide the type and depth of the information you need. Think about whether the information needs to be collected first hand through surveys or experiments or whether the information is already available in print or on-line.

Once you have some idea of the type of information you're looking for you need to work out what you need to know.

The books on your reading lists can give you pointers to other sources of information. Sometimes, it's helpful at this stage to brainstorm. Think about the what, where, why, who, how and when of the topic. Then try to work out the main aspects of the topic. If you can end up with a short list of key words or phrases it will help you find the most relevant information. You should also think about your timescale for finding the information. Information gathering is an activity which expands to fill the time available and beyond.

Information resources

The University library is a good place to start looking for information. Each MMU campus has its own library providing materials focused on the subjects studied at that site. You can reserve and borrow material from any campus library.

The library has a wide range of resources which include books, printed journals/magazines and newspapers, theses, DVDs, videos and CDs. Electronic resources are also available. These include electronic databases, e-journals and e-books. The Library catalogue (available via the Internet) provides details of all the various resources available.

You should try and familiarise yourself with the library services early on in your course. All new students should receive a library welcome session during their first term. Try not to miss it. If you do find that you need help in the library ask one of the librarians at the enquiry desk. They have a range of useful leaflets and will be pleased to assist. You may also contact the libraries by telephone or e-mail.

The Library also runs the 'InfoSkills' training programme which includes lectures, workshops and on-line tutorials. This will help you to work more strategically when you need to find information for an assignment. It will introduce you to planning your search for information, help you choose relevant resources, use them effectively and show you how to evaluate what you find.

Full details of the Library services on offer and our contact details may be found at the Library website: www.library.mmu.ac.uk

All students at MMU have access to the Internet. The Web can provide a wealth of information which you can access by visiting specific sites or by using a search engine. A search engine allows you to type in key words and phrases then returns a hit list of sites containing those words. It is important to be well-focused when searching the web as you can end up with thousands of web sites.

When you locate relevant information on the web make sure you check the authority and background of the site – anyone can set up a web site and you need to ensure that the information you use is valid.

More information

Payne, Elaine and Whittaker,
Lesley (2000)
Developing essential study skills Harlow: Prentice Hall

Drew, Sue and Bingham,
Rosie (1997)
The student skills guide
Aldershot: Gower

MMU library
www.mmu.ac.uk/library

www.mmu.ac.uk/library/induction/index.html

Researching Information

www.library.mmu.ac.uk/info/infoskills.html

Making Notes

Making notes is a skill which is needed for many different tasks during your time at university. You will find yourself making notes in lectures and from your reading. You'll also need to make notes when preparing your assignments and revising for your exams. If you have to undertake practical work, either in laboratory experiments or on placement or field work you will need to make notes to help you write your final report. Making notes, however, is a very personal skill and you will need to develop ways of making notes to suit your working style and at the same time making sure that you can use them in the future.

Methods of making notes

Annotation

One method of making notes is by annotation, that is by writing on the text. While this isn't a suitable method to use on library books which have to be returned, it can be very effective if you have your own copy of the text or are working with a photocopy. It can also be used in lectures when you are given handouts or copies of overheads at the beginning of a lecture. The key features of annotation are underlining and highlighting. It's useful to have different coloured pens to indicate key points and to show you where to home in when you come back to the text later. You can also make notes in the margin of points which you need to follow up or which help you to make connections with other issues.

Mind maps

Many people prefer to use graphic methods of making notes. These can be particularly useful for revision or when you're trying to clarify the structure of the topic. Mind maps help you to see the whole picture. When you create a mind map use a large sheet of paper and start with a central concept. Note points relating to that concept by working outwards from the centre. Use key words only and use colour to organise your map. Add images and symbols to help you get a feel for the subject. You'll find some examples of mind maps on the web sites in the references.

Column notes

Some people find it useful to structure their notes in columns. On each page of your notes draw a wide margin on each side. On the left hand side make a note of sub-topic headings. Your main notes will be written in the centre column. Then in the right hand column you can make a note of any questions you have or any points you need to follow up.

Linear notes

Many people prefer to make their notes in a list form.

If you use this method it can be helpful to have a numbering system so that you can identify main points easily. You can also distinguish between main headings and subtopics by indenting from the margin. Underlining, colour coding and drawing outlines around key words can also help you to emphasise important points. You can also work out a system of abbreviations and symbols to help you work more quickly.

Post-it notes

It can be very useful to carry a pad of post-it notes with you.

If you want to make a note of an idea you can then stick it onto a sheet of paper in a folder or into a notebook. When you come to write your essay or report you can then move the labels around to help you develop a structure for your assignment.

More information

Buzan, Tony (1995)

The mind map book

London: BBC books

www.mindtools.com/pages/main/newMN_ISS.htm

www.inspiration.com

www.mind-map.com

Reading Effectively

You are more than likely to be issued with reading lists at some point during your university course. Sometimes these seem overwhelming but remember that you are probably not expected to read all of every book on your reading lists. Reading is a key tool in your learning experience as it gives you access to the ideas and thinking behind the academic discipline you're studying.

Ways of reading

It can be useful to think of what you are trying to achieve when you read. The way you set about reading should depend on what you are trying to get out of the text you're reading. You will generally find that reading for academic study takes place in one of four ways.

Background reading

Background reading is the reading you do to get the big picture. It can be done at an easy, steady pace and will give you an overview of the subject. When you are reading for background try to choose texts that are easy to take in and which give you general views rather than detailed information.

Skimming

It's sometimes useful to search through a text or article quickly. When you are skim reading look for cues such as headings and sub-headings which the author is using to alert the reader. You may skim through the text looking for particular names or technical words. When you skim read remember that it's worth looking at the diagrams. They can sometimes provide a lot of information about the content of the text.

Scanning

Scanning is very similar to skimming in that you run through a text very quickly but in this case you will be looking out for specific information. When you scan you will be looking for answers to particular questions or for specific references. You are aiming to gain a moderate level of information when you scan, so you will find that you need to read some sections in detail.

Detailed and critical reading

You will often find that if you need to learn from the text you will have to read it in depth however. Detailed reading needs to be active reading if you are to keep up your concentration. One method for active reading which many people find effective is the SQ3R method.

First survey the book or chapter that you intend reading.

Skim through the text as a whole. Scan the introduction and conclusion. Look at the contents page and look up particular items in the index. Read the publisher's blurb and the bibliography. This will all give you some idea of what you expect to find in the text.

Next question yourself and ask what you would like to find out. Write down a list of questions which you hope the text will answer. Use the who, what, why, where, when and how approach to help you form questions.

You are now ready to read the text. Read the whole chapter or section carefully to start with. Don't make any notes at this stage but underline key words. Then divide it up into smaller sections and read these again trying to find the answers to your questions.

The next stage is to recall what you have read. At this stage try to write a summary in your own words of the section, noting main points and key ideas.

Finally, review the process. Skim through the section and look at your questions and your notes to see whether you have grasped what the chapter is about. At the same time, ask yourself how valuable you found the text. You need to feel confident about the information you've gathered.

More information

Ashman, Sandra and Crème,
Phyllis (1996)
Reading for study
4th ed Oxford: Blackwell's bookshops

Speed reading

[www.mindtools.com/pages/article/
newISS_03.htm](http://www.mindtools.com/pages/article/newISS_03.htm)

www.ucc.vt.edu/stdysk/suggest.html

www.study-pro.com/studytips.html

http://www.palgrave.com/skills4study/html/reading_writing/readingstrategies.htm

Writing Essays

For many subjects the type of written work that you will be asked for most often is an essay. If you are asked to write an essay you will be expected to present a short structured piece of written work which is complete in itself and deals with a specific topic. While essays are generally set as a means of assessing your progress they are also a key part of the learning process. Producing an essay should help you to increase your understanding of a particular subject and to develop your critical thinking skills. It should also help you to strengthen your written communication skills.

The stages of essay writing

Essay writing can be tackled in four stages: thinking, planning, writing and revising. It's a good idea to decide early on how much time to allow for each stage. Work backwards from the deadline and identify when you will move on from research to writing. It's very easy to get carried away by research and leave writing to the last minute. It's also a good idea to leave some time in hand for such things as computer failure.

Thinking

This is the stage which should take up most of your time.

You need to analyse the question carefully. This will decide the approach you take to the question. Discuss the question with your fellow students and your tutor so that you can clarify meanings. Your tutor may also be able to give you a breakdown of how the essay will be marked which will help you decide which direction to take. This is also the stage in which you need to do your research. Keep a folder to put in any notes, questions, ideas, cuttings and photocopies and details of the texts or audio-visual material you have used. Deadlines are important at this stage – remember that you won't be able to cover everything so call a halt to your research

Planning

This is a vital stage of essay writing but everybody has their own method of developing a plan. At the planning stage you are trying to structure ideas and order information so that you can develop a clear analysis of fact or a logical argument. Plans can take several different forms. If you work well with diagrams you might use a flowchart or a mind map. If you prefer to use words you might develop lists or write a summary. Some people will write a beginning and an end at this stage to clarify the direction the essay will take and to ensure that the question is answered. While this often helps to structure the essay it is not set in stone and can be changed later.

Writing

Writing the essay is often the hardest part. Set time aside when you can write without interruption and use your plan as a guide. Your thoughts ought to be expressed clearly and simply. Aim for a concise direct style. Try to make your argument flow by linking paragraphs and creating connections. If you are not sure about your style and sentence structure try reading your work aloud. It's often easier to 'hear' sentences that don't work. If you are using a computer to word process don't forget to backup regularly.

Revision

Before you hand your essay in set aside some time for revision. It's a good idea to allow one or two days between completing the writing and beginning revision. You will need to check the content and structure as well as making sure that everything is relevant and that your arguments are developed logically. Don't forget to check grammar, spelling and punctuation and make sure you have kept a copy before you hand your essay in.

More information

Ashman, Sandra and Crème,

Phyllis (1996)
How to write essays
4th ed Oxford: Blackwell's bookshops

Northedge, Andrew (1990)
The good study guide
Milton Keynes: Open University Press

Peck, John and Coyle, Martin (1999) The student's guide to writing
London: Macmillan

Temple, Michael (1997)
2nd ed Grammar book
Oxford: Blackwell's bookshops

[http://owl.english.purdue.edu/
handouts/general/index.html](http://owl.english.purdue.edu/handouts/general/index.html)

www2.actden.com/writ_den/tips/essay/

<http://www.lc.unsw.edu.au/olib.html>

<http://www.uefap.co.uk>

http://www.learnenglish.org.uk/grammar/archive/grammar_games_index_page01.html

Citing References

Citing references is a vital aspect of academic work which can cause a great deal of anxiety and often generates some criticism from academic staff. In this guide we can only provide a brief introduction to referencing. This is partly because all departments have different approaches to it. You may be given a handout by your department about referencing. If not check with your tutor to find out which convention is used in your department.

Why are references needed?

Much of your written work will be derived from information which you have gathered from books, journals or the Internet. You may simply be using the ideas to back up your arguments or you may decide that you need to quote the exact words that you have read. Either way you need to acknowledge the other writer's work as a matter of courtesy. You also need to demonstrate that your work is based on a recognised body of knowledge. In addition, anyone who reads your work may need to be able to find your source material effectively.

Methods of citation

The process of referencing consists of two parts. Citing the reference and developing a bibliography. Citation is the way in which you refer to the texts you have used in your

own writing. The two main citation methods used at MMU are the numeric method and the Harvard method. However, some subjects have very specific conventions.

The Harvard system is generally considered to be the most straightforward way of citing. All you do is to give the name of the author and the year of publication. If you mention the author's name you put the date in brackets afterwards.

If the author is not mentioned by name then the name and date are put in brackets. When using a direct quotation the page number should also be included in the bracket after the date. In the numeric system you should insert a number into the text which refers to the sequence of references at the end of your work.

References

A reference is a description of the source you have used. It is useful to make a note of all the details you need for the reference as you progress through your work. If you've borrowed a book from the library you may have had to return it before you come to write your references

The information you will need for your reference will include:

- the name and initials of the author or authors
- the year of publication
- the full title of the book or article
- for journal articles, the name of the journal and the number of the volume
- the edition of the book, if relevant
- the place of publication
- the name of the publisher
- relevant page numbers if a journal article.

If you are using the Harvard system of referencing you will include this information in a list at the end of your work, arranging the list in alphabetical order of author surname. If you use a numeric system the list will be arranged in the order in which you cited the reference.

Electronic publications have to be cited and referenced in the same way. In the case of electronic texts you will also need to include the URL and the date on which the work was accessed.

More information

Fisher, David and Terry,
Hanstock (1998)
Citing references
Oxford: Blackwell's bookshops.

<http://www.lc.unsw.edu.au/olib.html>

Giving Presentations

From time to time in your course you will be asked to give a presentation. This may vary from giving an informal talk to a group of fellow students or summing up after a seminar session to giving a formal assessed presentation in a lecture theatre. Whichever it is it may seem very daunting when you are first asked to give a presentation. It's a very valuable skill though and can stand you in good stead when applying for jobs. So it's worth putting some effort into giving good presentations.

The purpose of presentations

The key purpose of a presentation is to communicate a message to an audience. You may be wanting to pass on information or to give instruction but you may also be wanting to use the presentation as a means of persuading others of your particular viewpoint. You may also want to entertain your audience – remember that if you want to get your point across to them you will need to hold their attention. Essentially you will be giving a performance which will enable you communicate your message effectively.

Preparing for a presentation

Once you've decided on the purpose of your presentation you need to start preparing. Think about who the audience is and how they will react to what you are going to say. You may have been given some guidelines and you may be expected to answer questions from your audience. It's useful to find out a bit about the room where you'll be giving your presentation. Find out what equipment will be available. You are likely to have an overhead projector but you may also have facilities for a slide projector or a computer display. One thing you must be clear about is how much time you will be allowed for delivering your presentation. Remember that it takes longer to say something than it does to read it so don't prepare too much material. Work out what you want to say and structure it so that your audience can follow your train of thought. Give the audience an overview of your talk in the introduction and summarise your talk in the conclusion. Think of the presentation as a performance and rehearse beforehand. Time yourself and practise giving your talk from notes as opposed to reading a script.

Giving the presentation

Arrive at the room in good time so that you have time to get organised before you start presenting. Make sure that the audience have settled down before you start. If it's a formal presentation it's a good idea to tell the audience that you will take questions at the end. If anyone does ask a question during your talk you will then feel that you can make it clear that you will answer the question later. Speak a little more slowly than you would normally do and also a little more loudly. Try to stand where everyone in the audience can see your face and look up from time to time so that you can make eye contact with friendly faces in the audience. It can be useful to put your notes on postcards so that you can hold them in your hand and won't need to look down while you're talking. Prepare good lines to start and finish on. They will help to focus the audience's attention.

Visual aids

Decide well in advance what visual aids you need. This will give you an opportunity to make sure that the right equipment will be available. You may be encouraged to use a computer presentation package such as Power Point. If so avoid the temptation to make your slides too detailed. The same applies to overhead projector transparencies. They should be brief and in large print. Do make sure that they are in focus before you begin. Finally, accept the fact that you may be nervous. Remind yourself that you are well prepared and don't forget to smile at your audience

More information

Hindle, Tim (1998)
Making presentations
London: Dorling Kindersley.

Townsend, John (n.d.)
The business presenter's pocketbook Arlesford: Management Pocketbooks.

www.aicpa.org/cpe/powerpt.htm

<http://www.lc.unsw.edu.au/onlib/speak.html>

<http://www.mmu.ac.uk/tips/presentations/index.php>

Coping with Exams

Many courses will expect you to sit exams as part of your assessment. It's very easy to get worked up about exams but if you organise your approach to both revision and the exam effectively you will be able to demonstrate your skills and capabilities.

Revision techniques

Revision is about reviewing all the information you have acquired during the course, packaging it into memorable chunks and then using it to answer the questions. Look at all the information sources you have collected during the course and make notes on these, drawing together information from different sources. Make a summary of these facts. You might use a mind map or you might put key facts on small cards or in a small notebook so that you can carry them around with you and look at them in spare moments.

It will help if you prepare a revision timetable. Initially, you will need to fit revision in around lectures and seminars. Your revision may need to be in short bursts at that time. Once your lectures have finished you can be more structured about revision tasks. Plan tasks for each day such as completing a question from a past paper. Try the ones you're most confident about first to help you feel positive. You might also like to revise with a group of friends. If you do, set yourselves specific tasks so that you don't spend the time just chatting.

Find out what type of exam it will be so that you can practise answering the appropriate question. Many courses expect you to answer a certain number of essay questions in a specific time. You may however have open book exams into which you can take your text book. If so you should make sure that you know exactly what you may have with you and to what extent you can annotate the text. You may be expected to solve problems. Make sure that you are familiar with the techniques you are expected to use. Try to spread out the revision between different topics. It's no good just revising for the first exam. Just before the exams, slow down a little on your revision and avoid late night sittings especially on the night before an exam.

Exam techniques

The techniques you use in the exam will depend on the type of exam it is. You should have familiarised yourself with what will be expected of you and you should know how long you have to finish the paper. Make sure you divide your time appropriately between each question. Allow yourself time at the beginning to read the whole paper carefully and time at the end to read through what you have written.

If you're expected to write essay type answers, make a clear plan at the beginning. This will help you to sort out your ideas. Work out what the question is really asking you to do and keep focused.

If you have multiple choice questions, cover up the answers, work an answer out for yourself then check it against the choices given. Find out if marks will be deducted for incorrect answers and don't make wild guesses.

Check whether the marks are weighted for different parts of the question. Spend more time on the parts that will give you more marks. If the question asks you for a mathematical calculation remember to show all your working.

Before the exam you should make sure that you know where and when it's taking place. If you need alternative arrangements due to a disability you should check well in advance of the exam that these are in place

Finally, once the exam is over don't try to estimate how well or badly you've done. Concentrate on the next exam and, when the last exam is over reward yourself with a celebration.

More information

Drew, Sue and Bingham, Rosie (1997) *The student skills guide* Aldershot: Gower.

Payne, Elaine and Whittaker, Lesley (2000) *Developing essential study skills* Harlow: Prentice Hall.

Fry, Ron (n.d.)

Improve your memory
Oxford: Blackwell's bookshops.

[www.mmu.ac.uk/lisu/studyskills/
exams.html](http://www.mmu.ac.uk/lisu/studyskills/exams.html)

<http://www.mmu.ac.uk/academic/studserv/learningsupport//studyskills/pub-revision.html>

<http://www.lc.unsw.edu.au/onlib/exam.html>

http://www.adm.uwaterloo.ca/infocs/study_skills/exams.html

Working with Numbers

Even if you are not studying a mathematical or science based subject you are quite likely to need to use numbers to some extent in your course. After all, numbers are constantly used in everyday life. The numbers you come across every day are so familiar that you don't give them a second thought. You just accept that when you hear the temperature on a weather forecast you are being told how hot or cold it is. Numbers are just being used for description. In many subjects you will be expected to use numbers to describe what you have observed and you will also be expected to make calculations. The numerical information may seem difficult to you at first but provided you take time to understand the language of numbers you should be able to succeed with numbers.

Signs and symbols

If you are to work with numerical information you will need to become familiar with reading numbers and symbols. Numbers and symbols are used to summarise information in order to communicate specific facts, usually about an observed situation.

Learning to use those numbers and symbols is like learning a language. You have to know the rules and you have to follow those. You also need to practise using the language. With mathematical terms you will need to practise using them in solving problems.

You also need to become familiar with the words which are associated with the symbols. If your lecturer is demonstrating the way to solve a problem listen very carefully and try to relate the words you hear to the symbols on the board or in your text book. You will no doubt have learnt the basic rules of arithmetic but you may feel a bit rusty. They are essential if you are to combine numbers to form meaningful statements. If you feel that you could do with more practice try to find a simpler text to work through and give yourself a feel for the process. Remember that all you need is to follow the rules logically.

Statistics

Many courses will expect you do a certain amount of statistical calculation. Statistics can be used to generalise what has been observed in terms of numbers in order to communicate the conclusion more effectively. Numerical data can often be presented conveniently by using tables. You may see tables in your texts and feel tempted to skip them. Try to spend some time working out what the table is trying to communicate. By studying the way other people use tables you will be able to develop your own tables when you want to describe similar situations.

You may also be asked to present graphs. Before you start drawing your graph look carefully at the data you have. You can then decide on the type of graph which will demonstrate your data most effectively. You should also pay attention to the scales you use. These need to be accurate and to enable you to include all your data.

Some of the calculations you will need to do will be in deriving averages in order to form a generalisation about a large set of numerical data. Again you will need to study your raw data carefully before deciding on the appropriate calculation to use. You may also be asked to test the significance of your data. That may seem very complicated at first but remember that you need to become familiar with the language and listen carefully when you have the opportunity to hear the methods discussed.

You may be using a computer package to analyse your data. While this may seem infallible remember that whatever result you get depends on the data you put in. Just as with pencil and paper calculations take it slowly and consider what you want to do with your data.

More information

Graham, Lynne and Sargeant, David (1981)
Countdown to Mathematics
Harlow: Addison Wesley.

Huff, Darrell (1973)
How to lie with statistics
Penguin.

Kinnear, Paul R. and Gray, Colin D. (1994)
SPSS for windows made simple.
Hove: Lawrence Erlbaum Associates.

Northedge, Andrew et.al. (1997)
The sciences good study guide
Milton Keynes: Open University Press.

Solving Problems

In your university course you may be expected to solve problems. In science based subjects problem solving will form a key part of the learning process but even if you aren't studying maths or science you may be asked to use a problem solving approach in your work. This is a key skill which will help you to develop strengths in analysis and reasoning. It will also enable you to apply theory to practical situations.

Defining the problem

The first thing you will need to do is to make sure that you know exactly what it is you need to solve. Understanding the problem is essential if you are to find a solution. Read through the problem carefully and work out what you are being asked to do. Think about what sort of answer you are supposed to get and ask yourself whether you have come across a similar problem before. Try to express the problem in your own words, perhaps in summary form.

Once you have read through the problem carefully and feel that you have a good idea of what you are being asked to do concentrate on the details of the problem. Sort out all the facts that you have been given and make a note of them.

You may be able to draw a diagram which helps you to present the information that you have been given. Remember that all the facts may not be relevant. Think about the work you have covered in your lectures and reading and refer to any examples you may have so that you can decide what key facts you will need to use in solving the problem.

Discuss the problem with your friends. It may be that you will be able to identify different approaches and clarify what you are expected to do more easily when you pool ideas.

Solving the problem

Problem solving requires a step by step approach.

Before you can solve a problem you need to break it down into manageable steps.

Concentrate on one small part of the problem at a time. You may find that the problem has been set in a series of parts. As you work through think about whether the solution to one part may provide you with extra information for the next part. You may find it useful to work back from what you want to find out and think about what you need to know before you can find the answer.

If the problem is based on a case study or on a practical situation you may need to look at alternative solutions. You may be dealing with a problem which is looking for a best solution as opposed to an exact solution. In this case you should make a list of solutions and consider the advantages and disadvantages of each one. Ask yourself how well each solution would work in resolving the situation which you have been given. When you have decided on a best solution make sure that you are clear about the reasons why you think it is the best.

Writing up the problem

Don't forget that presenting your solution is as important as the final answer. You need to make sure that whoever is reading your work can understand how you arrived at the final answer. Your answers should be well structured so that the reader can follow your train of thought. If you are presenting a mathematical answer try reading it to yourself in words to ensure that it makes sense. If necessary support your mathematical notation with text to link your ideas.

Finally, if you have had difficulty with solving a problem don't give up. Problem solving is one skill where practice makes perfect.

More information

Adair, John (1997)

Decision Making and Problem Solving London: Institute of personnel and development.

Cottrell, Stella, (1999)

The study skills handbook.

London: Macmillan.

Drew, Sue and Bingham, Rosie (1997) The student skills guide

Aldershot: Gower.

Payne, Elaine and Whittaker, Lesley (2000)

Developing essential study skills Harlow: Prentice Hall.

www.psychwww.com/mtsite/page2.html

Thinking Critically

One of the skills which will help you in your university work is that of critical thinking. As an independent learner you will be expected to weigh up evidence and form your own opinions. You will be expected to consider issues carefully and examine the implications of particular conclusions. Critical thinking is not about criticising other people's ideas. It is about analysing them carefully and weighing up their validity. You may sometimes feel that there is very little distinction between the two but a critical thinker is always open minded and tries to avoid bias when coming to a decision. In fact, a good critical thinker behaves very much like a detective.

Critical thinking when reading and listening

In many of the texts you are expected to read, and the lectures you listen to, you will be presented with an argument. Your first task is to identify the line of reasoning of that argument. Ask yourself what point of view the writer or speaker would like you to accept. You should try to work out whether the argument is being dealt with in a logical fashion and whether it is being supported by relevant evidence.

It is often easy for a writer to sound convincing but to have started off from a false position. The reasoning behind the argument can often have flaws in it too.

If you are to think critically you will have to ask yourself lots of questions about where the basic information has come from, whether it is valid, and whether conclusions really do follow from the arguments presented. Ask yourself whether the evidence really is what it seems to be. Look out for evidence of bias and don't allow yourself to be swayed by the use of numbers and tables. Check out where those numbers have come from. Percentages can be very misleading. A survey which has identified a particular aspect of, say, 60% of the population can take on a different meaning if only 10 people have returned the questionnaire as opposed to 100 or 1000 people responding to the survey.

Beware also of the writer using persuasive language. Words such as 'of course' and 'obviously' can be used to hide the writer's lack of confidence in the conclusion. Make sure that you are clear about what the conclusion is. Weigh up the evidence which is being used to come to that conclusion and come to your own decision as to whether it is valid. You might also question whether the writer is speaking from a position of authority.

Writing critically

If you practise using your critical thinking skills when reading and listening you will be more able to analyse your own work and evaluate the validity of your own opinions.

When you have an assignment to write you should make sure that you know what your conclusion will be before you begin to write. You may have had a conclusion in mind before starting your reading but that may have been modified in the light of the information you have gathered. As you write you should be able to structure a clear line of reasoning to lead to your conclusion. Use the information you have gathered as evidence to support your argument. Remember that your readers will be reading critically.

Critical thinking in experimental work

Don't forget that critical thinking skills should also be applied when undertaking practical work. Although it might be obvious to you what result to expect, you will need to develop skills in observing and in weighing up whether your observations are significant. You may find that your experimental results are not as you expected. As a critical thinker try to interpret the results in the light of experimental conditions. Analyse what has happened and be prepared to investigate further.

More information

Cottrell, Stella, (1999)
The study skills handbook.
London: Macmillan.

<http://westwords.com/GUFFEY/critical.html>

Finding more Support

This booklet is not intended to cover all the issues which might cause you concern in the course of your studies. You may well find that there are times when you come across problems and need to discuss them with someone in more detail. If you are having difficulties with your course do talk to your course tutor, faculty student support officer, or another member of your department first.

If your difficulties cannot be resolved by them or if you prefer to talk to someone who is independent of your course do come to see us in Student Services. A separate booklet is available which gives you the details of all the services provided.

This booklet has been produced by members of the Learning Support team. We are available to give advice on study skills, either on a one-to-one basis or to groups. We run regular study skills workshops at each site – look out for posters – and have a range of leaflets which are also available on our website, accessible from the MMU home page.

We also provide advice and guidance to students with disabilities. We can assess your needs with regard to study aids and will liaise with your department to identify supporting study strategies.

We will also provide advice if you feel that you have made the wrong decision about your course and would like to investigate alternatives.

If you would like to arrange an appointment with a member of the Learning Support team contact Learning Support reception by visiting the first floor of All Saints

or by telephone: 0161 247 3491

or by e-mail: l.support@mmu.ac.uk