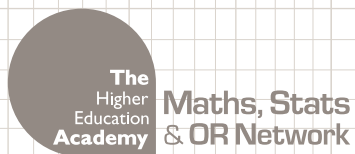


# Good Practice in Assessment

A Guide for Students in Mathematics, Statistics and Operational Research



Resources to support the learning and teaching of Mathematics, Statistics and Operational Research in Higher Education  
Maths, Stats & OR Network, The University of Birmingham, Edgbaston, Birmingham, B15 2TT.  
Phone: +44 121 414 7095 • Email: [info@mathstore.ac.uk](mailto:info@mathstore.ac.uk) • Web: [www.mathstore.ac.uk](http://www.mathstore.ac.uk)

# **Good Practice in Assessment**

## **A Guide for Students in Mathematics, Statistics and Operational Research**

### **Contents**

Introduction	3
Your feelings about assessment	4
Fairness and other issues	4
Is there more than one kind of assessment?	6
Forms of assessment	8
What is assessed?	12
Coping with assessment	14
Handling exams	15
Cheating and plagiarism	17
For lecturers	18
Conclusions	19
References	19
Bibliography for further reading	20



# Good Practice in Assessment

## A Guide for Students

### Introduction

This Guide complements the generic one produced by Race (Race, 2001), targeting its contents more specifically at Mathematics, Statistics and Operational Research (MSOR). Its structure and some of the content owes much to Race.

#### *Does Assessment Matter?*

For a student following a programme in Higher Education assessment matters like life and death - it is assessment that will determine whether or not you gain the qualification which you want. If that qualification is not simply ‘pass’ or ‘fail’, assessment will determine the grade or class of the award. What could matter more than that?

---

*your attitude to assessment may determine how much you enjoy the process and how many skills you learn which will be useful in later life.*

---

In fact, assessment matters more than that. Let us not underestimate the importance of gaining the qualification you want, be that a degree, diploma or whatever, but your attitude to assessment may determine how much you enjoy the process and how many skills you learn which will be useful in later life. Students’ behaviour is affected by assessment, naturally enough, for this is a sensible use of that rarest of resources, time. University study may prepare you more or less well for later life, when the tests you will face may not be as structured as a university assessment. It may put you in a frame of mind that makes it easier for you to get quickly to the heart of unstructured problems (and life is full of them), or it may not. You may be more or less well set up to learn by yourself later (“lifelong learning” is the catch phrase). Much of this will be determined by how you approach your learning in higher education, and that will probably be determined by your attitude to assessment.

Oh yes, assessment matters.

## **Your feelings about assessment**

You are in higher education to learn - new knowledge, new skills, other positive attributes. You have to demonstrate not just to others but, more importantly, to yourself that you have gained these attributes, and that is where the assessment comes in.

It is natural to have concerns about assessment. We have to perform well enough to gain the results we need, and this introduces some tension. Some students will cope with this without apparent fuss; others - most - will have some worries. A certain amount of tension is good for most of us, for without it we may take things too casually, but we need to keep this under control.

The common stresses are worry - will I know enough on the day? - could I have done better? - will I have enough time? - I am not as good as X and do not want to be shown up, and so on. Everyone feels emotions like these to some extent. There are some positive feelings too: having a deadline encourages you to learn, to bring it all together - it is another milestone to mark your progress - you may even enjoy the challenge of problems in an exam (but many people do not!).

The negative feelings could be because you feel you are not in charge and in one sense you are not: the assessment is for someone else to say how well you have done, a witness to your achievements. You are, however, in charge of much of the process for it is your learning that is assessed, and you control that. Coping with assessment is largely a matter of being clear about what you have to learn and setting out to do that.

There are people who really do have problems with some kinds of assessment. This may result in a feeling of panic in an exam or of your mind going blank. Perhaps you do not sleep well as a result. Some of these problems are more common than you might think, for your friends may not tell you if they suffer from them, but help is available. All higher education providers offer support to students, particularly study advisers. A study adviser may not be able to help you solve differential equations (and he or she may not even know what they are) but an adviser can help you focus on what you need to do.

If you suffer from any of these strong anxieties about assessment seek the advice that is on offer - and do it well before matters become urgent.

This guide is intended to help you cope with assessment. It will consider what assessment is about, what is assessed, something many students seem to misunderstand, and outline some strategies for coping.

## **Fairness and other issues**

Higher Education has to be seen to be fair, in assessment as in everything else. All institutions go to some lengths to ensure fairness and have procedures for complaints

in case it should seem that they are not fair. The Quality Assurance Agency for Higher Education issues a Code of Practice for assessment. You probably will not want to read this, but your university will have it and will adhere to it. The periodic audits by the QAA of institutions check up that each institution has appropriate procedures for doing this.

Some of the issues in assessment that relate to fairness, either to one student or to a student relative to others are:

### *Validity*

Assessment should test what it is supposed to test. While this is easier to say than to do, you should notice that the assessment will usually test more than simply knowledge. Your lecturers and the course literature will no doubt mention understanding or being able to solve problems, so you should be tested on these if that is what the assessment is supposed to measure. (We will discuss how you find out what is supposed to be measured later.) Some of the judgements may be about how well you do these things, and the skills you have gained in doing mathematics or statistics or operational research: they all need you to acquire some skills.

### *Reliability*

Assessment should be reliable in the sense that the outcome should not depend on who marked your work. Universities have checks on this. In MSOR it can be quite simple to achieve this or it can be difficult. If a problem is set and your answer uses a correct method to solve the whole problem, clearly explaining what you have done and its justification, you will be awarded the full marks available for that part. If you do not explain or your explanation is wrong you will receive fewer marks. “Marking schemes” setting out what you receive for each part are common. If you make a small error in a calculation (we all do it occasionally!) but continue correctly with a viable method, the marking is equally reliable. Where you make an error of principle, particularly if you do not explain what you are doing, it can be difficult for the examiners to assess what you have achieved. Reliability is less easy here, but different examiners can consult to achieve it.

### *Anonymity*

Potentially, an examiner might be biased towards or against a particular candidate. Most universities arrange that the scripts for the most important assessments (e.g. exams) are marked while they are anonymous, using a number or some other code in place of the candidate’s name. Clearly there should be no risk of bias here. In some circumstances like an oral presentation this anonymity is impractical.

### *Transparency*

It is not just good practice but usually a requirement that assessment be transparent - that is, you should be told how you will be judged. The University, School or

Department will issue you with handbooks, guides, module and program descriptions and other things that will tell you the 'rules'. These will not tell you the questions you have to answer, but they will tell you:

- how much each component (coursework, exams) contributes to the assessment of a module;
- what you have to do to pass;
- the arrangements for resits, if necessary;
- what you need to do overall to pass each year or the degree overall;
- the arrangements for what to do if you are prevented by circumstances (e.g. illness, bereavement, problems with relationships) from performing as well as you might;
- procedures for having special needs (e.g. dyslexia) considered and taken into account appropriately.

In the case of the last two bullet points it is best to deal with the problems as they arise. If you have special needs set the process in motion early, as there may be solutions you have not thought of and it may be appropriate to alter arrangements for coursework. The University will have procedures for this that are fair to you and to the others in the class. For cases that arise through illness or accident to you or a close relative or partner, including unfortunate circumstances (e.g. should you be the victim of some attack) then you should take notes of the circumstances and get what documentary evidence is needed. Cases like this are more convincing if the University is advised shortly after the event - do not wait until you have done badly in an exam.

---

*If you have special needs set the process in motion early, as there may be solutions you have not thought of and it may be appropriate to alter arrangements for coursework.*

---

## **Is there more than one kind of assessment?**

**Formative assessment** is there to provide you with feedback which should influence your learning. It may be marked by your lecturer or someone on his or her behalf. In some cases it may make a small contribution to the overall assessment because students can be reluctant to do work which does not contribute marks. Other formative assessment may not carry a mark and be purely for improving your learning. This might be assessed by your fellow students, for research has shown that assessing other students causes you to engage more fully with the task, and your own learning improves as a result. (Rust, Price and O'Donovan, 2003)

Other areas where students may participate in assessment is in group work of various forms, particularly if it is necessary to distinguish the different contributions made by the members of the group.

The one thing to be said about all formative assessment is that for the process to be effective you, the student, must engage with the feedback. As Taras (2002) says “for feedback to take place, the learner who is receiving it is required to be an active participant and use the information to alter the ‘gap’” [between actual level and the level required]. At the very least this means reading and thinking about the feedback, querying anything you do not understand, and reacting accordingly.

**Summative assessment** produces a final mark at the end of the process. This will almost always be marked by a lecturer. For large pieces of work, particularly exams, the scripts may be anonymous. Most assessed work is subject to moderation. This may amount to a second marker checking a sample of the work, or the whole lot being independently marked by a second person, without knowing the results of the first marker. The latter is obviously expensive and used only where it is necessary to improve the reliability of marking.

*Who assesses you?*

This will probably depend on the type of assessment. You, of course, should assess your own work and whether it meets the standards you have set yourself, but let us restrict attention to assessment that others will make.

---

*The one thing to be said about all formative assessment is that for the process to be effective you, the student, must engage with the feedback.*

---

At the end of the assessment process, results which contribute to a qualification are overseen by one or more external examiners. They will normally approve the tasks and examination papers set and will oversee the fairness and quality of the whole process. In many cases external examiners will pay special attention to borderline results. External examiners make an annual report to the University, which generally takes their comments very seriously.



## **Forms of assessment** (adapted from Race 2001)

<b>Type of assessment (jargon)</b>	<b>What this means (in real English)</b>
Unseen timed written examination	Normal exam, against the clock, where you do not know the questions in advance
Open book (or open notes) exams	Exams where you can take in your own notes or books, sometimes with a restriction on what you can take in. It is like 'legalised crib notes'.
Seen timed written examinations	Exams against the clock, but where you know the questions in advance
Problems	<p>In sets for formative assessment - with a deadline for tutor-marking, or to bring along completed to a tutorial.</p> <p>As exam questions for summative assessment</p>

## What this kind of assessment really measures (often)

Keeping your cool, memory, speed of thinking, speed of writing, how well you explain your answers, particularly the methods and justification, and (most importantly) how practised you are at answering exam questions.

How well you know your notes in the first place - your ability to find the most important and useful information or data. Open notes exams also measure how quickly you can find and retrieve important material from your own notes.

How well you have prepared to be able to answer the known questions; how well you remember your preparations; speed of writing. There is less emphasis on speed of thinking (you should have done most of the thinking beforehand). This kind of exam also measures how well you structure and set out your answers.

These tend to measure (surprise?) your ability to solve problems and do calculations - this is in many ways the least complex form of assessment - and one of the most 'valid' (and reliable to mark).

## Top tips...

**Practise** answering exam questions – that is what you need to do in the real thing.

Read the whole question before starting it.

Practise your answers to save time, with your reasons (but do write some fully so that you know you can when needed).

**Organise** your notes: you cannot afford to waste time finding things. Make an index if necessary.

Organise yourself: you need to focus on what is important - the skills involved and on recognising and looking up what is needed.

**Make** summaries of all the things which need to go into a 'good' answer to each question.

Practise stitching together good answers so that you know you can finish off each answer well in the time available to you for each.

Leave some time for polishing, correcting, explaining at the end of the exam - this may be more productive than you think.

**Do** them early enough to have a second try if you need to. You want to build up the skills of solving them yourself.

Learn methods and techniques, not solutions to particular problems.

Make yourself similar ones to practise on - coursework problems or calculations often appear again in exams. Get your speed up with practice.

Get all the feedback you can on problems to ensure you tackle them in the best (easiest, shortest) way - and can see why a particular approach might work.

**Type of assessment (jargon)****What this means (in real English)**

Multiple choice exams

Paper- (or maybe computer-based) exams which ask you to pick the right (or best) option from typically four options.

---

Oral exams

Face-to-face interviews with one (or usually more) examiner.

Sometimes used to investigate borderline candidates on degree classifications

---

Presentations

Occasions where you give a solo or group talk to some or all of your class, usually with the tutor present.

Sometimes peer-assessment is used.

---

Dissertations

An extended piece of written work, often the write-up of a final-year project.

## What this kind of assessment really measures (often)

## Top tips...

There are usually many questions, but you do not have to write anything, just pick options.

Decision-making skills, spotting the right (or best) option from a range; your speed of making decisions - these exams can cover vast tracts of syllabus! They also measure your breadth of knowledge of your syllabus, and how often you have practised doing multiple-choice tests and exams.

These allow examiners to follow up what you know, simplifying things you cannot answer, probing more deeply when you can.

Oral exams can be used to test whether you understood what you wrote in an assessment and can allow you to show that you have an overall understanding of an area, rather than a narrow question.

These measure your ability to talk fluently about a topic, and to answer questions. They may test how well you identify and explain the key points in a complicated topic.

They also measure your skills at preparing visual aids (slides, handouts, PowerPoint) to support your presentation.

Dissertations measure your ability to write-up research findings, and demonstrate good research method skills. They also measure your ability to review the related literature, and link your findings into this. They test your ability to set out with a well-defined quest, and bring it to a solid conclusion.

**Get practising** - make you own multiple choice questions continuously as you revise, and test yourself with them. Join in with other students on the above, and test each other.

Develop your skills at working back to the best option by working out what is wrong with all the other ones.

**Try** to sound confident, and get the main points over. The examiners can follow the detail if they wish.

If you are being examined on something you wrote, make sure you have read it recently, and that you know why you said what you wrote, particularly the reasons for the main thrust of your arguments. If there are doubtful points, admit the doubt but be prepared to offer further reasons for your conclusions.

**Rehearse** and practise: if it is your first presentation, get really used to hearing yourself do it.

Get feedback from friends, family - anyone prepared to watch you practise it.

Get your timing right - you must not run out of time before your main point!

Be aware of the difficulty of getting detail across.

**Get** as much feedback as you can, all the way, from your supervisor and any one else who will help you.

Link with fellow students to give each other feedback - but remember to acknowledge this.

Be well ahead of your allotted time scale - keep room for editing and improving.

Make sure you use consistent terminology.

### *Other kinds of assessment...*

The assessment formats listed in this table are only a selection. They include the most common ones in MSOR but you could be assessed on posters, case-study design or others. For any further kinds of assessment you know you will meet, use the format on this table to work out ‘what it really is’, and ‘what is really being measured’ and ‘top tips’ for yourself.

### **What is assessed?**

In these days of transparency, you will be told the sort of things that will be assessed. Students, however, often misunderstand or ignore this information. Most modules in MSOR have a syllabus - a list of the topics, methods, techniques and the like in the module - but few are concerned only with whether you remember the Altogether-Strange Theorem. Most will intend you to have acquired some skills, techniques and understanding associated with the factual content.

The technical statement of what you need to be able to do is stated in the “learning outcomes”. Individual modules have learning outcomes and so do entire degree programmes. Look at these learning outcomes. Generally they do not focus on memorising facts. An example might be: (The University of Reading, 2003)

By the end of the module students are expected to be able to:

- use skill in logical reasoning and problem-solving;
- construct simple mathematical proofs;
- manipulate simple inequalities;
- use the idea of limit of a sequence and sum of an infinite series;
- use the idea of continuity.

Clearly you need to know some facts to be able to demonstrate these outcomes: continuity is mentioned so you need to know what it is - but notice that the outcome is to be able to use it. Actually, if you have practised using continuity you will soon find that you remember the underlying idea.

The outcomes in the example mentioned include proof, which is an important part of much of mathematics. In this module you need to be aware of the methods of proof used and develop skill and judgement in deciding which method to try in a particular case. If you analyse the situation well you will choose a suitable method sooner than otherwise, saving you valuable time in a timed examination. If you judge less well you may have to try several methods in succession. In other modules it may be a matter of judging other things than proof techniques, but notice this second level you need to focus on, of using your skill, judgement or analysis. If you are tempted to concentrate only on some of the outcomes, it is wise to look ahead to see which of

them are important for later modules: if you learn these things later, you will have missed out on some available credit!

Now look at the learning outcomes for your degree as a whole. These will be in its “programme specification”. Some of them will be pretty obviously associated with the outcomes for particular modules, but others will be more general. For example, part of the QAA Benchmark statement for MSOR states that

“A graduate who has reached the modal level should be able to: ...

- apply a range of concepts and principles in loosely-defined contexts, showing effective judgement in the selection and application of tools and techniques;
- develop and evaluate logical arguments;
- demonstrate skill in abstracting the essentials of problems, formulating them mathematically and obtaining solutions by appropriate methods;
- demonstrate appropriate transferable skills and the ability to work with relatively little guidance or support.” (QAA, 2002)

Notice that some of these qualities may be assessed in oral or project work, while others may be judged indirectly. Notice particularly that the outcomes of your programme will contain some transferable (or key) skills. These are attributes that you can use elsewhere in life, and they are particularly valued by employers. Some of them are not directly assessed but may contribute to what will be a better performance than from students who have not acquired these skills, for example “effective judgement in the selection and application of tools and techniques”. Focussing only on the lower-level outcomes may be an indication of poor study skills:

“Learning mathematics for the principal purpose of passing examinations often leads to surface learning, to memory learning alone, to learning that can only see small parts and not the whole of a subject, to learning wherein many of the skills and much of the knowledge required to be a working mathematician are overlooked.” (Houston, 2001)

*How do you find out what to do?*

First look at the learning outcomes mentioned above. Pay attention to feedback on your work during the modules, whether or not it is assessed. These comments may make it clear what is valued, although some lecturers are better at conveying these values than others.

Speak to your lecturers and instructors. What do they think is important - at the very least that is a useful hint from their experience. When you are shown the solution to a problem you may simply kick yourself mentally for not seeing the method. However, it may take you some time to see that although you understand the parts of the answer, you cannot see why anyone would have thought of putting it together that way; you do

not understand the whole. Perhaps it is just a clever point, something its inventor took a long time to think of, in which case you remember it as such, or perhaps there is a way of thinking which would make this look completely natural. Ask about this sort of thing.

---

*Pay attention to feedback on your work during the modules, whether or not it is assessed.*

---

Much of MSOR revolves around standard techniques, which may be mentioned explicitly in learning outcomes. These you ought to learn as you go along, not just because you will be assessed on them, but because when you know the standard routines you can spot quickly which ideas are not standard.

### **Coping with assessment**

Do you know what the assessors are looking for? More particularly do you know what gains high marks? Remember the learning outcomes we mentioned above. Most universities publish general descriptions of what they are looking for at the various levels. For example:

**“First Class** First Class represents an excellent to outstanding performance demonstrating a thorough understanding of the subject. In addition to a mastery of a wide to full range of the standard literature and/or methods and techniques, it shows evidence of attainment beyond the standard material. ... A first class performance will also contain elements of most of the attributes which are appropriate to the subject from the following: originality in argument or problem solving; lateral thinking; significant critical insight; reasoned discourse involving critique and counter critique; reasoned questioning of assumptions; reasoned reflection on methodology; instances of independent judgement; successfully applying knowledge and understanding in unfamiliar situations.

**Third Class** The Third Class represents satisfactory work based on appropriate study, adequately presented, but reflecting only a limited familiarity with the standard literature and/or methods of the subject. ... it may show some superficiality in understanding and/or use of material, an over reliance on knowledge at the expense of development of argument, analysis or discussion and some technical or factual flaws and inaccuracies. (The University of Reading, 2002)”

If you are seeking to perform at the higher grades notice these qualities like “attainment beyond the standard material” and pay attention to them in your learning. Notice also the point about over reliance on knowledge being regarded as a weakness.

## Handling exams

Few people enjoy exams, but most cope with them. Like everything else in life, if you devote a little thought to the process in advance, you can improve your performance. The three key pieces of advice are: plan, do not panic and read the question.

### *Planning*

Get the main ideas and techniques into your head well before the exam; you may have several exams close together and not have time for much other than a quick brush-up between them.

You should know the format of an exam beforehand, how many questions there will be, how many you should answer and, at least roughly, what topics are covered. If you have a choice of questions you should think beforehand which are your preferred topics and go for these ones. Even if you are expected to answer all the questions, you do not have to do it in the order in which they appear on the paper; do the questions you prefer first. At the very least that will boost your confidence during the exam.

Work out beforehand what your target is: 60% or whatever, and what this represents in terms of questions answered. Notice the format of past papers: are all the questions, or parts of questions, of equal value? Make sure you know what you have to do to gain the score you are aiming for, and allow for a margin in case there are things you cannot do on the day. You do not have to answer everything perfectly.

Many setters ask a simple part at the start of a question, something less simple in the middle and perhaps something quite demanding at the end. In this form the last part may take you longer than the others: if you want a high mark you must do some of these, but if you are worrying about passing you may wish to skip them unless you have time at the end.

### *Don't Panic*

Read the first question you intend to answer, think about it, and confirm that you want to start with this one. Think about how to answer it for a short while before you start. If a question involves some definition or technical term that you do not remember, then you are not going to be able to answer it - go on to another one. You can return to it if you later remember the missing information. If you get stuck on a problem think what you need to do and whether there is any unused information which might help. Do not give up too easily for it will take you time later to get back into the question, but if you really are stuck move to your next question, and come back to this one if there is time.

Do remember to give a reasoned answer if that is what is expected. In most cases other than multiple choice exams, you are expected to show how you arrived at your conclusion - show the calculations, say how a deduction follows from what you are given, say what theorem or method you are using to justify your conclusion. Get into



the habit of explaining, but do not be too long winded, as that uses time you could use better for something else! It may be that you are convinced that there is a justification for the step you want to make, but you cannot remember it at the time. If so say that and move on to the next step. Perhaps you will remember the missing justification before the end.

### *Read the Question*

That is right, read it, all of it. What is the question asking you to do? If it is a problem solving question, reading the whole question may give you a clue about what the setter was thinking of when the question was written, and that may help you start.

### *Improving your answers*

Remember that examiners have to be fair and have to judge candidates by what they have written. If it is not there, you cannot get marks for it! Make sure you explain your reasons for what you write. Generally speaking in MSOR you should show your working on the answer paper. Do not put it on scrap paper.

Leave some time at the end for reading over what you have written to make sure you have said what you intended, and given your reasons. At this point you can “join up” the flow of your argument if you need to, and make it more convincing. You may be able to fill in some of the things you could not do first time, or provide reasons for things you were pretty sure of but could not justify.

### *Revision*

Make sure your revision is revision, not learning for the first time. The first effort of learning takes more time than you will probably have available for revision.

“Probably the only way to learn how to solve problems is to solve lots of problems.” (Gibbs and Simpson, 2002) Do not try to memorise large quantities of calculation or proof - learn methods and techniques. You will often find that these transfer to other areas, and being able to use techniques reliably cuts down what you need to remember.

*Definitions:* These are the vocabulary of MSOR. You need to know those you are going to use. They can be tedious to learn but if you do the coursework as you go along, you will soon spot those which crop up most often. You will save yourself time during term, and during revision, if you learn the important ones as you go.

*Theorems:* The purpose of referring to a theorem is to save your having to prove it every time you want to use it. In some modules you may be asked to prove theorems, in others just to use them; know which applies to you. The proofs of many theorems in mathematics illustrate the standard techniques of the subject, so the value of knowing the proof is that the technique then comes free.

If you are quoting a definition or theorem or any standard technique, you need to get it right. A half-learned result is useless. You may wish to revise definitions and

theorems at the last minute. Beyond that the best advice is to plan ahead, and to make sure that you are fresh and well rested for each exam.

### *Dissertations and other Course Work*

Much of the advice about explaining yourself applies even more strongly to dissertations. Normally there is not the same time pressure but you need to address the task in hand. Providing good explanation and examples may be clearly stated in the specification of what you have to do. Make sure you know what is required of you and that you give good reasoned arguments where that is what is sought. Above all, as with any piece of extended writing, read what you have written thoroughly to ensure it is what you intended to say.

## **Cheating and plagiarism**

Copying someone else's work and presenting it as yours is cheating, whether or not the other person consented. This applies to parts you might incorporate in coursework, whether the source is another student, a book, the web or whatever. Universities take a serious view of cheating and may follow it with disciplinary action.

You need to be clear, however, that discussing your work with others is perfectly allowable, indeed it is usually strongly encouraged. After that discussion you should then write up your own version, in your own words.

Plagiarism is misrepresenting someone else's work as your own. If you work along with someone else to produce some results then you must acknowledge that co-operation, even if the write-up is your own. If you use information from other sources then you must acknowledge it. The situation in MSOR is less straightforward than this implies, for if you are asked to state Cauchy's Theorem, or perhaps another result which has no name, then clearly you are not being asked to provide an original statement. Equally, in an examination it is acceptable to base a proof of a known result on one you met in lectures or a book.

When the task in hand is the solution of particular mathematical or statistical problems, you may choose to refer to theorems or examples in your notes as a justification of the truth of some assertion you have made, or some step in the solution. This needs no further acknowledgement, and makes it clear that you are not claiming originality in

---

*If you are quoting a definition or theorem or any standard technique, you need to get it right.*

---

this result. Justifying a step in a deduction is good practice anyway. Similarly, you may use techniques or even proofs from notes or other sources as a justification of the work you are doing.

The best advice on plagiarism is, firstly to read the policies of your own University, and to stick to them. In particular

- Sources you use must be acknowledged in detail, saying exactly where the piece you use comes from. You must be clear what is quoted (which you should put in inverted commas), or paraphrased (“Bloggs claims that ...”). Notice that if you use an argument or conclusion from a book you need to acknowledge it unless it is covered by the “common knowledge” below.
- You do not need to acknowledge the “common knowledge” of the subject. If you use differentiation in a calculus module, you do not need to say where you got the idea! Look for guidance on this.
- Look also for guidance on the extent to which collaboration, duly acknowledged, is or is not acceptable. You must acknowledge collaborative work with others, but not just casual discussions.
- You alone are responsible for what you hand in. Make sure you have acknowledged everything you need to on the version you submit.

Chapter 9 of The Sciences Good Study Guide (Northedge et al, 1997) has some useful advice on plagiarism, as has S. E. Van Bramer (1995)

## **For lecturers**

Assessment drives student behaviour and it is essential to be aware of this. What matters, actually, is what students think you assess, and it is important that you and your students are of one mind on this. See the comments above on learning outcomes, particularly on the higher outcomes. We all want our students to think about and reflect on principles, methods and so on, not just memorise facts. Yet despite that many students seem to think we wish them to memorise facts. Do your students know clearly what sort of answers will gain the best marks? Is that behaviour the sort you wish to encourage?

Note the effects of formative assessment, where there is evidence that students are selective about the feedback they absorb. There is no point in giving feedback if students do not benefit from it. Some authors have found that if students are given a grade, then they will pay scant attention to the comments, which are potentially more useful to them. Perhaps not giving a grade would be better, and might save some agonising. (See Black and Wiliam (1998), Taras (2000), Onwuegbuzie and Leech (2003), Rust, Price and O'Donovan (2003).)

## Conclusions

Assessment is here: whether it helps or hinders you is largely up to you. Our main advice is to find out how you will be assessed and what really contributes to that process. Do not fall into the trap of assuming that facts and memory are what people value most. Interact with your fellow students and with lecturers to find out what it is all about, and then manage yourself during the assessment process. The benefits to you could be more enjoyment and a better range of skills for later life.

## References

- Biggs J (1999) *Teaching for Quality Learning at University*, Buckingham and Philadelphia: SRHE and Open University Press.
- Black P and Wiliam D (1998) "Assessment and classroom learning", *Assessment in Education*, **5**, 7 - 74.
- Bridges P, Cooper A, Evanson P, Haines C, Jenkins D, Scurry D, Woolf H, Yorke M, (2002) "Coursework Marks High, Examination Marks Low: discuss", *Assessment and Evaluation in Higher Education*, **27**, 35 - 48.
- Brown G, Bull J and Pendlebury M, (1997) *Assessing Student Learning in Higher Education*, London and New York: Routledge.
- Gibbs G and Simpson C (2002) *How assessment influences student learning - a literature survey, preprint*, Open University, September 2002.
- Houston K (2001) "Assessing Undergraduate Mathematics Students", in Holton D (ed), *The Teaching and Learning of Mathematics at University Level*, Dordrecht: Kluwer Academic Publishers.
- Northedge A, Thomas J, Lane A, Peasgood A (1997) *The Science Good Study Guide*, Milton Keynes: Open University.
- Norton LS, Tilley AJ, Newstead SE and Franklyn-Stokes A (2001) "The Pressures of assessment in Undergraduate Courses and their Effect on Student Behaviours", *Assessment and Evaluation in Higher Education*, **26**, 269 - 284.
- Onwuegbuzie AJ and Leech NL (2003) "Assessment in Statistics Courses: more than a tool for evaluation", *Assessment and Evaluation in Higher Education*, **28**, 115 - 127.
- QAA (Quality Assurance Agency for Higher Education) (2002) *Benchmark Statement for Mathematics, Statistics and Operational Research*, Gloucester <http://www.qaa.ac.uk/crntwork/benchmark/phase2/mathematics.pdf> (accessed 14 January 2004).

- Race P (2001) *Assessment: A Guide for Students*, York: LTSN Generic Centre.
- Rust C, Price M, O'Donovan B (2003) "Improving Students' Learning by Developing their Understanding of Assessment Criteria and Processes", *Assessment and Evaluation in Higher Education*, **28**, pp 148 - 164.
- Stefani L and Carroll J (2001) *A Briefing on Plagiarism* York: LTSN Generic Centre.
- Taras M (2002) "Using Assessment for Learning and Learning for Assessment" *Assessment and Evaluation in Higher Education*, **27**, pp 501 - 510.
- The University of Reading (2002) *A University-wide Framework for the Classification of First Degrees*, paragraphs 3.2.1 and 3.2.4, The University of Reading, <http://www.reading.ac.uk/Exams/classificationpre2002.htm> (accessed 14 January 2004).
- The University of Reading (2003), module MA11A Introduction to Analysis, in *Programme Handbook for Part 1 of programmes involving Mathematics*, Reading: The University of Reading.
- Van Bramer SE (1995) *What is Plagiarism?* Chester, Harrisburg and Wilmington: Widener University, <http://science.widener.edu/svb/essay/plagiar.html> (accessed 6 March 2003.).

## **Bibliography for further reading**

An excellent guide to study, exams and many other aspects relating directly or indirectly to assessment is Northedge et al, 1997, *The Science Good Study Guide*. Beyond that you should read what your own university produces:

- Module specifications
- Programme specifications
- Programme handbooks
- Past exam papers
- Guide to examinations