Imperial College London

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STARTING TO TEACH IN HIGHER EDUCATION

Faculty of Engineering

Starting to Teach in Higher Education
(2011 edition)

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Foreword

Studying for a PhD at Imperial College London is an exhilarating experience: working at the cutting edge of science and interacting with world leading researchers.

Apart from intellectual growth, the PhD is also a time for much personal development. This can involve skills enhancement in communication, project management, teamwork and personal effectiveness; all of which can help support a fulfilling work life.

Teaching provides an excellent and rewarding opportunity for such development. An understanding of teaching and learning concepts often helps improve our own learning. For Graduate Teaching Assistants (GTAs), the experience also provides an appreciation of the academic role, and thus useful for informing future career decisions.

Our GTAs provide us with vital teaching and assessment support, and like any other member of the teaching team, measures are needed to help them feel effective in their role, as well as gain personal value from the experience.

The aim of this booklet is to provide GTAs with practical advice and tips for common learning situations. The information is concise, and where possible related to actual teaching and learning settings used across the Faculty of Engineering. As importantly, information is given on other College resources for GTAs, including online guide sheets and sources for further information. The booklet will be of great value to anyone who is keen to have a solid foundation in teaching practice.

Enjoy the booklet and enjoy your teaching!

Professor Peter Y. Cheung
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Content

Getting started

The main aim of most postgraduate students is to successfully complete their research degree. Along the journey, many opportunities exist for experiencing *academic life* which go beyond the research remit. The fact that you are reading this booklet probably means that you are currently involved in, or considering, some form of teaching. Teaching can be rather invigorating, but also quite daunting at times. Preparing and planning teaching sessions, dealing with student groups and individuals, assessing student work, and giving feedback can all pose a host of challenges. Even with the teaching support that your department may provide, there is often a feeling of 'being thrown in at the deep end'. Sometimes, the support is simply not in time for those critical first experiences of teaching.

The aim of this booklet is to help you to cope well with those first few critical steps in teaching in higher education. The strategies outlined should help you face the challenges and balance your dual role as a research student and teacher. There are plenty of books on teaching in higher education, but more likely than not, under the pressure of getting started in your teaching, you might not have time to use them. That's where this booklet will be really helpful to you. Hopefully, the booklet will then continue to be helpful as you venture further into your teaching.

Here are some intended learning outcomes for this booklet (i.e. what you should be able to do after studying this booklet):

1. Feel more confident and relaxed about starting to teach in higher education.
2. Prepare for, and conduct successfully, your first tutorials, lab supervisions and seminars.
3. Prepare for and give your first lectures effectively and successfully.
4. Undertake your first elements of marking systematically, fairly and efficiently.
5. Give useful feedback to your students, to help them learn successfully.
6. Continue to develop your teaching and assessing practices systematically and professionally.

I know my stuff – isn't that enough?

Most of the people around you may seem to have been teaching forever, and appear to glide effortlessly through the processes of preparing lectures, planning tutorials and seminars, and assessing students' work. But all of them are likely to remember that knowing one's stuff is only a relatively small part of becoming able to help students to learn one's stuff!

Even more scary, the stuff you know backwards is quite unlikely to be at the heart of the material you need to be able to teach. It's very likely that at least some of the syllabus content you need to teach, or run a tutorial on, will be new even to you, and you may be surprised at how long it can take to prepare for such lessons.

What are my sources of help?

In addition to this booklet, there are a number of other sources of help for people new to teaching. The ones listed below focus on approaches that are clearly missing from this booklet

– face-to-face, multimedia or involving some form of dialogue. The social aspects of learning are, after all, very important!

People

More often than not, you'll find someone who will be a real help. This might be the main lecturer of the course, or academic supervisor of the practical class or project. You may even be set up with a *buddy* or mentor. Also, don't forget other GTAs in the department, some of whom may have considerable experience in the teaching of a specific class or subject.

Workshops and Training

All departments will have some form of induction activity for their GTAs. This might involve an introduction to teaching practices or even an open discussion forum. To learn more about what your department does, a good point of contact is the Director of Undergraduate Studies.

At the Faculty of Engineering level, a GTA training programme is also provided for a limited number of individuals. This provides participants with opportunities to further reflect on their experiences and learn through the experiences of their

peers. Further information on the GTA programme can be found at:

www.imperial.ac.uk/envision

At the College level, the Educational Development Unit (EDU) offer workshops on *assessment and marking skills* for postgraduate students. Most departments will require you to attend these before you can formally mark coursework. The EDU website also has much useful information on teaching practice, including GTA Guide Sheets for a range of practical issues. The EDU website can be found at:

www.imperial.ac.uk/edudev

Virtual Learning Environment

There are many resources that can be easily accessed on the internet. Some of the most relevant have been selected and made available though the Blackboard Learning Environment (VLE), as part of the Faculty's GTA training programme – more will be said about VLEs later in the booklet. Even if you don't take part in the programme these resources can be helpful in giving you a better insight in the process of teaching and learning.

Alongside general information on teaching theories, some additional references and links are given for those who want to delve into particular aspects.

Since there are aspects of teaching that can be learned only by experience, a discussion board has been set up to promote the exchange of experiences and problems, as well as their possible solutions.

Furthermore, for those who would like online advice on a specific teaching matter from a member of academic staff or a senior GTA, there's *Just Ask* help feature.

Before you start

How many hours can I teach?

Generally this is up to a maximum of 6 hours per week on average, but this can sometimes depend on the funding agency supporting your work (if relevant). Sometimes, during the writing-up period, teaching can be extended to 15 hours per week. It's important at the onset to discuss the amount of teaching with your PhD supervisor.

Balancing teaching and research?

An hour's teaching can in fact involve several hours of preparation. You may need to consider planning and organising learning activities and handouts, and marking and returning assignments. Sometimes, the teaching content may be familiar to you, on other occasions not. It's important to feel comfortable about what you'll be teaching, and realistic about the time this

will take. It's your right to choose what you teach, and decline work which you feel may take too much time away from your research.

Nevertheless, teaching should be approached with the confidence that the extra work is benefiting your personal development and consequently research work. For example, reading and assessing student essays can tell you a lot about your own writing style. Likewise, the skills used for communicating technical information to students can help you in research conference presentations.

Also think about how the teaching timetable fits with your own research commitments. Are there certain days that need to be blocked out for research? If so, it's important that the relevant teaching organisers in your department know about these.

Who needs to be informed?

Your supervisor needs to know about any work outside your research project. She/He will also be able to notify you of any funding agency stipulations.

Is a record of teaching experiences important?

Some form of reflective teaching journal, log or portfolio will greatly enhance your learning and development experience. It will also be useful in recording any issues of concern or interest for discussion with other colleagues. Tips on keeping a teaching journal can be found on the EDU website - www.imperial.ac.uk/edudev.

What's the idea behind a 'teaching philosophy'?

The teaching philosophy is a statement of your objectives as

a teacher, how you work towards these objectives and what really motivates you to teach. You don't need to have a lot of teaching experience to have a teaching philosophy, although this is likely to improve in personal authenticity with experience. See it as a reminder of your personal values towards teaching, learning and development. Many institutions will ask applicants for academic posts to describe their teaching philosophy. More information on writing a teaching philosophy is given later in the booklet.

The role of the GTA

The role of the GTA is to support teaching, or more accurately, student learning. This might involve running tutorials, supervising a practical class, covering a lecture or giving special remedial tutorials.

Teaching is a complex task, so you shouldn't assume that a good knowledge of the subject will be enough; some things need to be prepared in advance

and possible problems should be considered beforehand in order to address them in the best possible way. As part of the role, a reasonable amount of time should be reserved for such preparatory activities.

Undergraduate students are generally more likely to ask questions to somebody who they perceive at their 'same level'. A key role of the GTA is to be a good interface between the lecturer and the student so that immediate student concerns can be dealt with. The GTA should therefore be approachable, give clear explanations, know how to get students to learn for themselves (i.e. don't always give the answer!) and show empathy for learning difficulties and struggles. All this needs to be done while still ensuring that the intended learning outcomes of the course, activity or assignment are met.

On occasion you may also be involved in giving feedback to students and so supporting academic (and maybe even professional skills) development. Some GTAs may even be asked to mark coursework and other transcripts.

How students learn

Learning should not be considered a passive process: the understanding of a subject won't necessarily improve by simply listening to new information. Often some form of active engagement in the material is needed, such as its application or physical demonstration.

Different student motivations for learning should also be recognised. Some students have an intrinsic motivation and are naturally driven towards a better understanding of a subject. Other students have an extrinsic motivation and might, for example, be mainly concerned about getting a qualification as a means of securing a job.

A related concept is that of the *locus of control* (LC). Basically, some students might view learning as mainly their

responsibility (internal LC), whereas others might view it as the responsibility of their teachers and department (external LC). Research evidence shows that students with an internal LC do better in their studies and also gain greater satisfaction from their learning achievements. To help encourage an internal LC, students need to feel responsible for their learning. This might involve student options in course content and assessment, and an emphasis on study and other personal skills that support the ultimate goals of the student.

Different motivations can lead to different learning approaches, which might either involve deep and transformational understanding of the material, or rather surface and superficial understanding (but perhaps enough to pass an exam!). Teaching approaches which help foster a deep approach to learning are given in the Appendix of this booklet. In short though, it comes down to the attitude and behaviours of the teacher, and the design of assessment methods that promote rich learning outcomes and not the simple recall of facts and formulae.

It is also important to note that students respond differently to the way information is presented. For example, some students might be more at ease when presented with images or graphs whilst other students prefer a verbal description. Teaching materials and activities should take this into account. Generally, it is good practice to use a range of instructional approaches to appeal to these different

learning styles. What worked well for you as a student might not work for others.

Further information on some basic learning theories can be found in the Appendix.

Teaching philosophy

As mentioned earlier, the teaching philosophy is a statement of your objectives as a teacher, how you work towards these objectives and what really motivates you to teach. It should reflect your personal values, motivations and aspirations for teaching. Even if you haven't done a lot of teaching, you have been a student for a long time and you should have some opinion as to what teaching *really* is about and the kinds of approaches that work well.

You might also want to reflect on the great teachers you have had, and the characteristics that made them so effective and memorable.

Another useful tip is to try the opposite and think what you didn't like in a teacher. Then, see if you can draw out positive attributes to counter such poor teaching.

QUESTIONS YOU SHOULD ANSWER IN YOUR TEACHING PHILOSOPHY:

What do I mean by learning?
What is my role as a teacher?
What are my goals for the students?
What are my goals as a teacher?
Why do I want to teach?

Teaching needs to adapt to the type of students (e.g. stage in their learning and prior knowledge) and the class size. When writing a teaching philosophy, you might also want to consider the full spectrum of teaching situations you are likely to encounter. Teaching philosophy statements are not meant to be a list of the experiences you have. What is relevant is 'how' rather than 'how much' you have taught in the past. Whenever you write a statement about teaching, try to give examples on how you would achieve a particular goal. Everybody for instance understands the importance of stimulating discussions within a group of students, but what makes a good teacher is actually putting this into practice. Remember that this statement has to be personal; whoever is going to read it should get a clear idea of who you are as a teacher.

A checklist is provided below to identify whether all the key points of a teaching philosophy are covered appropriately. If one day you decide to apply for an academic job, there is a good chance that you might be asked to comment on your teaching philosophy!

Teaching Philosophy Checklist

(adapted from the Centre for Teaching and Learning, University of Minnesota)

Purpose & Audience

Is there a clear focus or theme(s)?
Are the language and tone appropriate?
Would it hold the audience's attention?

Voice

Is it 'authentic' - focused on the writer and personal? Do you have an idea of who this person is as a teacher (or aspires to be)?
Does the writer reveal self and personal/political/pedagogical commitments?
Is enthusiasm for teaching evident?
Does it sound as though the writer cares about the beliefs expressed?
Would you like to take a course taught by the writer?

Beliefs/Arguments/Claims & Illustrative Support

Does it detail what the writer believes in a way that is engaging, specific, and easy to understand?
Does it detail why these beliefs are held?
Does it detail how these beliefs came to be held?
Does it define the writer's goals for and expectations of learners?
Are the beliefs/arguments/claims grounded in the writer's discipline?
Is the relationship between the writer's discipline and beliefs about teaching and learning made clear?
Does the organisation/structure support the arguments/claims being made?
Are the beliefs/arguments/claims supported by evidence, or examples?
Are there specific examples of strategies, methods, or theories used to achieve teaching and learning goals and to help students meet or exceed expectations?

A Note on Learning Technology

What is learning technology?

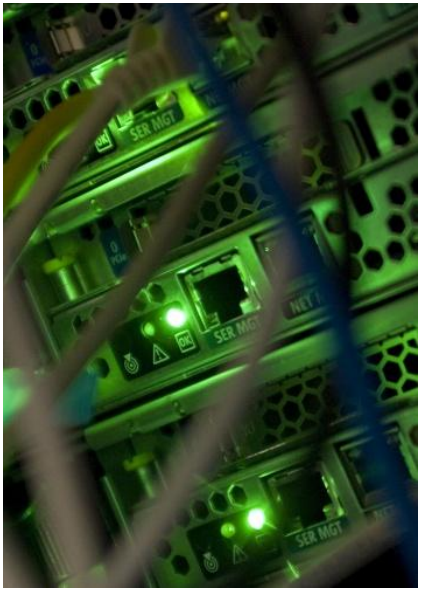
> "The application of technology for the enhancement of teaching, learning and assessment. This includes computer-based learning and multimedia materials and the use of networks and communications systems to support learning."
> Rist and Hewer (1996)

In the Faculty of Engineering, there is wide use of such technology. Examples include:

- Virtual Learning Environments (VLEs) as a repository for lecture and tutorial materials, online student assignment management and assessment, quizzes and discussion forums.
- METRIC software for the support of engineering mathematics education.
- Classroom technologies such as clickers and ebeam.
- Web 2.0 tools such as blogs, wikis, podcasts and digital video.
- Web-based peer assessment and feedback tools such as WebPA.

As a GTA, it's possible that some of your teaching tasks will have a Learning Technology component. On occasion, you may want to take the initiative and try a technology which you feel might enhance the learning experience of your students. Further information on current Faculty of Engineering Learning Technology resources can be found at:

www.imperial.ac.uk/engineering/teaching/learningtechnology



Small-group teaching

With drives towards efficiency and cost-effective provision, in some disciplines small-group teaching has been reduced, or even phased out, in favour of lectures and resource-based learning (paper-based, online, or both).

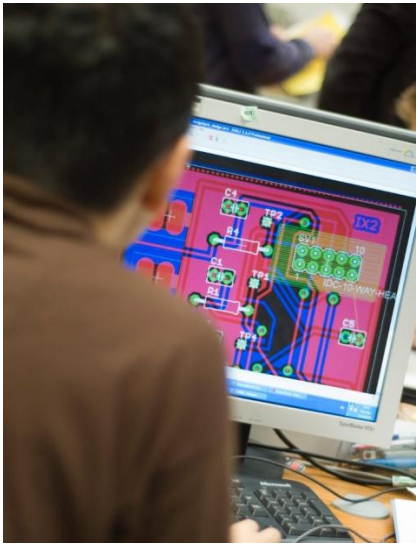
Perhaps, however, the most significant reasons for using small-group teaching are the benefits students acquire which lie beyond the curriculum as expressed through intended learning outcomes; the *emergent* learning outcomes associated with small-group work help students to equip themselves with skills and attitudes they will need for the next stages of their careers and lives.

Focus in the first instance will be given to seminars and tutorials. The concepts are then applied to a special form of small-group teaching, namely laboratory work.

Seminars and tutorials

These terms are sometimes used interchangeably for small-group sessions. However, strictly speaking, a *seminar* is usually meant to be a student-led small-group session, for example when one or more students give a short presentation, then answer questions and open up discussion on a pre-assigned topic. Here, the tutor's main responsibility is to be a facilitator or chairperson.

Tutorials come in many shapes and sizes, from one-to-one face-to-face sessions between staff and individual students, to small-group teaching-learning sessions. The latter are directed largely by tutors, but



with a considerable expectation of active participation by students rather than passive 'sitting and listening'. In some disciplines, tutorials often take the form of problems-classes, where small groups of students work through quantitative problems either individually or collaboratively, guided by the tutor and helped out when necessary.

What could go wrong if there was no small-group teaching

If small-group teaching for some reason had to be discontinued, the following manifestations could occur:

Increased drop-out and failure statistics, because students would not have enough opportunity to get help with their difficulties.

Students would be much less aware of how well (or indeed how badly) their learning was progressing, as they would miss out on small-group contexts allowing them to gain a great deal of feedback from each other.

More time would need to be used trying to help those students making appointments for one-to-one help with particular problems – often the same problem many times over.

There would be more interruptions to the flow of large-group teaching, when it would no longer be possible in a lecture to reply

to a question: 'This is just the right sort of question to discuss in detail in your next tutorial – bring it along then and make sure that it's sorted out to your satisfaction'.

Increased risk of students

succeeding satisfactorily in written assessment scenarios, but not having gained the level of mastery of the subject matter that comes from discussing it, arguing about it, and explaining it to other people.

Increased risk of lecturers remaining unaware of significant problems which students were experiencing until too late – when the problems turned into assessment failures.

How students sometimes spoil small-group work

Before we look at what we can do to make small-group teaching work well, it's useful to think about some of the things that can get in the way of small-group teaching. Later in this section we'll return to some of these in the 'what can I do when…?' mode, but for now, let's just list some of the potential problems, starting with some difficulties that students can cause us.

WHAT STUDENTS MIGHT DO

Don't take it seriously
Don't turn up
Come unprepared
Tend to dominate
Be 'passengers'
Fall out with each other

Students don't take it seriously

Students often seem to regard lectures as much more important than seminars or tutorials. This is sometimes our fault – if we don't seem to be taking small-group teaching as seriously as lectures, students are quick to pick up the vibrations.

Some students don't turn up

This follows on from the problem above, but it makes our job all the harder if we don't know till the last minute what size group we are likely to be working with.

Some students come unprepared

They turn up without having done the pre-reading or preparatory work which we set

in advance of the small-group sessions.

Some students tend to dominate

It can be tiresome for their group-mates, and we often need to change group membership regularly, so that the dominating students are spread around.

Some students are 'passengers'

In large-group teaching we can't always get everyone to participate actively (though we can try), and passengers can usually get away with not contributing. In small-group contexts, however, passenger behaviours become more noticeable, and we need to try all the harder to make sure that small-group learning is active for all present.

Students may fall out with each other!

Conflict can arise in small-group contexts, particularly when student contributions to the products of the work of a group are assessed, and when contributions have been uneven.

How *we* can spoil small-group work!

The things that go wrong are not all down to students. The following short list shows that our own actions can lead to small-group work being unproductive

Tutors sometimes carry on teaching rather than keeping students working actively

Particularly if the students don't engage actively, or ask questions, it's all too easy just to keep the small-group session going by expanding on what we may have covered in lectures.

Tutors sometimes make students feel uncomfortable

For example, when students turn up but have not done the expected preparation for a small-group session, it's natural enough to exhort them to greater efforts in future. However, if they respond badly to such pressure, they become more likely simply to skip a future session if they haven't prepared for it. A balance is needed here to challenge the students without demoralising them.

Tutors sometimes allow domineers, and fail to bring in shy violets

We need to find ways of equalising contributions in small groups, such as using Post-its® to get everyone to contribute ideas before opening up for discussion.

Tutors sometimes fail to make it clear what each small-group session is intended to achieve

It's useful to continue the practice used for lectures regarding specifying some precise intended learning outcomes for small-group sessions.

Some groups can become 'disadvantaged'

For example, if a particular group gets into detailed

discussion of what the assessment standards are, or what would be reasonable exam questions to expect, other groups which did not have this discussion are disadvantaged. Ideally, it's best to have any discussion about standards in the whole-group session.

Five ways to help students to learn well in small-group contexts

Improve students' motivation for learning

Our best chance to achieve this is through our own enthusiasm for the subject – and making it obvious that we have students' best interests at heart and want them to succeed. If tutors seem bored with a subject, it's hardly surprising that students will not be excited by it!

Help students to take ownership

We can do this by reminding students of the benefits of learning success, and helping them to see exactly what they need to succeed. This boils down to making it very clear what sort of evidence of achievement they need to be working towards. It also helps if we remind students that this is going to be perfectly manageable for them, and that even the most complex outcomes are achieved one small step at a time.

HELP STUDENTS IN SMALL GROUPS

Increase their willingness to learn

Stimulate autonomy and learning by doing

Give useful and timely feedback

Make sure students understand that learning happens by doing

Help them to see that very little happens just sitting looking at some notes or handout materials, but that learning starts when they try to do something with the materials. Also, help them to see that learning happens gradually, and that even the most difficult tasks can be broken down into small steps. When learning from books, handouts, or on-

screen, a useful maxim is ‘not much learning will happen unless you’ve got a pen in your hand and are using it’. In other words, tutors can help students not to ‘drift’, but to make notes, jot down questions, practice answering questions, and so on while working with learning resource materials.

Make sure that students get quick and useful feedback

Help them to assess their own achievements, and to reflect on things they have done successfully, and think quite deliberately of what worked in their learning, and why it worked. Even more importantly, we can help students to learn from their mistakes. If we can help them to see that getting things wrong at first is a very productive step along the way to getting them right, they can gradually become able to look at learning by trial-and-error as a valid and productive way of going about their learning.

Help students to make sense of things

Point out the benefits of collaborative learning here. Help students to find out how much they get their own heads round something they have just learned by explaining it to some fellow-students who haven’t yet seen the light, and talking them through it till they too have made sense of it. More about this aspect of tutoring follows later in this booklet. It can be important not to allow students to worry too much about ‘not understanding’ something – especially when difficult concepts or ideas are involved. Sometimes, the understanding will take its own time; some things have to be lived with and worked with for a while before understanding begins to dawn. Indeed, sometimes there’s actually no need to *understand*

something to succeed at assessment with it.

All one may be required to do is to *use* it or *apply* it, and this may often be done successfully even without understanding it. In an ideal world it would be good for everyone to understand everything, but in the real world students are measured on their demonstration of the evidence of *achievement,* not necessarily understanding. It can in fact be enormously comforting for students who are struggling for a tutor to say: 'Don't worry that you don't yet understand this – just keep practising with it, and the understanding will come in its own time'.

Nine ways to help your students to get the most out of small-group sessions

Help your students to become ready for assessment

This is the sharp end of tutoring, not least because most forms of assessment involve winners and losers – and it's very uncomfortable to be a loser. Perhaps the most important attribute of excellent tutors is the ability to be felt by students to be 'on their side' in the assessment battle. Even when tutors are going to be doing the assessment themselves, it's really helpful for students to feel that everything possible is being done by their tutors to maximise their chances of succeeding at the assessment hurdle. Preparing for assessment should not degenerate into the 'guess what's in the tutor's mind' game – there should be no guesswork involved. In particular, it helps when tutors strive to help students to make sense of what they have learned, so that they feel they have 'digested' the information involved, turned it into their own knowledge, and

have a sense of ownership of their achievement well before the time when they are required to demonstrate evidence of their achievement of the learning outcomes.

Negotiate agreements with your small-group students

The main advantage of learning agreements is that they help students to take ownership of the need to learn. Because it's an *agreement,* students feel they have played a part in working out the timescales involved, and deciding *what* to learn, *how best* to go about learning it and *at what level* the learning needs to take place. The best ways of making it feel like an agreement to students is to ensure that they see that their tutors have their own parts to play in bringing the agreement to fruition.

Help students to make sense of their targets

In particular, clarify exactly what is meant by the intended learning outcomes. The problem with such outcomes is that they are often written in a foreign language to students – 'academese'! It's all very well to use phrases such as 'demonstrate your understanding of…' but students need to know exactly *how* they are expected in due course to do this. They need to know what the *evidence* will look like when they have 'understood' something to the level required. They need to know what the standards are that will be applied to this evidence. They need to understand the contexts in which this evidence will be generated – whether it be exams, coursework, practical work, independent work and so on. Small-group contexts are ideal for helping your students to find out exactly what the intended learning outcomes mean in practice.

Help students to see the importance of becoming better at learning

Study skills are important, not just in the context of helping students work their way towards succeeding in their present studies, but for life in general. Students will continue to need to learn new things far beyond the years when they are involved in formal study, and the better they become able to take on new learning targets, and work systematically and purposefully towards achieving these targets, the better the quality of their future lives. Even when an element of learning has proved unsuccessful, there are usually useful study skills lessons to be gained from the experience. Study skills cannot be directly 'taught' – they are (like just about everything else) learned by doing, practice, trial and error, and experience. Tutors can use small-group learning contexts to help by setting up practice opportunities, responding to the trial and error, and helping students to learn productively from each other's experience.

Help students to manage their time

Time management is not only an essential study skill – it's a life skill. Probably the most important single element of time management is 'getting started' on each task – if something isn't started it will never get finished! In small-group contexts, tutors can help students to get their learning underway by pointing out that human nature is to find 'work avoidance tactics' which delay getting started, but that once they are recognised as such it's perfectly possible to counteract them. A task that has only been started for five minutes is much more likely to be completed than a task that has not yet been started. Therefore, tutors should make themselves sure that tasks get started in face-to-face contact time, even if only for those vital minutes which will allow students to go away and continue them in their own time and at their own speed.

Help students to balance their act

An important addition to good time management is good *task management.* In other words, help students to prioritise their tasks. This involves making sure that the important ones get done, and the less-important ones aren't given too much time. Tutors can help students in working out what exactly are the most important tasks, and putting these at the top of the agenda. Tutors can also help by advising on sensible limits for the important tasks, so that they don't just swallow up all of students' available time and energy and leave other important tasks un-started. It can be better to do an hour's worth on each of three tasks than to spend all three hours on one task, especially if all three

tasks contribute to the assessment agenda.

Help students to identify questions, and seek the answers to these questions

'If I knew what the exam questions were going to be, I could easily prepare for the exam', many students say. But they *can* know what the questions are going to be. 'Any important piece of information can simply be regarded as the answer to a question' is a useful way of helping students to think in terms of questions rather than information. Once they know what a question is, they can find out the answer in any of the following ways:

- Look it up in a book or handout
- Look it up on the internet
- Ask other students and see if they know the answer
- Ask other people altogether
- Ask an expert witness – for example you.

Encourage students to make question banks of their own. In other words, get them to jot down all the questions which they might some day need to be able to answer to demonstrate their learning. It's really useful to start with the intended learning outcomes, and turn these into long lists of very short, sharp questions. This will demonstrate to students that if they can answer lots of straightforward questions, they can in fact answer much more complex questions.

It can be particularly useful to get students to make question banks in small groups, so that the range of questions is better, and to help them to learn from each other's questions. Tutors can give valuable responses regarding which questions are the really important ones, to

help to steer students to the main agendas of their learning.

Help students to become better readers

Not all students come from households where walls are lined with bookshelves. Not all students devour books. Indeed, for many students, reading is not a particularly pleasurable activity, unless they are reading about something about which they are already passionate. Tutors can help students to realise that they don't have to devour books, but that all that may be needed is to *use* them successfully to find information from them. In other words, *information retrieval* (whether from books or websites) does not necessarily mean reading everything in sight, but homing in to what's important. This goes back to starting reading with *questions* in mind. If students read a page of text pre-armed with five questions, they are much more likely to get what is intended out of the page than if they just 'read' it.

Help students to make good use of headings, sub-headings, contents pages, and the indexes of books and articles. Help them to read in 'search and retrieve' mode, so they are looking for particular things, and

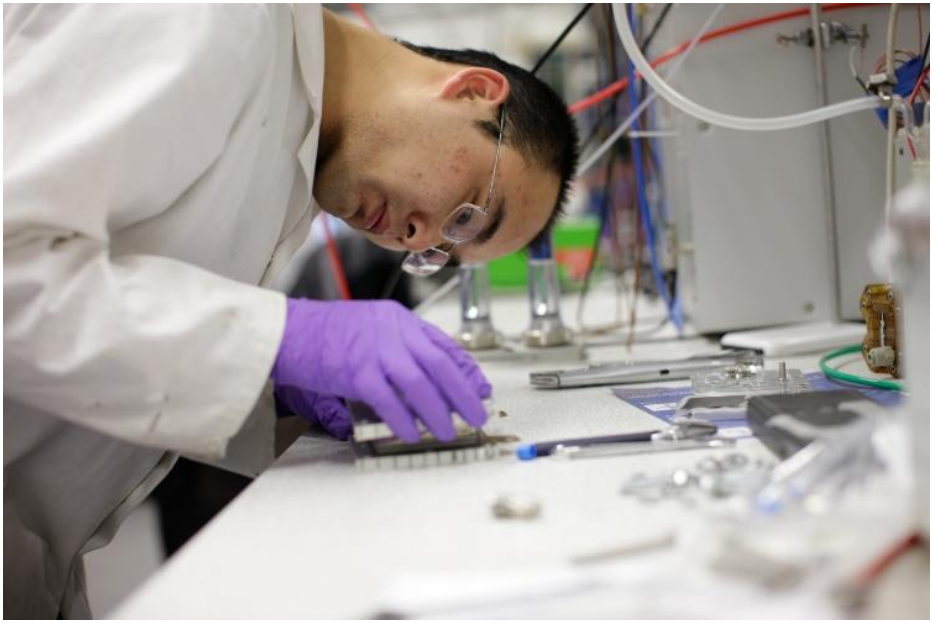
noting them down as they find them, rather than simply reading page after page vainly hoping that some of the information there will 'stick'.

Help students get their revision act together

Most students regard revision for tests or exams as a bore! This is all too often because they have previously tackled the job in boring ways. They have tried to 'learn' their subject materials in non-productive ways, and become disillusioned.

A good start is for tutors to reinforce that revision is simply about systematically becoming better able to answer questions – that's what exams and tests actually measure. As with anything else, the best way to become better at something is to do it – and do it again – until it becomes second nature. Students who have practised answering a question seven times in a fortnight are very likely indeed to get it right the eighth time – in the test.

Another way tutors can help students with revision is by alerting them to what *not* to revise. There's no point spending a lot of time and energy on learning something



that won't or can't be the basis of a sensible exam or test question. Similarly, anything that *isn't* directly related to an intended learning outcome is not on the revision agenda – if it were important it would have been there among those intended outcomes.

Tutors can remind students that what is measured by tests and exams isn't what's in their heads – it's usually what comes out of their pens or pencils. In other words, it's their evidence of achievement of the intended learning outcomes that is the basis for assessment, and the best revision processes involve purposeful practice at evidencing that achievement.

Problems in small-group teaching: 'What can I do when…?'

What can I do when students don't turn up for my small-group sessions?

In practice, there's little mileage in trying to 'force' students to turn up to any element in their programmes, and when students don't regard small-group teaching as particularly important, the problem of absenteeism increases.

However, a combination of one or more of the following tactics can improve things sometimes:

Make sure it's worth turning up. When the students who are present come away with something they would not have wanted to miss (be it handouts, the light dawning, tasks they found valuable doing, and so

on), the word can get around and attendance can improve.

Ask some regular absentees 'What's wrong?'. Sometimes there could be a timetable clash you didn't know about, or travel difficulties relating to a particular time slot. Sometimes, of course, the answer can be 'I didn't find the sessions helpful' and we may need to probe gently into 'why not exactly?' and remain ready to listen to the responses.

You could also try keeping an agenda on the table. When students can see that each small-group session has a bearing on helping them become ready for future exam questions, or helps them see what's being looked for in coursework assignments, students are less likely to miss them.

Include at least some coursework mark for 'participation'. Don't just include it for attendance, however, or the odd student may come along but not join in!

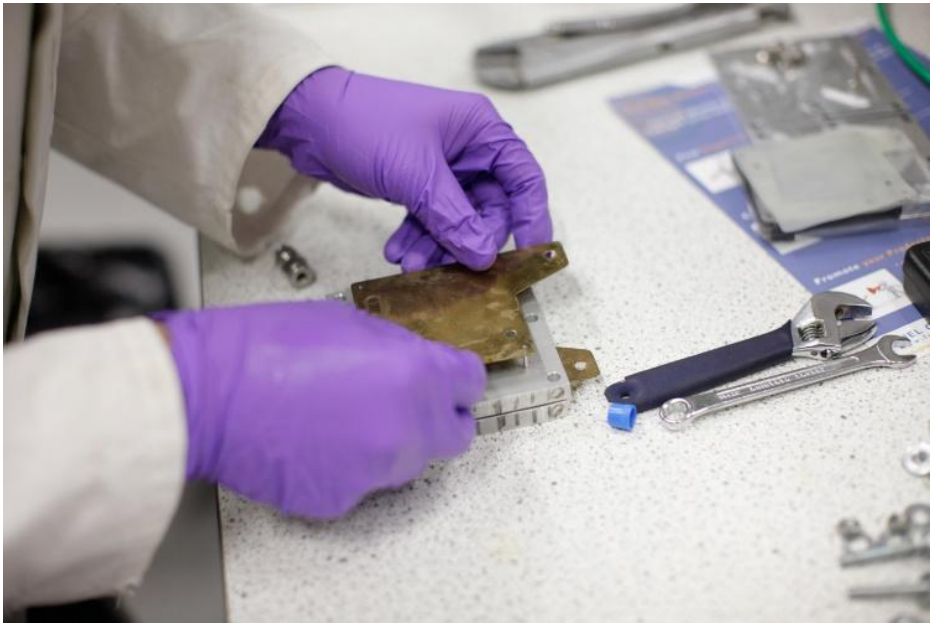
Absentees should also be reported to the relevant lecturer.

What can I do when students refuse to do a task?

This is an awkward one. If all the students won't start your task, it's worse. The following tactics can help:

Make sure the task briefing is really clear. Explain again exactly what you want them to do. It can be useful to say 'what it really means is…' and then put it into straightforward language.

Show the task on a slide or overhead, or give it out as a handout. Sometimes, students can get the gist of a task rather better if they can see it and hear it at the same time.



Try to find the block. For example, ask students 'Which part of the task are you having problems with?' and see if clarifying that part helps them to get started.

Break the task into smaller bits. Ask students to just do the first bit now, and then explain the later stages one by one when they're properly under way.

Ask them to work in pairs to start with. You can then go round any pairs who still seem reluctant to start the task, and find out more about what could be stopping them.

Set a precise deadline for the first part of the task. Sometimes this is enough to get them started.

Resist the temptation to keep talking. Give them some time when there's really nothing more going on, and it's clear that you expect them to get stuck into the task. A few seconds of solemn silence may seem interminable to you, but the resistance to getting started with the task may be fading away.

What can I do when students don't get on with each other?

This is more likely to happen in small groups than large groups. The following tactics can help:

Re-arrange group membership now and then. This can be done randomly, but check that particular pairs of students who didn't seem to be getting on are then moved apart into different groups.

Give them all a task to start on their own. Sometimes if all of the students have already invested some energy in thinking through the topic before the actual group work begins, differences between students are pushed further into the background.

Make the first part an individual written task. For example, give out Post-its®, and ask everyone to jot down a single idea relevant to the task. Then when everyone is armed with at least one idea, the chances of students not getting on with each other can be reduced.

Go closer to the people who don't seem to be getting on. Sometimes, your proximity will cause them to bury any differences – for the moment at least. You may also then get

the chance to work out what exactly has been causing the confrontation between the students concerned.

Watch out for the occasional 'difficult student'. When the same person doesn't get on in group work contexts with different individuals, it can be worth having a quiet word. Just sometimes, you'll find the odd student who really doesn't function well in group contexts.

What can I do when one student dominates the group?

This is a frequent occurrence. Sometimes the causes are innocent enough – enthusiasm, knowing a lot about the topic, and so on. One or more of the following tactics may help you to balance things out:

Set appropriate ground rules at the start of small-group work. It can be useful to say a little about leadership and followership – making the point that in many small-group situations in real life, too many leaders can militate against success, and that everyone needs to be able to be a good follower for at least some of the time.

Re-arrange group membership regularly. This means that the domineering student moves on, and doesn't dominate the same students for too long.

Intervene gently. For example after the domineering student comes to a pause, ask: 'Would someone else now like to add to this please?'

Have a quiet word. Do this with the domineering student outside the group context, for example giving suggestions about 'air time' and allowing everyone's views to be heard.

Change the dynamic. Appoint the domineering student as chairperson for a particular activity, with the brief not to make any input on that task, but to co-ordinate everyone else's thinking.

Don't fight it too hard. Recognise that domineering is a common human trait, and that domineering people often reach distinguished positions in the world around us, and may be developing relevant skills in small-group contexts.

The multicultural classroom: issues to be aware of

- Students from the same cultural background not mixing with others
- Not using English during class work
- Reluctance to challenge the tutors or ask/answer questions
- Difficulty following instructions because of language problems
- Different motivations tied to different cultural values
- Different attitudes to the values and benefits of group work
- Different interpretations of non-verbal cues (e.g. level of eye-contact, hand and facial gestures)

Be aware of cultural issues and respond to these with sensitivity and empathy! (see also McKeachie, W. J. (2009))

Laboratory Teaching

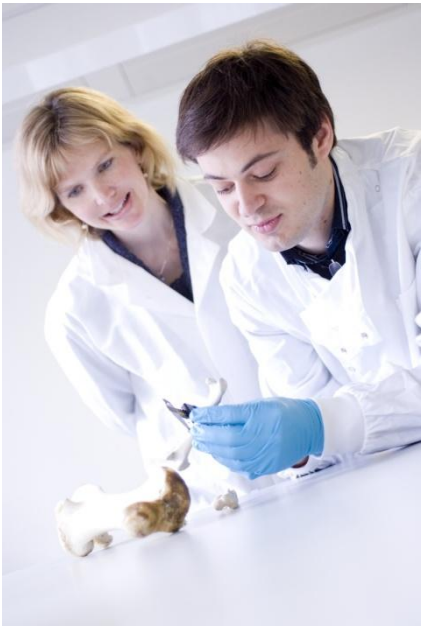
We will use the term *laboratory teaching* to mean small-group practical work involving either bench, pilot-plant or construction scale apparatus. This special type of learning situation has a number of benefits in that it can:

- further stimulate student interest in the subject
- deepen understanding through relating theory to practice, and knowledge to application
- develop organisational, observational and problem-solving skills
- raise appreciation of the consequences of experimental uncertainties and errors
- develop professional attitudes and skills for collaborative work
- familiarise students with basic experimental and engineering equipment
- provide experiences in communicating experimental findings in both oral and written forms

The role of the GTA in laboratory teaching can vary a lot. This might involve demonstrating the experiment or equipment, supervising the work or providing guidance when difficulties arise. There is some basic good practice though that applies to many laboratory teaching situations. These can be split into tasks before, during and after the practical:

Before the practical:

- Check with the lecturer or technician on details and methods of the practical class, as well as the relevant theoretical background needed for the work.



- Are there existing handouts that can be reviewed?
- To what extent has the theory been covered in lectures?
- Are you confident with the theory?
- Are there copies of past student reports that can be read?
- Is there a previous demonstrator that you can talk to?

- Check equipment and other materials.
  - What are some of the safety issues?
  - Has a risk assessment been carried out?

  - Any dangerous substances or procedures?
  - Have you considered what can potentially go wrong or be done wrong?
  - Any requirements for safety wear that need to be announced or enforced?
  - Are you able to trial the experiment before the teaching session?
  - Will the equipment be in a ready state? If not, what is needed on your part?

- Plan how you will run the session.
  - What needs to be explained?
  - How will you check on work progress?
  - What can be told to students and what should they be encouraged to find out for themselves?

During practical:

- observe student performance at initial stages of work
- check that safety precautions are being followed
- test student understanding
- check and advise on time-scale for work completion
- give explanations and guidance, and not necessarily answers

- be prepared to say you don't know answer, but know what to do about it
- use experience of supervisors for difficult situations
- keep all communication professional.

After the practical:

- report any equipment or procedural problems
- reflect on what you did well
- reflect on what could have been done better
- seek advice from the lecturer, technician or other GTAs on any problematic occurrences

The student objectives for the practical work may be quite different to the intended learning outcomes! Your role is to ensure a learning experience that goes beyond getting, for example, the right data or answer.

> The only kind of learning which significantly influences behaviour is self-discovered or self-appropriated learning – truth that has been assimilated in experience.
>
> Carl Rogers

Interestingly, when groups of new GTAs are asked to list their concerns about working in the lab, typically 3 themes arise:

1. Personal competence/skills /expertise to deal with technical content.
2. Equipment operation / management.
3. Group management and discipline.

Competence and equipment operation issues can often be addressed by considering some of the “Before the Practical” points above. It also helps to remember that you are not expected to know all the answers, rather help facilitate learning, and that there are others in the department who can help, including other GTAs! When it comes to group management issues, well all the issues mentioned previously in *Learning in Small Groups* apply. Post-session reflection and, if possible, discussion with other GTAs and colleagues, will further help your skills in group management.

Large-group teaching

Getting started with lectures

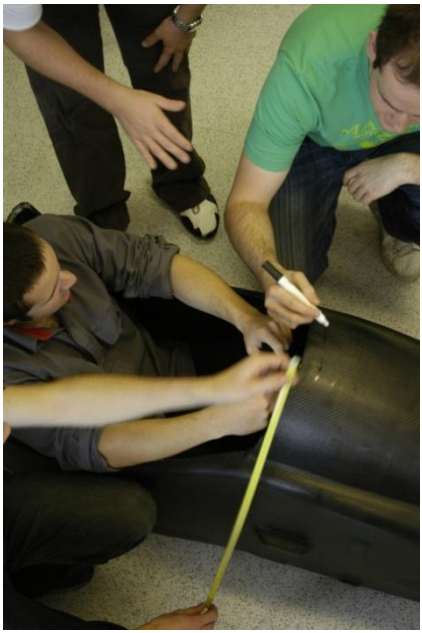
For many staff in higher education, lectures are the central part of their teaching. Even if you're new to higher education teaching, you've probably done something similar before. For example, you may have given presentations at conferences, which in many respects could be thought of as a similar experience. Actually, giving conference presentations is rather more scary, as the audience is likely to know a lot more about the subject than is typical of students at a lecture.

However, many people find the prospect of giving their first lectures quite daunting. The thought of an hour under the spotlight seems like a long time! In practice, even though most institutions timetable lectures for one-hour slots, it's rarely an hour, as it can take a few minutes to get everyone settled into the room, and it's necessary to have the venue ready for the next class in reasonable time by the end of the allotted session.

Note-making rather than note-taking

Left to themselves, your students will often simply try to 'capture' the lecture by copying down things you say, and things you show them. This, however, is just note-taking. Comfortable as it is to have a roomful of people writing down what you say, not much real learning is likely to be occurring. Students can do such copying actions without actually thinking much at all about what they're writing down. It's better to help your students to make notes rather than just take notes.

For example, now and then during your lecture, give them a couple of minutes to make a summary of what you've been talking about. It can then be useful to ask them to compare their summaries with students sitting close to them, and add to their own any interesting or important points that they may have missed.



Don't just 'lecture'

A notional one-hour lecture doesn't boil down to 60 minutes' worth of 'content', as the intended outcomes need to be introduced and then de-briefed, and your class needs to settle in and leave. So we're normally thinking about no more than say 45 minutes for the 'delivery' part of your lecture. But in practice, 45 minutes is too long for you to 'deliver' and too long for your students to 'receive'. Concentration spans are much shorter than 45 minutes.

It's better to break your lecture down into some shorter elements, for example no more than ten minutes at a time of you talking to your students, interspersed with getting them to do things, for example making notes, asking you questions, answering questions you ask them, and so on. Already the scary prospect of giving a one-hour lecture is much more manageable – all you need to do is to manage a few episodes of talking to your students, and intersperse a few episodes of them doing things (giving you the chance to catch your breath, regain your composure, and plan what exactly to do next).

Begin (and end) with the intended learning outcomes

It's good practice to explain to your students what they should be getting out of the lecture. Often, the syllabus of a course or module will already be expressed in terms of such outcomes, and for a lecture you will normally need to focus on just a few of these. However, the learning outcomes as

written into course documentation are sometimes not particularly clear. For example, they may be expressed in rather vague terms such as ‘students will deepen their understanding of…’.

To start a lecture well, it’s much better to be able to say to the students: ‘by the end of this lecture, you’ll be able to…’ and then to list three or four things your students should be able to do by the end of that particular lecture, as a direct result of being there and of the experience you design for them there. There are all sorts of ‘doing’ words and phrases which help to clarify what ‘understand’ may have meant in the published versions, including ‘explain’, ‘discuss’, ‘argue that’, ‘compare and contrast’, ‘prove that’, ‘describe the origins of’, and so on.

In practice, it’s better to present the intended learning outcomes for a particular lecture a few minutes into the event, so that all of your students have got there and settled in. It can be useful to spend the very first few minutes recapping what you have covered in previous lectures while latecomers arrive, and until the class is settled. If, of course, you’re

Hint: if you’re using PowerPoint slides, make your very last slide one repeating the intended learning outcomes. You can get instantly to that last slide simply by entering ‘99’ (or any number greater or equal to that of the number of that last slide) at the keyboard and pressing ‘enter’. This means that even if you haven’t managed to get through all of the slides in your presentation, you can seamlessly go to that rounding-up slide. You can then ask your students about how well they now feel that they have achieved the outcomes, possibly asking them to show for each outcome in turn whether they feel they have ‘completely achieved’ or ‘partly achieved’ or ‘not yet achieved’ it by a show of hands raised – two, one, and none respectively. This not only reminds the students of what they should now be able to do, but also lets you know how well your lecture worked.

about to give the very first lecture in a series, you need to do something different, for example, gently quiz your students to find out how much they may already know of what you're about to start teaching them.

It's useful to let students see the intended learning outcomes as well as hear them. For example, show them as a slide or overhead, but also talk the class through them, making the most of tone of voice, body language, eye contact, and so on to help your students to see what the intended outcomes actually mean in practice. Don't just read the slide out to them, however – students can read from a screen or a handout quite a lot faster than we can talk, and get bored (or even irritated) if we read out to them things they can already see for themselves.

The intended learning outcomes can also take care of your last few minutes. Near the scheduled end of the lecture, it's useful to return to your slide of the intended outcomes.

Hint: it can be useful to have handouts with blank boxes for students to write into during lectures. In other words, have spaces for them to do tasks at a few points in your lecture. Rather than actually print the task briefings on the handout materials, it works better simply to put 'Task 1', 'Task 2' and so on in the empty boxes. This helps to stop students getting ahead of where you want them to be, but more usefully it gives you the chance to adjust the actual tasks depending on how the class seems to be getting on with the subject, and depending on the amount of time you find you have available. It is useful to have slides or overheads ready for a few alternative tasks, so that you can decide exactly what you want the class to do at each particular time. Also, if your students happen to ask an important question, for example, you can sometimes turn it into a task for all of them to try for a couple of minutes, before you answer the question. (This sometimes gives you the luxury of a couple of minutes to get your own answer ready.)

Making the most of handouts

Students like handouts. Sometimes handout materials are issued directly in lectures. Sometimes handouts are made available to students before lectures – in print or electronically. Alternatively, handouts are given out at the end of lectures. The trouble with handouts is that your students can switch off mentally during your lectures if they feel that all of the information is in their handouts. When students coming out of lectures are asked: 'Tell me what the lecture was about?' they admit: 'Sorry, I don't know yet – I've got the handout, but I haven't read it properly yet'!

If they have the paper versions with them at the lecture, it can be quite tedious for them if you simply talk through what they can already see in front of them. It's much better to make sure that what they take away from the lecture is more than just the information in their handouts. For example, get your students to make important extra notes expanding on important elements in the handouts, or deepening their thinking about the key issues you're introducing in your lecture.

What works best is to make handout materials interactive so that students do things with the handout during the lecture, and come out with something to which they have added a lot of their own ideas and thoughts, adding value to it.

One of the worries that many lecturers share is 'getting through all of the material' in a lecture or in a module. Handout materials afford the luxury of

the option to focus on just some of the content, and to explain to your students that 'other parts we are not going to talk about today are included in your handout – don't forget that you need these parts as well when you prepare for your exam' and so on.

Designing slides for lectures

Most lecturers use slides or overheads. In particular, PowerPoint slides have become the norm. [Note: they aren't in fact 'slides' at all – they are digital files on a computer or memory device, sent to a data projector and turned into a visual image on a screen.]

In some subjects, slides can be quite sophisticated, containing diagrams, photos, graphs and charts, drawings and other sorts of visual information. In other subjects, slides tend to be mostly print on the screen, often 'bullet points' giving the main sub-topics that are going to be discussed, or questions that are going to be addressed in the lecture. However, it can get quite boring for students if

all the slides are just print, and most lecturers now deliberately put in visual stimuli on at least some of their slides.

Slides allow your students to see things on the screen at the same time as they hear about them from you, and this means a better chance of your students making sense there and then of the topic in hand. Usually, you can see your slides on a computer screen in front of you, without turning round to the main screen onto which the image is projected, which means you can talk about your slides without turning your back on your audience. In former times when lecturers wrote on blackboards (or whiteboards), students' attention was often lost when lecturers turned to face the board – and lecturers' words were often lost if they talked to the board!

Slides are also a useful comfort blanket for us as lecturers. A well-produced set of slides gives an immediate impression of a professional and credible lecture, even when we're new at it. Slides can also be a way of making our lectures much more flexible, allowing us to respond to what actually happens in the session. For example, it can be useful to have prepared (say) 30 slides,

but only to intend to use 20 of them at the session, with the others being there in case there is time to go into more depth about particular aspects, or to have a ready answer available for anticipated questions from students.

Ten tips for good slides

1. Don't put too much on any slide. A few questions, headlines or bullet points are better than solid paragraphs. Detailed information is best left to handout materials.
2. Use large fonts, to ensure that everything can be read from the back of the room. Check this out – or get a colleague to run quickly through your slides with you sitting at the back yourself.
3. Check which colours work well. Some text colours (notably orange and red) don't come across clearly at the back of the room. The software allows you to have dark text against light backgrounds and vice versa. However, light text against dark backgrounds works rather badly if you can't dim the lighting in the lecture room (for example if there are windows without good blinds).
4. Try to fill only the top half or two-thirds of any slide. Students may have to peer around each other's heads to see anything right at the bottom of a slide – you can tell by when they move their heads as you reveal a 'last bullet point' on a slide.

Hint: if using PowerPoint slides, prepare paper copies of all of your slides, say two per page, and lay these out in front of you if possible at the start of your lecture. Write clearly the numbers of the slides on your paper copies. When giving your presentation, you can go to any slide at any time, and in any order, simply by keying in '5' then 'enter' to go to slide 5, and so on. This is particularly useful when students ask a question and you may want to go back to an earlier slide, or for when time is running out and you want to skip ahead to a later slide, and so on. It gives you full control of which slides you show when, without having to clumsily run backwards or forwards though slides you're not actually going to use on that occasion. Remember, however, to tick off on your paper copy which slides you did in fact use (or not use) so that later you still have a record of exactly what you covered in that particular lecture.

Hint: remember to switch the slides right off – and know how to get them back easily. There are few things worse than a slide staying up on screen too long after it has been used – for example when you've moved on to talk about something else, or are answering a question from your audience – it then just becomes a distraction for your students. An easy way of switching your slides off when using PowerPoint is to press 'B' on the keyboard – 'B' for black. When you want your slide back, all you need to do is press 'B' again – 'B' for back. This is far safer than risking switching off the data projector with its remote control – some machines take minutes to warm up again if switched off.

5. Use pictures, cartoons and graphs when they help to bring your subject to life.
6. Don't include detailed graphs, tables or flowcharts, if the detail would not be clearly visible at the back of the room. Such detail is better in handout materials than on-screen in the lecture room.
7. Don't include 'slide numbers' on slides (the software allows automatic numbering if that's what you wanted). Not including slide numbers gives you the freedom to pick-and-mix your slides, without your students realising that you're skipping some of them!
8. Don't issue 3-per-page or 6-per-page handout copies of your slides in advance. This robs you of opportunities to 'surprise' your students with unexpected quotations, or even 'fun' slides. Especially if you're going to pick-and-mix from your slides as in the 'hint' above, only issue later the slides you did actually use.
9. Don't cause 'death by bullet point'. It gets tedious for students if successive bullet points always come one at a time in exactly the same predictable way.
10. Learn from other people's use of slides. Whenever possible sit in on colleagues' lectures and conference presentations and see what works well for others – and what doesn't.

Questions and answers in lectures

A good lecture should be a shared learning experience for all present. Those students who miss the lecture should have missed something much more than just the slides or handouts.

Questions and answers work both ways. During your lecture, you've got the opportunity to help your students to think; asking them questions helps them to make sense of the topic, lets you know how well they are doing so, and alerts you to areas where they are not yet succeeding in getting their heads round the subject material being addressed. Allowing and indeed encouraging students to ask you questions helps you to find out what they still need from you on their journey towards achieving the intended learning outcomes.

Getting students to ask you questions

What not to do: just ask 'Any questions?' now and then. Why not? Usually there's no response, especially if you ask towards the end of your lecture. Students are likely simply to take your question as a sign to start packing up.

Also, when students do take advantage of your offer to respond to their questions, you tend to get questions from the relatively confident students, who aren't usually the ones who most need to have their questions answered. On the whole, students are shy at asking questions in lectures, not least because of the fear that they may ask a 'stupid' question and then feel embarrassed.

Hint: a useful way of getting questions from a large group of students is to pass some Post-it® notes around. Ask all the students to jot down any questions they have, one per Post-it®, and either pass them down to you, or stick them on a wall or door on their way out of the lecture. You can then gauge which questions are the most prevalent ones, and answer them in your next lecture, and note also what the other questions tell you about how the overall learning is progressing in the group.

Even when we assure them 'better to feel stupid for a moment than to remain ignorant for a lifetime', voicing a question in a lecture is a risky prospect for most students. That's why they tend to come up to you at the end and ask their questions individually – but with schedules to keep, and the next class coming in shortly, that's not an ideal alternative in practice.

Some suggestions for when students do ask you questions in lectures include:

Repeat the question to everyone – many may not have heard the question, and your answer won't make any sense if they don't know the question.

Even if it's a stupid question, don't make its owner feel stupid – just answer it quickly and kindly.

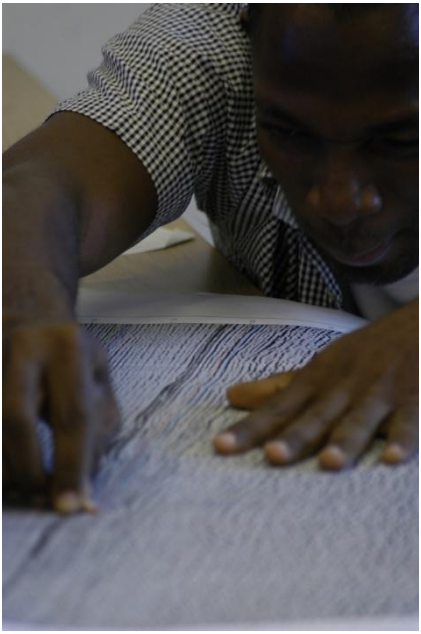
If you don't know the answer, don't make one up – say that you'll find out, or ask if anyone else has an answer.

Getting students to answer your questions

In large group lectures in particular, students can be quite reticent about answering your questions. They may fear looking stupid or 'being caught out' when they haven't been paying attention.

Some 'don'ts' for asking questions in your lectures:

Don't ask the whole class a question, then simply answer it yourself. That just causes the class not to take your questions seriously.



Don't pick on the same students each time you ask a question – for example the ones who happen to have eye-contact with you. That just discourages students from looking at you!

Hint: where possible, show your questions on-screen, so that students can see it as well as hear it. It also makes the questions seem more important to students, and they're more likely to take on board that these are questions that they need to be able to answer

Don't just pick on students near to you – that allows those at the back to become even more switched-off than they may be already.

Don't choose a student and then ask your question – that causes everyone else not even to try to think of an answer to your question.

Question, pause, pounce!

The best way to ask students questions in your lecture is this three-stage approach:

- Ask the question.
- Wait for enough time for most students to be ready to give at least some level of answer.
- Pounce – pick a student at random. This means more students think of an answer – their learning is more active.

Don't, however, intimidate students

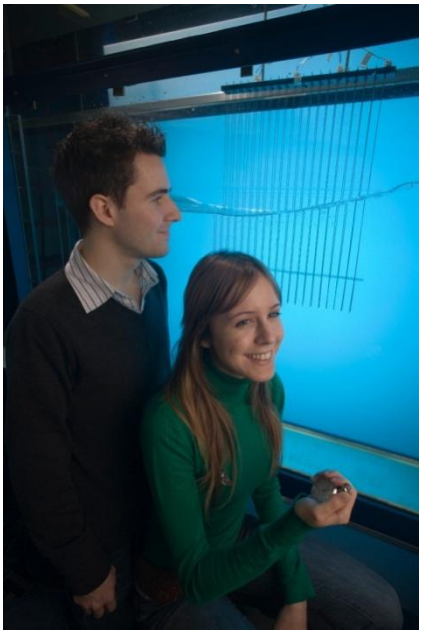
When you pick a student who can't (or won't) answer a particular question, move on fairly quickly to another student.

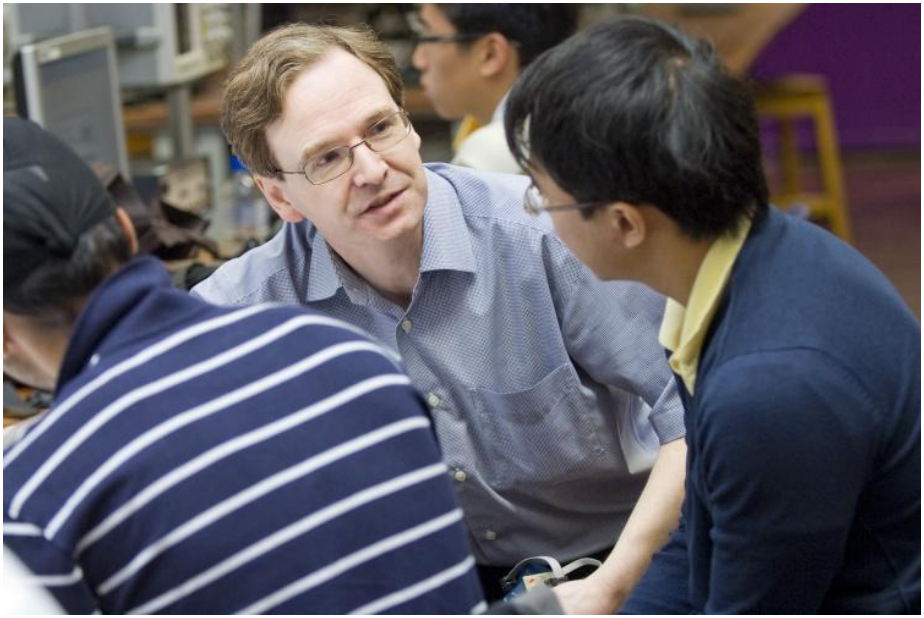
If students come to fear the prospect of being asked a question in a large-group situation, they may well opt not to attend at all!

Another hint: if you're issuing handouts in your lecture, it only takes a minute or two to pencil onto (say) the top right-hand corner of each copy a number. You can then ask students to note the number on their handout, and also to notice the numbers on their neighbours' handouts. You can then ask your question, pause for a moment, then say: 'Whoever has handout number 78, please?' You may notice this particular student 'shrinking', but people close to the student will point out the student concerned. Then when you've asked your next question, you can return to the owner of handout 78 and ask: 'Now you pick a number between (say) 1 and 257, please', and from now on it isn't a matter of you picking on particular students to answer your questions – they have ownership of the process.

More tips on giving lectures (adapted from Race, 2005)

- Always link lectures to assessment. Give students cues and clues about how this particular lecture 'counts' in due course. Whenever you say 'You'll need today's material for exam questions like so-and-so' you'll notice students jotting something down!
- Lecturers should be seen and heard. Use a mike if it helps. Don't just say 'Can you hear me at the back?' – ask someone in the back row a question and find out. And don't dim the lights to show your slides at the expense of students no longer being able to see you.
- Don't keep slides up too long. Students will keep looking at the screen, even when that screenful is quite finished with. Get them to look at you now and then. (When using PowerPoint, you might switch off the presentation, using the shortcut introduced in the hint-box on Page 50).
- Avoid death by bullet point. Make different slides look different – include some charts or pictures where possible. If you're confident with technology, put in some optional very short video clips now and then – but nothing which would matter if it didn't work straightaway.
- Try to cause the students to like you. Smile. Be human. Look at them. Respond to them. If they like you, they're more likely to come to your next lecture too.
- Think of what students will be doing during the lecture. Don't worry too much about what you will be doing, plan to get your students' brains





engaged. Get them making decisions, guessing causes of phenomena, trying out applying ideas, solving problems and so on. They'll learn more from what they do than from what you tell them.

- Don't put too much into the lecture. It's better to get students thinking deeply about a couple of important things, than to tell them about half-a-dozen things and lose their attention.
- Bring in some appropriate humour. The odd funny slide, amusing anecdote, or play on words can work wonders at restoring students' concentration level. Then follow this up with an important point, while you've still got their full attention. But don't use humour if it's not working!
- Keep yourself tuned into WIIFM. 'What's in it for me?' is a perfectly intelligent question for any student to have in mind. Always make time to remind students about why a topic is included, and how it will help them in due course.
- Don't over-run. At least some of your students are likely to have something else to go to after your lecture, and

perhaps with not much of a margin for error. If you come to a good stopping place and there are 15 minutes left, do your closing bit and stop. Students actually like lectures that finish early now and then.

- Pave the way towards your next lecture. After reviewing what students should have got out of the present lecture, show (for example) a slide with three questions which will be covered in next week's instalment.

Problems in lectures: 'What can I do when…?'

Next we'll look at some of the most frequently occurring problems that lecturers experience. Some of these problems are the sorts of nightmares about lecturing which many new lecturers have. In each case, I will suggest three or four ways of getting round the problem – leaving you to take your pick of which would suit you best – or think of your own better way round the problem.

What can I do when I'm feeling very nervous?

You're not alone. Even many very experienced lecturers are quite nervous, especially with a new group, or with a subject they don't know particularly well. Some tactics that can help include:

Smile! You'll notice that at least some of the students will smile back – this immediately makes you feel better.

Have good prompts available. It's reassuring to have (for example) a list of your slides, so that you won't be nervous

about losing your place in the lecture.

Ad-lib an explanation of the importance of a point you've just recently been making. Sometimes the very fact that you're making a spontaneous addition is relaxing in its own right.

Bring in your students. For example, ask them a question along the lines: 'How many of you have already come across ...?' or 'How many of you have never yet heard of …?'

Don't be afraid to pause for a short while, and take a deep (quiet) breath.

What can I do when I forget where I am in my lecture?

This happens to most lecturers now and then, so don't feel that there's something wrong with you if it happens to you. Your choices include:

- Give your students something to do for a couple of minutes. For example, have a slide or overhead already prepared for such an eventuality. Make the activity seem a perfectly natural step for your students, for example by saying: 'Now would be a really good time for you to think for a minute or two about…' and then put up

your task briefing. While the students are doing the task, you've got time to sort out where you are, and get ready to resume your lecture after debriefing students' work on the short task.

- Minimise the chance of losing where you are by having a print-out of your slides, so that you can quickly see what you've done and what you were talking about.
- Ask students to jot down the two most important things they've learned so far from your lecture. Then ask them to compare with those sitting close to them. Then ask for volunteers to tell you what they chose as these things. This often helps you to regain a feel for exactly what had been happening in their minds up to the point at which you lost your way.
- If you're very confident, you could say: 'Oops, I've lost it! Anyone like to remind me what I was going to say next?' At least then, you'll have the full attention of your students for a moment – and they normally respond well to you just being human.

What can I do when I don't know the answer to a student's question?

A common nightmare. You'll feel less concerned about this as you gain experience – but the following tactics can take away some of any worries you may have about this.

- Give yourself time to think. Repeat the question to everyone, as other students may not have heard the question. Sometimes this extra time is enough to give you a chance to think of how you may respond.
- Don't try to make an answer up! If it turns out to be wrong, or if you get stuck in the process, you will soon have the full attention of all the students – not what you really want at this stage!
- Say: 'This is a really good question. How many of you can respond to this?' and look for volunteers. Quite often there will be someone there who is willing answer it.
- Break it down into smaller bits. Then start by responding to one of the bits where you do have something to say. If it's a question that your

students don't actually need to know an answer to, say so. 'Interesting, but not actually needed for your course,' and so on.

- Admit that at this point you don't have an answer to the question, but you will find one by the time of the next lecture. Invite the student who asked the question to jot it down on a Post-it®, with their email address, so that you know exactly what the question was, and can respond to the questioner directly as soon as you've located an answer. But don't forget to share the answer with the whole group at the next lecture too.

What can I do when students repeatedly come in late, and disrupt my lecture?

This is a balancing act. There will usually be some students who arrive late, but sometimes the problem becomes more significant in certain time-slots and at particular times in a module.

- Don't gradually get more and more annoyed! The next student to arrive may have a very good reason for being late.
- Resist the temptation to be sarcastic (e.g. 'How good of

you to join us today'). Mostly, students who come in late don't actually enjoy being late, and if they get a rough ride from you, next time they're late they may well decide not to risk coming in at all.

- If the late-coming is noisy (loud doors, shoes on floors, and so on), pause until it will be possible for everyone to hear you properly again. The students themselves will get tired of having to wait for latecomers, and will often show their own disapproval, sparing you the need to do so.
- If necessary, agree some ground rules with the whole group. For example, if quite a lot of the students have had to come from another session at the other end of the campus, negotiate to start promptly five minutes after the normal time.
- Build in a little 'warm-up' time at the start of each lecture. In other words, start doing something useful with the students (for example reminding them of three important points from last week, or quizzing them gently).

What can I do when the technology lets me down?

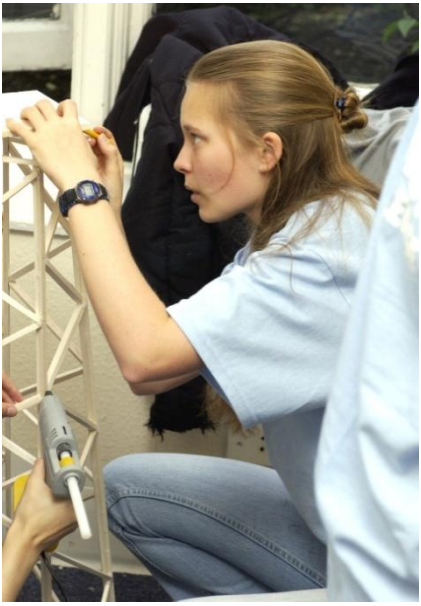
For example, your PowerPoint slides disappear, or freeze! The thing not to do is to struggle for ages, with the undivided attention of the whole group, with a mouse, a remote control, a keyboard, or any other piece of technology. Alternatives include:

- Smile, rather than sweat! Even if inside you're quite tense about it, it's best to give the impression of being cool about it.
- Give your students a discussion task to do – something to talk about to those sitting next to them – a decision to reach, a problem to solve, and so on. It's a good idea always to have such a task ready and waiting. Then when they're all busy and eyes are off you, you can try to rescue the technology.
- Ask for help. 'Anyone know how to fix this please?' quite often brings a competent volunteer from the floor. Sometimes, you can ring up technical support, but it remains advisable to give the students something else to do until help materialises.
- Recognise when the problem is terminal – for example when the bulb has failed in a ceiling-mounted data projector.
- If it's towards the end of a session, wind up. Remind your students of the intended learning outcomes, and promise to cover anything important that remains outstanding on a future occasion – or to put the relevant slides onto the web. Your students won't mind you stopping early!

What can I do when attendance drops off during a series of lectures?

It could be, of course, that your students are getting bored – or tired – or are busy trying to catch up ready for someone else's assignment deadline. Whatever the cause of absenteeism, one or more of the following tactics may help:

- Don't wait an inordinate time for more students to appear. Those who came punctually deserve to be getting some value, so get started even if the audience is sparse.
- Find ways outside the lecture room to ask a few students why they missed a particular session. Don't however rail on them and tell them how unwise they are being – keep to fact-finding until you know more about what's going on.
- Link each and every lecture firmly to the assessment agenda. Students don't like to miss (for example) clarification of what a typical exam question could reasonably ask of them.
- Don't vent your frustration on the students who do turn up. If anything, make them feel all the more welcome and valued.
- Try for added value. Make sure that the students who do turn up feel that it's been well worth doing so. Give them a useful and enjoyable learning experience – and handouts they would have missed if they had not turned up.



What can I do if students are talking in my lecture?

Many lecturers get upset by this, and clearly if students can't hear you over each other's chatter, the situation becomes untenable.

- Don't just carry on trying to ignore it. That often makes the problem get worse. Pause, looking at the people who are talking until they stop – or until the other students shut them up for you.
- Don't necessarily assume they're just being rude. Sometimes, one will have asked another to explain or repeat something that has been missed. Sometimes they could be translating what you say into another language for each other.
- Acknowledge that you may have been talking yourself for too long, and give them something to talk about with near neighbours. In other words, legitimise their talking for a few minutes, and let them get the need to talk out of their system.
- Note any persistent 'talkers' but resist the temptation to confront them in front of the whole group. Instead, find a time to talk to them on their own, and explore how they're finding your lectures.
- Think carefully about the consequences before asking an 'offender' to leave! If they actually refuse to leave, you'll have a much more difficult problem to deal with. Never issue a threat that you would not in practice be able to implement.

What can I do if I come to the end and there are still 15 minutes to go?

Possibilities include:

- Say: 'This is a good place to stop this particular session' and re-visit the intended learning outcomes for a moment or two, then wind up. Your students will not be terminally disappointed!

- Have with you a revision activity – for example a set of short, sharp quiz questions on your lectures to date with the group, and give them a quick-fire quiz until the time has been used up.
- Give out Post-its® and ask students to write any questions they would like to ask about the subject on them, and pass the Post-its® down to you. Choose which questions to answer to the whole group until the time is used up.
- Put up a slide of a past exam question on the topic you've been covering, and explain to students a little about what was expected in answers to that question.
- Ask the students to write down the two most important things they now know, that they didn't know when the lecture started. Then get them to compare with their neighbours, and invite volunteers to read out a few such things.
- Give a brief overview of what's coming next – for example showing the students the intended learning outcomes for the next couple of lectures.

> 'I never teach my pupils; I only attempt to provide the conditions in which they can learn.'
>
> Albert Einstein

Assessment, marking and feedback to students

Nothing we do affects students more than assessment. If we get our assessment wrong, students' whole lives or careers could be jeopardised. And feedback is vital to students, so that they can be praised for what they do well, learn from their mistakes, and improve their next piece of work on the basis of our feedback.

Often much time is spent designing student assignments and assessment methods, marking work and giving students feedback on their progress. For many, this is a real 'in at the deep end' experience. Sometimes it seems as if we're expected simply to hold a red pen in our hand and automatically to know how to use it!

Summative and formative assessment

'Summative' assessment is normally measured at the end of an element of learning – for example end-of-module exams. Students usually get the results as marks or grades, and may sometimes not get any further feedback (for example on their exam performance).

'Formative' assessment is normally used during the course of a module, and even though the marks or grades may count towards students' overall awards, the feedback they receive is intended to help them to identify weaknesses and build on strengths to make their next piece of assessed work better. With large classes, the time taken to give students effective formative feedback increases, and the danger is that the quality of the feedback is reduced by the pressure on assessors.

Assessment matters to students

Students are often quite strategic about their learning – if it counts towards their overall qualifications they will do it – if it doesn't, many won't! This, in fact, is an intelligent response to the situation students often find themselves in – a heavy burden of coursework

assessment and looming exams.

Yet assessment and feedback are areas where students are least satisfied with their experiences of higher education, as shown by the data from the annual National Student Survey in the UK.

It's probably the case that students who are highly successful in assessment are perfectly satisfied with the feedback they get, and that student dissatisfaction with assessment and feedback is attributable to students who fare less well, and perhaps rightly believe they could have done better if they had been given enough formative feedback early enough to improve their performance.

The sharp end of learning and teaching

Because assessment is so important to students, emotions can run high. Students can be very sensitive to the language we use when we give them feedback. It's all too easy for us, despite our best intentions, to damage their motivation in

our attempts to give them constructive feedback on weaknesses in their work. This danger is exacerbated if we have large piles of work to mark, and not enough time to phrase our feedback carefully.

Assessment is at the sharp end for us too, as we are likely to be under the scrutiny of external examiners.

Fit-for-purpose assessment is valid, reliable, transparent and authentic, and manageable!

Why do we need these characteristics for assessment and what do they actually mean in practice?

Validity is about making sure that we're using assessment to measure exactly what we set out to measure – students' evidence of achievement of the intended learning outcomes. We need therefore to make sure that we know exactly *which* intended learning outcomes each element of assessment is addressing. But sometimes validity can be compromised by the form of assessment we choose – for example traditional exams sometimes end up measuring how well students can *write* about what they know, rather than how well they've got their heads round the subject.

Reliability is about making sure that we're being fair and consistent, and that each mark or grade is accurate and realistic. In practice, this means that we've got to make a well-honed *marking scheme* for

each element of assessed work (whether it's an exam question, an essay, a report, etc.) so that we can be sure that we're being equally fair to all our students. When there's a really good marking scheme, different assessors will agree on the marks to be awarded for particular exam answers or assignments. Also, there won't be any variation in the standard of assessment on the journey from the first piece of work you mark down to the last piece in the pile.

Transparency means we have to make sure that our students know how assessment works. They need to know what we're looking for in an excellent answer. They need to know what they must do to reach a pass mark. They need to know what would *not* get them a pass. In other words, we need to help our students to see that what is being assessed is their evidence of achievement of the intended learning outcomes, and that these outcomes are useful to them as goalposts for their studying.

WHAT MAKES GOOD ASSESSMENT ?!

Validity
Reliability
Transparency
Authenticity
Manageability

Authenticity has two sides. We need to be sure that what we are marking is indeed the work of the students concerned – in other words that they haven't copied it or downloaded chunks from the web. At least in traditional exam situations, we're fairly sure about whose work it's. But plagiarism is largely a problem of our own making – we need to design out plagiarism in coursework assessment, by making what we assess more clearly students' individual efforts (for example critical incident accounts, reflective logs, and so on). The other side of authenticity is about how 'real life' our assessment is in practice. For example, we can't expect to measure drama performance skills effectively by asking students to sit in an exam room and *write* about

drama performance skills!

Manageability also has two sides – assessment needs to be manageable for us – and for our students. In the UK, it can be argued that there's too much assessment, and that because of all of the pressure this causes it doesn't work very well. We need to be streamlining assessment so that it's of high quality and we're *assessing* (making judgements on important things) and not just marking (merely ticking off routine things, for example spelling, punctuation and grammar). When students themselves are overloaded with assessment, they are often driven to surface-learning mode, learning things rapidly just for the exam or assignment, then forgetting them just as quickly.

Beyond exams, essays and reports

Traditionally in higher education in the UK, there has been perhaps too much emphasis on written assessment, and students' qualifications have depended too much on their skills relating to quite a narrow range of ways of demonstrating their achievement of the intended learning outcomes: answering exam questions, writing essays and writing reports. There are many alternatives, including:

Computer-marked multiple-choice tests or exams

Once set up, the computer handles all the marking, and can even cause feedback to be printed out for candidates as they leave the test venue, or indeed give them instant on-

screen feedback if the main purpose is feedback rather than testing. Care has to be taken, however, when designing multiple-choice questions for testing purposes, so the questions are known to discriminate reliably between students at different ability levels in the subject concerned.

Short-answer exams or tests

These reduce the effect of students' speed of writing, and syllabus in a given assessment element than when long answers are required.

Annotated bibliographies

For example where students are asked to select (say) the most relevant five sources on a particular idea or topic, then review them critically, comparing and contrasting them in only (say) 300 words. This can cause students to think more deeply about the topic than they might have done if writing a 3,000-word essay (and the annotated bibliographies are much faster to mark).

Portfolios of evidence

These can take even longer to assess than essays or reports, but can test far more than mere essay-writing or report-writing skills.

Oral presentations

These focus on important skills that would not be addressed or assessed through written assessment formats.

In-tray exams

Much more ‘real life’ testing situations, where instead of a question paper on the exam room desk there is a collection of paperwork, which students study and use to answer relatively short, sharp decision-making questions which are issued every now and then during the exam.

Open-book (or ‘open-notes’) exams

Where students don’t have to rely on memory, and have with them the texts or notes of their choice (or a known-in-advance selection of texts and handouts), and where the exam questions test what they can do with the information already on

Vivas (oral exams)

Which can be a better measure of students’ understanding, as their reactions to on-the-spot questions are gauged and there is no doubt about the authenticity of their answers (such doubts can colour the assessment of various kinds of written work).

Poster displays

Where students’ individual or collaborative design and originality can be among the attributes measured.

Setting exam questions

Often, only on the first occasion when they mark exam scripts do lecturers first become aware of just how sensitively the questions need to be designed, and how clearly the assessment criteria and marking schemes need to be laid out to anticipate as many as possible of the different ways that even the most unambiguous-looking question can turn out to be answered in practice. The suggestions below are extracted from Race *et al (*2005) and may help to spare you from some of the headaches that can result from hastily written exam questions.

Don't do it on your own! Make sure you get feedback on each of your questions from colleagues. They can spot whether your question is at the right level more easily than you can. Having someone else look at one's draft exam questions is extremely useful. It's better still when all questions are discussed and moderated by teams of staff. Where possible, draft questions *with* your colleagues. This allows the team to pick the best questions from a range of possibilities, rather than use every idea each member has.

Get one or two colleagues to do your questions – or do it yourself! Sometimes even sketch answers can be helpful. This may be asking a lot of busy colleagues, but the rewards can be significant. You will often find that they answered a particular question in a rather different way than you had in mind when you designed the question. Being alerted in advance to the ways

that different students might approach a question gives you the opportunity to accommodate alternative approaches in your marking scheme, or to adjust the wording of your question so that your intended or preferred approach is made clear to students.

Have your intended learning outcomes in front of you as you draft your questions.

It's all too easy to dream up interesting questions which turn out to be tangential to the learning outcomes. Furthermore, it's possible to write too many questions addressing particular learning outcomes, leaving other outcomes unrepresented in the exam.

***Keep your sentences short*.** You're less likely to write something that can be interpreted in more than one way if you write plain English in short sentences. This also helps reduce any discrimination against those for whom English is not the first language.

Work out what you're really testing. Is each question measuring decision-making,

strategic planning, problem-solving, data-processing (and so on), or is it just too dependent on memory? Most exam questions measure a number of things at the same time. Be up-front about all the things each question is likely to measure. In any case, external scrutiny of assessment may interrogate whether your questions (and your assessment criteria) link appropriately with the published learning outcomes for your course or module.

Don't measure the same things again and again

For example, it's all too easy in essay-type exam questions to repeatedly measure students' skills at writing good introductions, firm conclusions, and well-structured arguments. Valuable as such skills are, we need to be measuring other important things too.

Include data or information in questions to reduce the emphasis on memory

In some subjects, case-study information is a good way of doing this. Science exams often tend to be much better than other subjects in this respect, and it's appropriate to be testing what candidates can *do* with data rather than how well they remember facts and figures.

Check the timing

You'll sometimes find that it takes *you* an hour to answer a question for which candidates have only half an hour. Assessors setting problem-type questions for students often forget that familiarity with the type of problem profoundly influences the time it takes to solve it. Students who get stuck on such a question may end up failing the exam more through time mis-management than

through lack of subject-related competence.

Decide what the assessment criteria will be

Check that these criteria relate clearly to the syllabus objectives or the intended learning outcomes. Make it your business to ensure that students themselves are clear about these objectives or intended outcomes, and emphasise the links between these and assessment. When students are aware that the expressed learning outcomes are a template for the design of assessment tasks, it's possible for them to make their learning much more focused.

Work out a tight marking scheme for yourself

Imagine that you are going to delegate the marking to a new colleague. Write it all down. You will find such schemes an invaluable aid to share with future classes of students, as well as colleagues actually co-marking with you, helping them to see how assessment works.

Proof-read your exam questions carefully

Be aware of the danger of seeing what you *meant*, rather than what you actually *wrote*! Even if you're very busy when asked to check your questions, a little extra time spent editing your questions at this time may save you many hours sorting out how to handle matters arising from any ambiguities or errors which could have otherwise slipped through the proof-reading process.

Designing marking schemes

Whether you're marking exam answers or students' assignments, the time spent making a good marking scheme can save you hours when it comes to marking a pile of scripts. It can also help you to know (and show) that you are doing everything possible to be uniformly fair to all students. As your marking schemes will normally be shown to people including external examiners and quality reviewers, it's important to design schemes in the first place so that they will stand up to such scrutiny. The following suggestions should help.

Write a model answer for each question, if the subject matter permits

This can be a useful first step towards identifying the mark-bearing ingredients of a good answer. It also helps you see when what you thought was going to be a 30-minute question turns out to take an hour! If you have difficulties answering the questions, the chances are that your students

will too! Writing model answers and marking schemes for coursework assignments can give you good practice for writing exam schemes.

Make each decision as straightforward as possible

Try to allocate each mark so that it's associated with something that is either present or absent, or right or wrong, in students' answers.

Aim to make your marking scheme usable by a non-expert in the subject

This can help your marking schemes be useful resources for students themselves, perhaps in next year's course.

Aim to make it so that anyone can mark given answers, and agree on the scores within a mark or two

It's best to involve colleagues in your piloting of first-draft marking schemes. They will soon help you to identify areas where the marking criteria may need clarifying or tightening up.

Allow for 'consequential' marks

For example, when a candidate makes an early mistake, but then proceeds correctly thereafter (especially in problems and calculations), allow for some marks to be given for the ensuing correct steps even when the final answer is quite wrong.

Pilot your marking scheme by showing it to others

It's worth even showing marking schemes to people who are not closely associated with your subject area. If they can't see exactly what you're looking for, it may be that the scheme is not yet sufficiently self-explanatory. Extra detail you add at this stage may help you to clarify your own thinking, and will certainly assist fellow markers.

Look at what others have done in the past

If it's your first time writing a marking scheme, looking at other people's ways of doing them will help you to focus your efforts. Choose to look at marking schemes from other subjects that your students may be studying, to help you tune in to the assessment culture of the overall course.

Learn from your own mistakes

No marking scheme is perfect. When you start applying it to a pile of scripts, you will soon start adjusting it. Keep a note of any difficulties you experience in adhering to your scheme, and take account of these next time you have to make one.

Marking students' work

Particularly when you're under pressure to mark a lot of work in a short time (exam scripts or students' assignments), the following suggestions may help you to do so fairly and efficiently.

Be realistic about what you can do

Put work for marking into manageable bundles. It's less awesome to have ten scripts on your desk and the rest out of sight than to have a large pile threatening you as you work.

Devise your own system of tackling the marking load

You may prefer to mark a whole script at a time, or just Question 1 of every script first. Do what you feel comfortable with, and see what works best for you.

Avoid 'halo effects'

If you've just marked a brilliant answer, it can be easy to go into the *same* student's next answer seeing only the good points and passing over the weaknesses. Try to ensure that you mark each answer dispassionately. Conversely, when you look at the *next* student's answer, you may be over-critical if you've just marked a brilliant one.

Watch out for prejudices

There will be all sorts of things which you like and dislike about the style and layout of students' work, not to mention handwriting quality in exam scripts. Make sure that each

time there is a 'benefit of the doubt' decision to be made, it's not influenced by such factors.

Recognise that your mood can change

Every now and then, check back to work you marked earlier, and see whether your generosity has increased or decreased. Be aware of the middle-mark bunching syndrome. As you get tired, it feels safe and easy to give a middle-range mark. Try as far as possible to look at each script afresh.

Take account of the needs of second markers

If someone else will be double marking the work, don't make written comments on the scripts themselves, to avoid prejudicing the judgement of a second marker (unless of course photocopies have already been made of each script for double marking).

Making the most of feedback to students

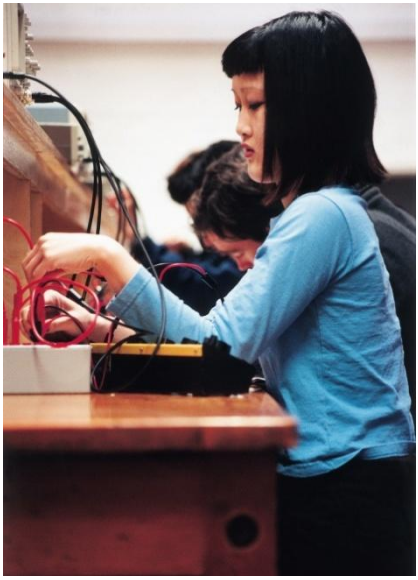
It used to be the case that there were two main ways of giving students feedback on their work:

Written (handwritten) comments on students' work

Face-to-face feedback, where tutors discussed students' work with them, individually or in small-group tutorials.

Although these two methods are still in use, in many disciplines there are just too many students needing too much feedback for either process to be practicable any longer. Fortunately, word-processing technology and communications technologies have extended our repertoire of methods of giving students written feedback. We can now choose from options including:

- Statement banks, from which we can draw often-needed feedback explanations from a collection of frequently used comments which apply to the work of many students, and stitch these comments together to make a composite feedback message to individual students.
- Emailing feedback directly to students, so that they can study our feedback in the comfort of privacy at their computers.



- Building an overall general collection of feedback comments to the class as a whole, based on common errors and frequent difficulties, posting this on an electronic discussion board which each student can view, and then emailing individual students only with any specific additional feedback they need.
- Using assignment return sheets, where the feedback agenda has already been prepared (for example based on the intended learning outcomes or the assessment criteria for the assignment), enabling us to map our feedback comments to students more systematically.
- Creating an overall feedback report on a task set to a large group of students, covering all the most important mistakes and misunderstandings, referring individual students to the sections relevant to their own work, and adding minimal individual feedback to students, addressing aspects of their work not embraced by the general report.

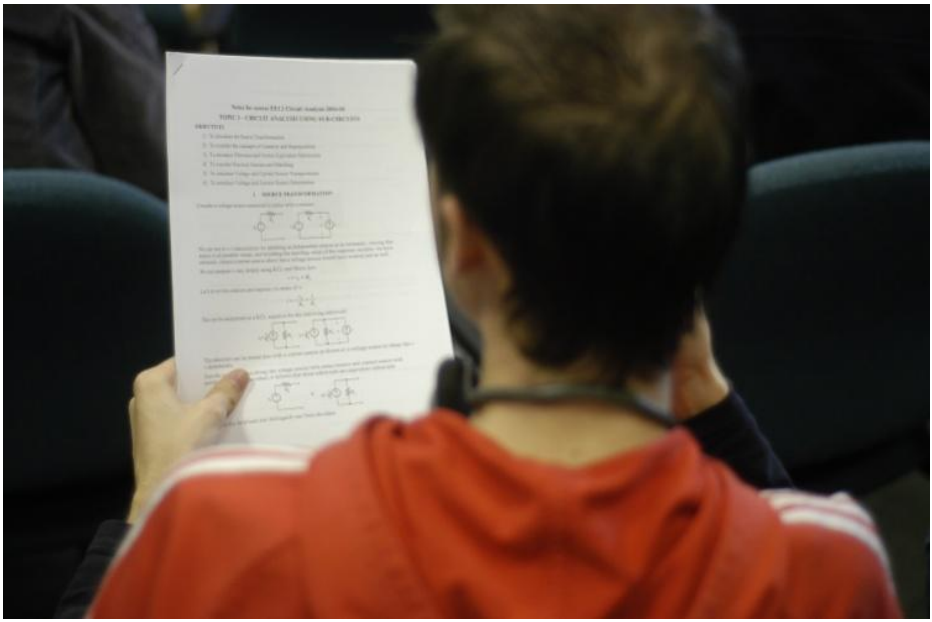
- Model answers: these can show students a lot of detail which can be self-explanatory to them, allowing them to compare the model answers with their own work and see what they've missed out or got wrong.
- Giving feedback in a lecture, allowing us to cover all the most important points we need to make, and also allowing students to see how their own work compares with that of their fellow-students.
- Using the 'track changes' facilities in word-processing packages to edit students'

electronically-submitted essays and reports, so they can see in colour the changes we've made to their work at the click of a mouse on their own screens. This sounds complex, but in practice can be a very quick way of giving a lot of detailed feedback, and the feedback is in exactly the right place amid their words, not in a margin or over the page.

Feedback to students should be:

Timely – the sooner the better

There has been plenty of research into how long after the learning event it takes for the effects of feedback to be significantly eroded. Ideally feedback should be received within a day or two, and even better almost straightaway, as is possible (for example) in some computer-aided learning situations, and equally in some face-to-face contexts. When marked work is returned to students weeks (or even months) after submission, feedback is often totally ignored



because it bears little relevance to students' current needs. Many institutions nowadays specify in their Student Charters that work should be returned within two to three weeks, enabling students to derive greater benefits from feedback. When feedback is received very quickly, it's much more effective, as students can still remember exactly what they were thinking as they addressed each task.

Personal and individual

Feedback needs to fit each student's achievement, individual nature and personality. Global ways of compiling and distributing feedback can reduce the extent of ownership that students take over the feedback they receive, even when the quality and amount of feedback is increased. Each student is still a person.

Articulate

Students should not have to struggle to make sense of our feedback. Whether our messages are congratulatory or critical, it should be easy for students to work out exactly what we are trying to tell them, They should not have to read each sentence more than once,

trying to work out what we are really saying.

Empowering

If feedback is intended to strengthen and consolidate learning, we need to make sure it doesn't dampen learning down. This is easier to ensure when feedback is positive, of course, but we need to look carefully at how we can best make critical feedback equally empowering to students. We must not forget that often feedback is given and received in a system where power is loaded towards the provider of the feedback rather than the recipient – for example where we are driving assessment systems.

Manageable

There are two sides to this. From our point of view, designing and delivering feedback to students could easily consume all the time and energy we have – it's an endless task. But also from students' point of view, getting too much feedback can result in them not being able to sort out the important feedback from the routine, reducing their

opportunity to benefit from the feedback they need most.

Developmental

Feedback should open doors, not close them. In this respect, we have to be particularly careful with the words we use when giving feedback. Clearly, words with such 'final language' implications as 'weak' or 'poor' cause irretrievable breakdowns in the communication between assessor and student. To a lesser extent, even positive words such as 'excellent' can cause problems when feedback on the next piece of work is only 'very good' – why wasn't it

excellent again? In all such cases it's better to praise exactly what *was* very good or excellent in a little more detail, rather than take the short cut of just using the adjectives themselves.

Maximising learning payoff through feedback

The following suggestions are adapted from Race (2005) and aim to give you some practical ways in which you can increase the learning payoff caused by your feedback to students.

Provide students with a list of feedback comments given to a similar assignment prior to them submitting their own

You can then ask students, for example in a large-group session, to attempt to work out what kind of marks an essay with specific comments might be awarded. This helps them to see the links between feedback comments and levels of achievement, and can encourage them to be more receptive to critical comments on their own future work.

Let students have feedback comments on their assignments prior to them receiving the actual mark

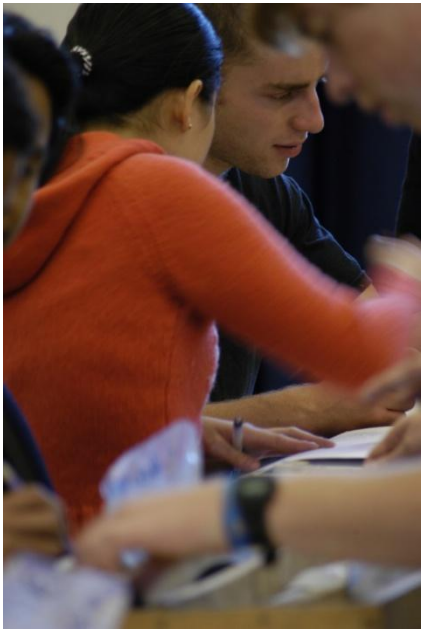
Encourage them to use the feedback comments to estimate what kind of mark they will receive. This could then be used as the basis of an individual or group dialogue on how marks or grades are worked out.

Focus your comments on students' work, not on their personalities

Comments need to be about 'your work', rather than 'you'. This is particularly important when feedback is critical.

Get students to look back positively after receiving your feedback

For example, ask them to revisit their work and identify what were their most successful parts of the assignment, on the basis of having now read your feedback. Sometimes students are so busy reading, and feeling depressed by the negative comments, that they fail to see that there are positive aspects too.



Ask students to respond selectively to your feedback on their assignments

This could for example include asking them to complete sentences such as:

‘the part of the feedback that puzzled me most was…’

‘the comment that rang most true for me was…’

’I don’t get what you mean when you say…’

‘I would welcome some advice on…’.

Ask students to send you an email after they have received your feedback, focusing on their feelings

In particular, this might help you to understand what emotional impact your feedback is having on individual students. It can be useful to give them a menu of words and phrases to underline or ring, for example including: exhilarated, very pleased, miserable, shocked, surprised, encouraged, disappointed, helped, daunted, relieved (and so on).

Ask students to tell you what they would like you to stop doing, start doing, and continue doing in relation to the feedback you give them

This is likely to help you to understand which parts of your feedback are helpful to specific students, as well as giving them ownership of the aspects of feedback that they would like you to include next time.

Don’t miss out on noticing the difference

Comment positively where you can see that students have incorporated action resulting from your advice given on their previous assignment. This will encourage them to see the learning and assessment processes as continuous.

References and further reading

Race, P., Brown, S. and Smith, B. (2005) 500 Tips on Assessment (2nd edition). London: Routledge.

Race, P. (2005) Making Learning Happen. London: Sage Publications.

McKeachie, W. J. (2009). McKeachie's teaching tips: Strategies, research, and theory for college and university teachers (13th edition). Boston: Houghton Mifflin.

Jaques D (2003) Teaching small groups. BMJ; 326:492–94.

Fry H, Ketteridge S, and Marshall S, (1999) A handbook for teaching & learning in higher education. London: Kogan Page.

List of web resources

The role of the GTA

Lee Haugen (Center for Teaching Excellence, Iowa State University) gives an overview on teaching philosophy, providing a series of tips for writing an effective statement.
www.celt.iastate.edu/teaching/philosophy.html

Educational Development Unit (Imperial College London): useful information about the needs of keeping a log and the ways to approach the task.
www.imperial.ac.uk/edudev/resources/gtamaterials/trainees/trainee16

Teaching theory basics

Richard Felder defines the different learning styles in this interactive presentation
dhtv2.csudh.edu/CTL/021507_HB.wmv

Richard Felder and Barbara Soloman devised a 44-item questionnaire that you can use to find out your learning style
www.engr.ncsu.edu/learningstyles/ilsweb.html

Open University: general information about learning styles, as well as another questionnaire to determine your particular learning style.
www.open2.net/survey/learningstyles/

Teaching Teaching & Understanding Understanding" by Claus Brabrand and Jacob Andersen.A 19-minute award-winning short-film (DVD) about Constructive Alignment.
www.daimi.au.dk/~brabrand/short-film/

The Institute for Interactive Media & Learning, University of Technology Sidney, provides a series of useful tips to understand different approaches to learning and how to act in order to achieve the best possible results.
www.iml.uts.edu.au/learnteach/enhance/understand/

The SOLO taxonomy was introduced by Biggs to classify the different levels of understanding showed by students. This visual representation was produced by Atherton, and endorsed by Biggs himself.
www.learningandteaching.info/learning/solo.htm

Laboratory teaching

Educational Development Unit (Imperial College London): provides a guidesheet with useful advice on how to approach lab demonstrations.
www3.imperial.ac.uk/edudev/resources/gtamaterials/trainees/trainee5

Center of Teaching and Learning, Queen's university gives an overview on lab-based learning
www.queensu.ca/ctl/goodpractice/lab/index.html

Beverly Black, Martha Gach, and Nancy Kotzian (Center for research on Learning and Teaching, University of Michigan) present some checklists that can assist when preparing for the lab activities.
www.crlt.umich.edu/gsis/lab_guidebook.php

An article by Alan Dickman (Ersted Award winning teacher from Oregon University) on lab-teaching
tep.uoregon.edu/resources/librarylinks/articles/lab.html

University of Virginia website offers a short guide on lab-teaching
trc.virginia.edu/Publications/Teaching_UVA/III_Lab_Teaching.htm

Small-group teaching

David Grantham (National Teaching Fellow), presented these tips for postgraduates on small group teaching
www.ukcle.ac.uk/resources/postgraduate/grantham.html

George Roberts (Brookes University) gives a possible definition of small groups and introduces groups' dynamics and interactions.
www.slideshare.net/georgeroberts/small-group-teaching-in-higher-education-1173056

A bullet-point style guide to teaching in small groups written by Dr. Kusyszyn (York University, Toronto).
www.keele.ac.uk/depts/aa/landt/docs/small-gr.html

Students with disabilities

When teaching students with disability, there are some factors that need to be taken into account. The Teachability website (The University of Strathclyde) offers a guide for creating accessible tutorials for disabled students.
www.teachability.strath.ac.uk/chapter_4/tableofcontents4.html

The JISC TechDis Service aims to be the leading educational advisory service, working across the UK, in the fields of accessibility and inclusion. Their mission is to support the education sector in achieving greater accessibility and inclusion by stimulating innovation and providing expert advice and guidance on disability and technology.
www.techdis.ac.uk/

GTA guides

HEA Engineering Subject Centre (EngSC) has produced a series of peer reviewed guides looking at various aspects of teaching and learning aimed at all those involved in engineering education.
http://www.engsc.ac.uk/guides
Three guides of particular relevance:

- Learning and teaching
  http://www.engsc.ac.uk/teaching-guides/introduction/
- Education Theories on Learning
  http://www.engsc.ac.uk/teaching-guides/education-theories/
- Learning and teaching in laboratories
  http://www.engsc.ac.uk/teaching-guides/laboratories/

Appendix: Some theories on learning

What is learning?

Learnt information can be seen as an organised body of existing concepts, such as scientific ideas, everyday ideas, or mental plans for solving problems or interpreting information. These bodies of information are sometimes referred to as *knowledge schemas*.

Learning can then be seen as:

- the encoding of information from *short term memory* into existing knowledge schemas within *long term memory*
- the effective utilisation or recall of information within long term memory
- the abstraction or processing of this knowledge in postulating new understanding

Typical student concepts of learning (Marton et al., 1997) include:

- a quantitative increase in knowledge
- memorising
- acquiring facts and methods for subsequent use
- the abstraction of meaning
- an interpretative process for understanding reality
- developing as a person

Learning is also:

- coming to experience the world
- motor skills, e.g. riding a bike, handling a gas cylinder
- developing strategies for reasoning and thinking

‘I cannot teach anybody anything, I can only make them think.’

Socrates

Cognitive Approaches

Cognitive processes include thinking, reasoning and problem solving. These actively organise and modify information from the environment, i.e. assimilation of material into existing ways of thinking, and accommodation of material through adapting ways of thinking to fit new information or experiences. Brain encodes information into schemas. Knowledge and understanding is a mental construction: new learning builds on existing understanding. Learners are more likely to pay attention to material which they can fit into or relate to existing schemas.

Some implications?

- Connecting new material to existing schemas leads to meaningful (*deep*) learning, otherwise, if it can't be connected anywhere learners may resort to rote (*surface*) learning.
- Learning is an active process involving the construction of meaning; new learning must fit in with existing experience and prior knowledge.
- Teaching is not a transmission of knowledge but the design and organisation of tasks to promote learning, i.e. appropriate learning tasks, materials and resources needed to enable students to construct their knowledge.

'If the purpose of teaching is to promote learning, then we need to ask what we mean by that term. Here I become passionate. I want to talk about learning. But not the lifeless, sterile, futile, quickly forgotten stuff that is crammed into the mind of the poor helpless individual tied into his or her seat by ironclad bonds of conformity!'

Carl Rogers (1983) – humanist:

- Activation of prior knowledge useful as well as relating ideas in a coherent way; useful to use advance organisers, anchoring ideas, analogies, concrete examples and concept and topic maps.
- Making learning strategies explicit, with opportunities for student reflection on these, will be helpful; e.g. clarifying goals, planning, monitoring progress.

Social Approaches

Learning is not a simple process of information transfer from a source (teacher, parent, computer), but often involves an active social interaction in which, for example, a student constructs knowledge through discovery and experiment (Piaget), learns through imitation or observation (Bandura), or relies upon teacher support which is congruent with the student's immediate (proximal) potential for learning (Vygotsky).

Some implications?

- Role of teacher is to emphasise connections, incite motivation or structure task solution.
- Cultural and social influences act upon student attitudes and beliefs towards learning and education.

- Student-centred teaching is important, whereby the student can efficiently progress within their potential towards a learning outcome.
- Learning through guided participation is important, e.g. building bridges between what's known and new knowledge, structuring and supporting efforts, transferring responsibility for learning, teacher as a *scaffold* in learning.

Humanistic Approaches

Student learning should be self-directed. Students will be motivated to learn if it's something they need or want to learn. Goal of education is to foster students' desire to learn

Some implications?

- Formative assessment and self-evaluation are important to student learning: grading may encourage students to work towards grades and not personal satisfaction.
- Feelings and knowledge are important in the learning process; i.e. cognition and emotions important and influence each other.
- Students learn best in a non-threatening environment.

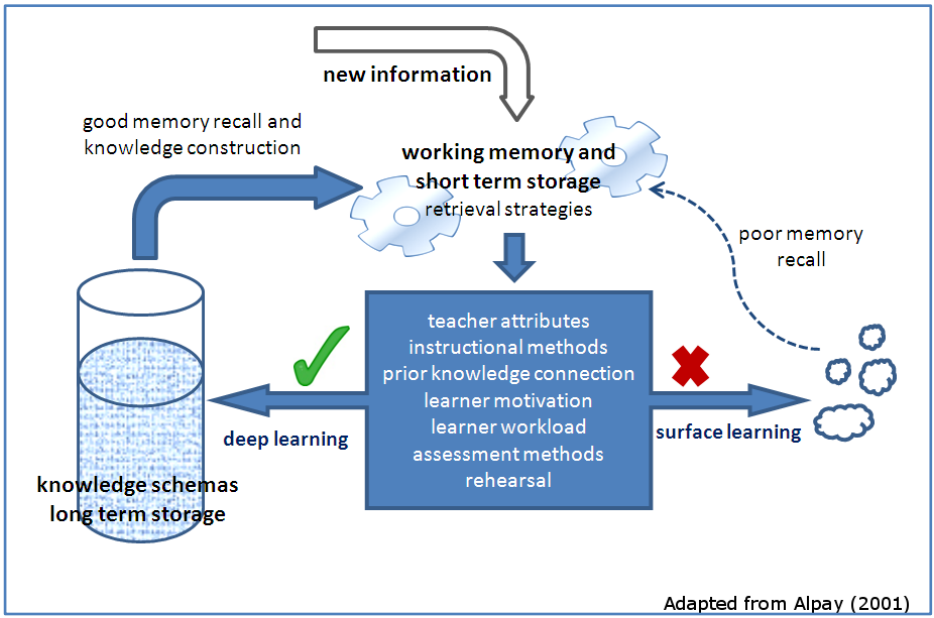
Levels of Processing Knowledge

Deep learning:

- focus on what is signified, e.g. concepts applicable to solving a problem
- relate previous knowledge to new knowledge
- relate knowledge from different courses
- relate theoretical ideas to everyday experiences
- relate and distinguish evidence and argument
- organise and structure content into a coherent whole

Surface learning:

- focus on the signs, e.g. the equations needed to solve the problem
- focus on unrelated parts of the task
- memorise information for assessments
- associate facts and concepts unreflectively
- fail to distinguish principles from examples
- treat task as an external imposition



What encourages deep learning?

- stimulating and considerate teaching, e.g. demonstrate your personal commitment to the subject and stress its meaning, relevance and importance to the students
- allow opportunities to exercise choice in the method and content of the study
- clearly state academic expectations
- teaching and assessment methods that foster active and long-term engagement with the subject matter
- assessment method directly linked to objectives

What encourages surface learning?

- a teacher with a lack of interest in the subject matter, or poor background knowledge
- lack of independence on study
- poor or absent feedback on progress
- an excessive amount of material / information
- assessment methods emphasising recall or the application of trivial procedural knowledge
- assessment methods that create anxiety

Teaching approaches for deep learning:

- sharing your love of the subject with students
- making the subject material stimulating and interesting
- explaining the material plainly and at the level of student understanding
- making it very clear as to what has to be understood, at what level and why
- showing concern and respect for the students
- encouraging student independence
- improvisation and adaptation when needed
- using methods and tasks that require students to learn actively (rather than passively), responsibly, and co-operatively
- using suitable assessment methods
- focusing on key concepts and student misunderstandings rather than covering the material
- giving high quality feedback on student work
- modifying your teaching as you learn from students

Cognitive styles and learning strategies

A cognitive (or thinking) style is a person's habitual mode of perceiving, thinking and problem-solving, or the characteristic style in which cognitive tasks are approached or handled. Several distinct cognitive styles have been identified by researchers; typically defined through polar dimensions such as:

Serialistic-wholistic

step-by-step construction of knowledge vs. seeing the whole picture first

Convergent-divergent

trying to find an answer vs. exploring possibilities

Reflective-impulsive

reflect on information and options first vs. act quickly to test outcomes

Intuitive-analytical

look for connections and extrapolations vs. base decisions on real data and facts

For each dimension, learners have a general preference for one style or another. Riding and

Cheema (1991) reviewed 30 different cognitive styles and examined correlations between them. They concluded that the different styles could be grouped into two principal dimensions:

- ***wholist-analytic***: a tendency to organise information into either whole or parts.
- ***verbaliser-imager:*** a tendency to represent information during thinking either as words (verbally) or as mental images

Learning strategies are then adopted by individuals to achieve the learning objectives. For example, *imagers* may like to make diagrammatic representations of information presented to them, whereas *verbalisers* may like to annotate graphs and illustrations. *Wholists* may better appreciate connections and extrapolations to other lecture courses and concepts before learning procedural or methodological details, whereas *analytics* may give focus to the specific components of the learning task in the first instance. Likewise, wholists may be relatively comfortable with open ended problems which lack informational details, whereas analytics more rigorous with real data and facts. Some commonly associated terms with this learning dimension include (Cassidy, 2004):

Wholist: inductive, expansive, divergent, creative, unconstrained, informal

Analytic: deductive, rigorous, convergent, critical, constrained, formal

Different strategies for different tasks may be used, but often accommodate the preferred cognitive style of the individual.

The overall outcome of such research findings is that teachers should adopt a range of instructional approaches to appeal to as many students as possible.

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Alpay,E. (2001), Some psychological theories in engineering education, Chemical Engineering Education, 212-219.

Cassidy, S. (2004), Learning styles: an overview of theories, models and measures. Educational Psychology, 24, 419-444.

Marton, F., Hounsell, D., Entwistle, N. (Eds.) (1997), The experience of learning. Scottish Academic Press.

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