Module and Curriculum Design

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1. Introduction

In the early years of your career, you are likely to find yourself teaching established modules (courses) that have been taught before, being part of an existing programme and with all the accompanying documentation prepared. However, at some point you will want to branch out and design your own module; perhaps one that aligns with your research interests. It may even be that the time comes when you have ideas about how the programme itself should be structured, or you want to design a programme of your own choosing. This chapter discusses some of the steps that you would need to follow in order to be successful in module and programme design.

The chapter extends, updates and complements the earlier chapter on 'Designing undergraduate degree programmes' by Rebecca Taylor (2002).

It has never been more important to ensure that the education we provide for our students fits their needs and meets their expectations in an increasingly competitive job market. Thoughtful and well-planned module and curriculum design can provide a framework for this.

Students who expect to complete their degree programme with substantial debts need to know that the education they receive will prepare them for their life beyond graduation. A thorough and rigorous grounding in a subject will still be important, but the ability to apply disciplinary thinking in a variety of employment settings will also be crucial. Furthermore, there are more generic skills that need to be embedded into the curriculum alongside the disciplinary components. Graduates need to be prepared to adapt to a rapidly changing global environment, in ways that we cannot foresee.

As economists, we know that the subject engenders a way of thinking that is indeed widely applicable in many different contexts. However, this needs to be clear in the design of our modules and curriculum.

In any move towards designing — or redesigning — a module or curriculum we must be aware of the constraints within which we must operate. The Quality Assurance Agency (QAA), as the regulatory body for UK HE institutions, provides the framework that shapes the structure and content of the curriculum, but allows for considerable flexibility.

This chapter will explore how the economics curriculum, and the modules that are its components, can be designed to maximise its appeal to students and employers, without losing the rigour of analysis that we hold dear.

2. Definitions and assumptions

The focus of this chapter is on the undergraduate curriculum, and its component modules. The issues that arise in designing a degree programme for postgraduate students are rather different, given the specialist or vocational focus of such programmes and their shorter duration.

For discussion of designing postgraduate programmes, see the Handbook chapter 'Designing *ab initio* postgraduate degrees' by Mark Baimbridge (2013).

Nomenclature relating to the components of a degree can vary between institutions, so let's be clear about the definitions that will be used in this chapter

A **degree programme** (or just **programme**) refers to the entirety of the study undertaken by a student, normally over a three-year period. Programmes are sometimes known as courses, but this chapter will refer to programmes.

A programme can be seen to be divided into a number of parts. A **part** is taken to be the material studied during a year of full-time study. For example, Part 1 will be taken to refer to the material normally covered in the first year of full-time study. This is used instead of referring to 'years' to avoid potential confusion caused in relation to part-time or sandwich programmes.

Each part is in turn made up of a number of **units** or **modules**. These are also sometimes known as courses. These are the building blocks of the curriculum, and will be termed as modules for the remainder of this chapter.

The design of a module needs to reflect the overall structure of the programme to which it contributes, and this will be an important factor to consider when producing or amending a module.

Curriculum design in the context of an undergraduate programme refers to the way in which material is organised within the programme. There are many dimensions to this, including the balance between micro, macro and econometric topics; the balance between theory and applied material; the need to ensure progression through the typical three-year programme; and so on. These aspects will be considered in Section 5.

In England, Wales and Northern Ireland, the typical undergraduate programme runs over three years — or four years for a sandwich course. In some disciplines (notably Engineering), it is common to have a four-year integrated undergraduate Masters' degree. Universities in Scotland operate four-year degree programmes, reflecting the different nature of pre-university education. This offers different challenges and opportunities for curriculum design.

The QAA provides the regulatory framework for degree programmes in the UK, and specifies the criteria to be met by any degree programme. The QAA covers Scotland through a similar but separate process. Section 5 explores the way in which the QAA influences discipline-based curriculum design through its general framework and its subject benchmarks.

3. Desirable characteristics of an economics graduate

A first step in designing a module or curriculum is to be clear about its objectives. From our perspective as economists this may seem self-evident, but is deserving of some discussion. A starting point is to think about the nature of the product from the programme — i.e. to consider the desirable characteristics of a graduate from an economics programme. In the context of an increasing focus on the employability of graduates, this needs to take into account the expectations of typical employers of economics graduates. Notice that success in placing our graduates in employment contributes to the Teaching Excellence Framework (TEF) through the data regarding the job destinations of graduates (DHLE).

3.1 Disciplinary knowledge and understanding

The first objective is to produce graduates who are well-grounded in economic analysis, fulfilling the national subject benchmarks. This is an essential feature of any economics programme, and the benchmarks are discussed in section 5 below. It is also desirable for students to be exposed to a balance of theoretical and applied material — although programmes may differ in having a bias towards one or the other. Curriculum design also needs to consider the sequence in which material is presented.

3.2 Reflective and independent learners who can think like economists

Looking beyond the benchmarks, we want our graduates to be able to think like economists. This is less well-defined, but most would acknowledge that this is part of our aim in designing a programme. We would also want to produce graduates who are reflective learners and capable of independent thought and research. After all, this is the essence of what a university education is about.

This is more challenging in a world in which students become increasingly exam-oriented, and in which many students come to university from educational and cultural backgrounds that have not fostered notions of independent study. If we are to achieve this objective, we need to provide students with opportunities for independent study and research. These should be embedded within the design of the curriculum, for example through a research project or dissertation. These are discussed in the chapters in *The Handbook for Economics Lecturers* by Kim Marie Goldrick (2007) and Peter Smith (2016).

3.3 Graduates fit for life beyond the programme

The curriculum also needs to be able to prepare our graduates for the life after their undergraduate studies. In other words, we should see the undergraduate programme as a step that will lead into the next phase of their career path. Given the burden of debt with which they will leave our programmes, it is likely that they will want to know the ways in which their studies will provide a preparation for their intended career, and we will need to be able to articulate this.

It is worth being aware that the qualities that we wish to endue in our graduates may not correspond to the factors valued by employers in recruitment terms. A survey by the CBI in 2015 revealed that the two top qualities considered by employers were attitudes and aptitudes for work and relevant work experience or placement. Degree subject was only the third highest, followed by degree class, with university attended and foreign language capability some way behind.

Of course, one of the complications here is that there is no unique destination for an economics graduate, so the curriculum needs to be designed in such a way that it can prepare our students for multiple alternative lifepaths.

Some of our students may wish to continue their studies in economics, pursuing their studies to postgraduate level, and possibly beyond. Others may have an ambition to become professional economists. Some may wish to enter a career in finance or management. Others may enter a wide variety of other careers connected to economics to varying degrees.

In order to accommodate these different paths, the curriculum and its modules need to be flexible enough to allow graduates to exit towards these different destinations. If we were to design a programme solely for the purpose of preparing students to proceed to an MSc and then a PhD, the curriculum would look very different from one that was designed to produce graduates for employment in a range of non-specific occupations. In many cases, we want the curriculum to deliver on both, or we may run interlocking but parallel programmes with different objectives in mind.

In the past, there may have been a tendency to focus on programmes that are just the first step in a sequence ending with a PhD, or on programmes that were designed to produce professional economists. This can result in a relatively narrow focus in the curriculum. In 2016, some 60% of economics graduates from UK universities were working full time, compared with about 14% who were in further study, training or research.[note 1]

This is by no means a feature only of economics programmes, and there are many discipline-based programmes which assume that students are only interested in a single subject. This can be unfortunate, as not all students who study history become professional historians, nor do those who study chemistry all become chemists. Economics is no different in providing graduates to a range of professions. As far as curriculum design is concerned, this means that we may want to provide opportunities for students to broaden their horizons as part of their programme of study.

There is some evidence to support this. Employers have indicated that it is not uncommon for them to interview students whose knowledge and understanding of their own discipline is excellent, but who struggle when asked questions that take them out of this comfort zone.

Curriculum design can tackle this in several ways, for example by highlighting generic skills that are embedded into the curriculum and by encouraging students to participate in what has become known as the ‘co-curriculum’ — activities in which students participate outside of the formal credit-bearing programme but which enhance their employability skills. This includes the development of ‘non-academic’ skills. The curriculum can also be designed in such a way that students are able to look beyond their own discipline as part of their programme.

Footnotes

[1] See Kirsty Palmer (2016) "Social Science Overview" Higher Education Careers Services Unit

4. Designing a Module

Let's suppose that you have the opportunity to design and launch a module, or that you want to make major changes to a module that you have inherited from someone else. Where do you start?

You might think that you can start by focusing on what you would like to teach…but in today's climate it pays to begin by thinking about what your students need to achieve by attending your module. To put it into education-speak, you need to consider the learning outcomes that the module will deliver. You will need to express things in this way in order to comply with the bureaucracy (which we will discuss soon). If you prefer it, you can think about this in terms of how students will benefit from the things you would like to teach them.

Approaching the task in this way, you will need to consider not only the content that you intend to provide, but also the skills and attributes that students will acquire by attending your module. You can then tailor the design of the module in order to be able to deliver these learning outcomes. This process is known as 'constructive alignment', and this entails three key elements: syllabus content, teaching methods and assessment strategy.

4.1 Syllabus

In identifying the intended content of the syllabus, a first consideration is how the module will fit into the programme (or programmes) of which it will be part. If the module is an optional component of the programme, you are likely to have more discretion over the content than if it is a core or compulsory module. The content of a compulsory module is likely to be more circumscribed, as other colleagues will be relying on you to deliver some key concepts or topics.

You also need to consider your likely audience. Will the students taking the module be specialist economists, joint honours students, or perhaps students from unrelated programmes who happen to be interested in the topic? This is important because you need to know what prior knowledge they are bringing. It may be that you need to set prerequisites for the module, if you will be assuming familiarity with certain parts of

economic theory. Otherwise, you will find yourself having to explain concepts or impart knowledge that you did not expect to have to include, taking time away from your real intended content.

Top Tip

Make sure that you are familiar with the overall structure of the overall programme, so you know what topics are likely to have been covered by the students you expect to take your module. Liaise with colleagues.

The syllabus for your module will also have to take into account the amount of contact time available for your teaching. This will be determined by the Department or the University. Remember that there is a trade-off between syllabus coverage and depth of learning. You may be tempted to cram in lots of interesting stuff, only to find that you do not have enough time to cover everything to the level of detail that you wish.

Top Tip

Don't be too ambitious in the quantity of material you set out to cover. Students may benefit more from deep learning of a limited number of topics than from skimming through lots of issues at a superficial level.

4.2 Teaching methods

So you have chosen the topics you will cover in the syllabus. The next step is to consider how you will deliver the learning outcomes through your choice of learning and teaching methods.

There is plenty of advice on the range of learning and teaching methods available in the Network's *Handbook*, so make sure you make good use of the guidance provided there. For our purposes, when designing a module, the key decisions concern the balance between different styles of learning and teaching delivery.

For example, how do you envisage the balance between passive and interactive learning? Will you rely on the traditional 'chalk and talk' approach, or will you try to engage the students in active and interactive learning? Lectures allow you to cover lots of material by transferring some knowledge from your brain to your students' short-term memory, but this does not encourage deep learning.

You may prefer to use flipped classroom techniques, experiments or teaching technologies. These methods encourage deeper learning, and will engage students more actively in your module, as they need to become active participants in the learning process.

Top Tip

Before you spend time planning lots of exciting ways of engaging students, make sure that the facilities you need are available. Will the rooms in your university be suitable for the innovations you want to introduce? Is the required technology supported?

4.3 Assessment strategy

Having decided what to teach and how to deliver it, you also need to think about how to assess your students.

An important decision in designing a module concerns the balance between formative and summative assessment. Formative assessment aims to help students by providing feedback on their work and to motivate them by developing their awareness of their strengths and weaknesses. It also allows you to diagnose those strengths and weaknesses. Formative assessment does not necessarily contribute to their formal performance measure on the module. Summative assessment, on the other hand, does contribute to the judgement of student performance on the module.[note 1]

Both types of assessment are important. Formative assessment is especially important as a way of improving student learning, and providing feedback. An issue here is that although students routinely complain in the National Student Survey about the lack of feedback provided to them, there are always some students who will only submit work if it counts towards their mark. Providing motivation for them to attempt formative assessment is important, but tricky. Summative assessment is of course essential for determining pass/fail, grading students, enabling them to signal their performance and so on.

You will also need to decide on the form that assessment will take. It may be that your Department insists on an unseen written examination for each module, or that a certain portion of the summative assessment should be based on some form of coursework.

If you decide on setting coursework (or a combination of coursework and exam) as the summative assessment, you will need to think about the timing of the coursework. Too early, and the students may not have covered enough material to make it possible to assess their performance. Too late, and they get embroiled in exam preparation. Where the assessment is wholly on coursework, attendance at lecture and seminars may be affected if the topics relevant to the work have been covered too soon in the module.

Top Tip

Remember that it is important to coordinate the timing of coursework assessments across modules, otherwise students may find themselves with multiple pieces of work with the same deadline. They will then complain about the workload and pester you for extensions. Talk to colleagues to check this.

4.4 Information

When designing a module, you will inevitably need to produce documentation. This will be needed for the module approval process, but also you will need to provide information to students who are considering taking the module, or who enrol on it.

Early in the process, contact your administration or University website to find out what documents need to be submitted to get approval to run the module. This is likely to include the items already discussed — learning outcomes, teaching methods and assessment strategy. There will no doubt be a template in which this needs to be presented.

Top Tip

Find the template at the outset to avoid duplication of effort, and check the timescale in which the documents need to be submitted.

The template will no doubt demand other information as well, including credit weighting, teaching and study hours, not to mention the learning outcomes.

As you prepare this documentation, be aware that you will also need to provide information to the students who will take your module — and notice that some of this will be the same information that is needed to go through the approval process. It thus makes sense to think about this at the same time. Students will need to know about content, teaching methods and assessment methods. They will also be interested in the prior knowledge they will need to tackle the module successfully and the technical level expected. They may also be interested in the likely reading and references involved. They may even refer to the intended learning outcomes.

4.5 Using the VLE

An important part of planning and launching a module concerns the way in which you will make use of the Virtual Learning Environment (VLE). This could be Moodle, Blackboard or some other software used by your university.

Most (if not all) universities set minimum requirements for the information provided to students via the VLE. This will include such things as the module profile setting out details of the things that we have already discussed, such as content, teaching methods and assessment. You may want to provide a rough schedule for the expected timings of syllabus content, or other information that students will find useful (some of these are discussed in the next section).

You might want to use the VLE more imaginatively, providing video links, setting up blogs or discussion boards. You may wish to tailor the way the site looks to students to set your module aside from the crowd. All these things need to be planned in advance.

4.6 After the module is approved…

Once the module is approved, you need to start planning ready for the launch. There are some obvious things you need to do (such as planning your lectures and seminars etc.). There are also some crucial 'little' things that can easily be missed, but which can have a big impact on how the module turns out.

4.6.1 Who needs to know?

Think about who else needs to know about your new module. The **library** needs to know what you will expect students to access, so a reference list is important. If there is a core text, does the library have enough copies for the number of students likely to take the module? The **bookshop** will need to know what books to stock (even if most students may rely on Amazon or the library). The **computing service** will need to know if there is particular software that students will need to use, or if you need to book computer rooms for workshops.

4.6.2 Room bookings

Then there are issues around **timetabling** and **room bookings**. Do you need particular facilities that are only available in some rooms? If you are running a combination of large and small groups, what does this mean for the timing of small group sessions? For example, do they run every week? If in alternate weeks, when do you want them to start and finish? You might have a preference for 'odd' or 'even' weeks. If you are running experiments or games, do you need a larger room than the number of students would justify, in order to allow them to move around the room or interact with each other? If you want to run sessions where the students discuss in groups, you may wish to avoid a room with fixed seating. If you intend to record your lectures, you need to check that your room has the facility for this. There are many aspects to room booking, so think about how you want to operate.

4.6.3 Handouts

Think about handouts. Will you be providing handouts to support your students at the beginning of the module? Will they get weekly updates or copies of lecture slides? How will these be provided? How will you inform them about assessment tasks (both formative and summative)? Will the VLE be the prime way in which you provide your handouts? Does you institution insist that handouts are provided in advance of the lectures?

Top Tip

When handouts are distributed before the sessions, you may observe that students may think that they do not need to take notes. You could try leaving gaps in the handouts so that students have to write something. They may even take extra notes when they realise that you are not just reading out the handouts.

4.6.4 Liaison with teaching assistants

You might be in a situation where you will have graduate teaching assistants (GTAs) to run seminars or classes for you, or to undertake marking of formative assessment. You will need to provide tutorial or seminar work to your GTAs in good time for them to prepare their sessions. You may well wish to give them worked answers and explain what you want the students to gain from the tutorials or seminars.

4.6.5 Assessment

You will need to be clear about the logistics of the assessment. If you are setting formative assessment tasks or summative coursework, you need to plan how students will submit their work. Will you use electronic submission? Or will they hand in hard copy through an office?

Electronic submission is becoming increasingly common, although this may pose challenges for some maths assignments. You may be able to accept submission through the VLE, and perhaps mark it online. Indeed, this may be an institutional requirement.

Remember that for summative coursework, you may need to provide a sample of work for scrutiny by the external examiner, although this may not apply to work that carries a small weighting in the overall module assessment. You may also need to have the coursework approved by the external examiner if it does carry a high weighting. For written work such as project reports, you will want to check for potential plagiarism, probably using the TurnitinUK software (which may be invoked automatically if you accept work through your VLE).

Top Tip

When running a module for the first time, it is helpful (perhaps essential) to provide sample assessment materials (e.g. a sample exam paper). This helps students to know what you expect from them.

You may want to use mid-term exams or tests as part of the assessment. You may well intend to allocate normal lecture time for this to take place – but be careful. There are likely to be students following your module who are eligible for special exam arrangements, such as extra time (because of dyslexia), or other accommodations for medical conditions. Or there may be students who are ill, or for other good reason unable to take the test at the time you plan. All these will need to be accommodated somehow.

4.6.6 Feedback and communicating with students

Providing feedback to students on their work is important because this is the way in which students can learn from the work that they undertake — and because they will be answering questions about it in the NSS, although, of course, this is not why we do it.

Feedback can be provided in a variety of ways, although all too often it seems that students have a narrow view of feedback as comments given in writing on their work.

This is far from the case, but it is important to make students aware when they are receiving feedback. There is a chapter on giving feedback in the Network's *Handbook*. You may find that you will have to provide details about how you will give feedback when preparing document for module approval.

When designing the module, it is good to think about how you will communicate with students. Your Department may insist that you have office hours (or even 'feedback and office hours'), or you may be able to use an online booking system for appointments. You may choose to use the VLE to send emails, or set up a discussion board. However, be aware that students may see these as old-fashioned and clunky ways of communicating, being more accustomed to texting and social media.

4.7 Summary on module design

Please don't be put off by the range of issues that need to be considered in designing a new module. Much of the hassle comes up-front, and once running the module should be good for a while!

When the module runs for the first time, take notes of what goes well, and what could be improved in the future. It is all too easy to forget both good and bad aspects unless you keep a record. No doubt your institution runs an annual module questionnaire of some sort, so make sure you check out the comments made by students to see whether they view the module's successes (and areas for improvement) the same way that you do.

Footnotes

[1] See Nigel Miller's chapter, "Alternative Forms of Formative and Summative Assessment"

5. Designing a Programme

Launching a new programme is a complex process that entails extensive planning and administrative hassle. However, in a rapidly changing economic and political environment, it is crucial to refresh the range of degree programmes offered to students. This may involve revamping existing provision, or it may mean introducing wholly new programmes, perhaps reflecting the changing research and teaching interests of staff in the Department as well as the changing needs of students.

5.1 Market research

As with designing a new module, a first step is to reflect on why the new programme is needed, and for whom it is intended. Is there a demand for the new offering? Or is it just something that appeals to you and/or your Department? There is no point in devising a wonderful new programme that will be enjoyable to teach if no students will want to follow it.

Market research will need to focus on potential student demand and on competitor analysis. As far as student demand is concerned, your admission office may have the resources to do some of this work for you, or you may have to rely on asking questions when applicants come to visit. This is unreliable, of course. For example, if you ask applicants whether they are interested in study abroad, and you may well be faced with great enthusiasm – but once they are on course, persuading them to take advantage of these opportunities becomes a challenge.

Competitor analysis is also important. Are you entering a crowded market, or have you found a new niche programme? Watching what other institutions are doing in terms of curriculum development may provide ideas, but also warn of the potential intensity of competition in some areas. External examiners on your existing programmes and colleagues can act as a useful sounding board as you explore the potential viability of your new programme. You will no doubt need to make a case for viability as part of the approval process.

Top Tip

The Economics Network website provides links to economics departments in the UK.

5.2 Making the case for the new programme

Having convinced yourself of the desirability of the new programme, how do you convince your colleagues and administrators that it is a good (and viable) idea?

In addition to the market research, you need to be able to show how the new programme will enhance the Department's portfolio of programmes, and how it will fit in with existing provision. What is the underlying purpose for the programme? What will be the overall learning outcomes? How does this complement what is already being offered?

An important issue for both your colleagues and for the institution's administration is naturally the resourcing of the programme. What will it cost in terms of staffing? Will it be able to draw upon existing modules, or will it necessitate the development of lots of new ones? Will it be attractive to international as well as UK students?

You will need to convince your colleagues that the new programme will fit with existing provision. Make sure that there is coordination across programmes in relation to things like entry requirements. If you are intending to make use of some existing modules, check capacity constraints and prerequisite structures.

How will the admissions process be handled? Will the new programme be advertised alongside existing programmes? How will you announce the availability of the new programme? Will recruitment to the programme complement the existing programme or draw recruitment away from existing offerings?

You may need to coordinate the assessment structures and the range of assessment methods to be used across the programme, to ensure a good balance of exams and other forms of assessment.

Will the current external examiners be able to take on responsibility for the new programme, or will there need to be new appointments?

Top Tip

Talk to colleagues throughout the process: get them involved and on board.

In designing a new programme, you will face a variety of constraints that will influence the way in which the programme can be built. These come from your Department and/or Faculty and from the need to comply with the approval procedures of the university, which will in turn reflect the demands of the QAA.

Your institutional programme approval processes will ensure compliance with the requirements of external bodies, but it helps to be aware of how these are likely to affect the way in which you build your programme. External regulatory bodies include the QAA and the Competition and Markets Authority (CMA), but also may involve accreditation agencies if your planned programme is intended to offer exemptions from professional exams, such as are needed for accountants or actuaries etc.

5.3 The requirements of the QAA

The first essential thing to be addressed in designing a curriculum is to ensure compliance with the requirements of the QAA, which is the regulatory body charged with the responsibility of upholding quality and standards in universities and colleges. QAA does this through its **Quality Code**, which 'gives all higher education providers a shared starting point for setting, describing and assuring the academic standards of their higher education awards and programmes and the quality of the learning opportunities they provide'.[note 1] For programme design, the most important parts of the Quality Code relate to the Framework for Higher Education Qualifications (FHEQ), subject benchmark statements, programme specifications and programme approval. Many, if not all, of the steps needed to ensure compliance will be imposed on disciplines through the medium of institutional procedures.

5.3.1 The Framework for Higher Education (FHEQ)

The FHEQ sets the general framework for degree programmes, and the QAA is clear that it 'should be regarded as a framework, not a straitjacket'.[note 2] At the heart of the FHEQ is an attempt to ensure that qualifications awarded by Higher Education Institutions (HEIs) maintain consistent standards, with a common expectation about student achievements. It is important to note that the 'fundamental premise of the FHEQ is that qualifications should be awarded on the basis of achievement of outcomes and attainment rather than years of study'.[note 3] This underpins the approach to be taken in designing a curriculum and in preparing the associated documentation. There is a wealth of detail in the QAA documentation, so I will focus on a few key issues that need to be built into curriculum design.

First, it is worth noting that the FHEQ does *not* constitute a credit framework. Many UK universities do operate on a credit framework, but this is not mandatory under the QAA rules. However, QAA does provide guidance on academic credit arrangements. If your institution does use a credit framework (and most do so), your programme will need to recognise that in the way it is put together. In practical terms, this determines the size and number of modules that will comprise your programme. What this means in practice is that you will not have freedom to make up your own modular structure, but work with your institution's standard set-up in terms of the number and size of modules.

Top Tip

At the outset, make sure that you know the modular structure that is used in your institution. This may involve CATS or ECTS credits being allocated to each module.[note 4]

Under a credit system, each module takes on a credit value. This reflects the hours of study expected of a typical student following the module, these hours being divided between formal contact time and independent study hours. For example, a module rated at 20 CATS points would involve a total of 200 study hours. A year of study must sum to 120 CATS. Under the Bologna process, the learning outcomes (and associated workload) of a typical full-time year of academic formal learning represent 60 ECTS. In other words, 1 ECTS is approximately equal to 2 CATS.

Where this becomes important for curriculum design is in specifying the overall requirements for an honours degree or any of the intermediate exit points that are available on most programmes. Table 1 summarises the credit values normally associated with each part of an undergraduate programme in England.

Table 1: Credit values and curriculum design

HE qualification as in FHEQ	Part	FHEQ level	Minimum credits (CATS)	Minimum credits at the level of the qualification (CATS)	ECTS
Cert HE	1	4	120	90	
Dip HE	2	5	240	90	approx 120
Bachelor's degree with honours	3	6	360	90	180-240
Integrated Master's degree	4	7	480	120	

A normal interpretation of this is that to be awarded an honours degree, a student must have accumulated 120 CATS (60 ECTS) per part, with at least 90 CATS (45 ECTS) at each FHEQ level. Institutions will no doubt have their own rules and regulations for implementing the framework, so you may have no real choice in choosing the overall credit structure. Nonetheless, it is worth being aware of the structure, as it underpins curriculum design.

An important aspect of this is that there must be progression in what is expected of students at each successive level.

5.3.2 Subject benchmarks

When designing a curriculum, a fundamental requirement is to ensure that the contents are consistent with the relevant subject benchmarks. The economics benchmark statements, which were amended in 2015, can be found at http://www.qaa.ac.uk/en/Publications/Documents/SBS-Economics-15.pdf .

If you study the benchmarks, you will find that they are not actually very constraining, in the sense that they summarise in a common-sense way the components that most economists would agree should lie at the heart of any economics curriculum. In other words, the benchmarks specify a range of features that we would look for in any economics degree programme. The details are not provided here, as this would be repetition of the benchmarks themselves. Suffice it to note that they encompass the aims of degree programmes in economics, and specify the subject knowledge and the subject-

specific and other skills that students are expected to accrue during their studies. The economist's way of thinking and the importance of the transferable application of economic concepts are also emphasised. In other words, the benchmarks set out the attributes that students successfully completing a degree programme would be expected to have gained.

Top Tip

Notice that the way in which the benchmark is set out is helpful when setting out to draft the programme specification, which is another essential part of developing a new curriculum.

5.3.3 The programme specification

Part A of the QAA's *Quality Code*[note 5] requires all HEIs to 'maintain a definitive record of each programme and qualification', to be shared with staff and students. This is the reference point for the delivery of the programme, and will be a key part of the documentation that you will need to submit as part of the approval process.

The most common form that this definitive record takes is the **programme specification** (or equivalent). Make sure that you obtain a copy of your institution's template for this early on in your planning.

Programme specifications (or equivalent) are normally built around the learning outcomes. This is potentially helpful, and can be seen as a foil to the common media obsession with contact hours. The outcome-based approach focuses on what a student can have achieved successfully completing a programme of study, rather than how study hours are divided between direct contact with academic staff and independent study time and other forms of learning.

Top Tips

If you want to look at some examples of programme specifications, you may find them as part of the Key Information Sets (KIS) that all HEIs are required to supply. These are found on the Unistats website at https://unistats.ac.uk/ . If you select a programme, find the heading 'Time in lectures, seminars and similar', then click on 'How the course is taught'. You *may* then find the programme specification, although not all institutions provide the information in this form.

As outlined in the discussion of module design, individual modules are also expected to have their own learning outcomes associated with them, and the programme specification then shows how those modules can be combined into a coherent programme.

Notice that having a programme specification (or its equivalent) is not optional, as it is one of the key documents that will be audited as part of the QAA Higher Education Review. Programmes will be judged by whether they deliver on the claims that are embedded in the specifications.

5.4 Programme approval

Chapter B1 of the QAA Quality Code contains guidance about programme approval.[note 6] Your institution's formal approval procedures will ensure that your programme complies with this guidance, so make sure that you follow this carefully. The process will no doubt include an element of external scrutiny, so think about who you might consult.

Top Tip

When looking for an external scrutineer, you could do worse than start with the list of Associates of the Economics Network. Notice that you cannot use present external examiners for this role.

Be aware of the timescale over which the approval process will be spread. A new programme is likely to go through several stages of scrutiny and consultation. For example, you might draw attention to your plans at the start of an academic year, with the hope of being ready for the following year — but in practice, it might take longer than this.

There will need to be preliminary discussions with interested parties (including your colleagues). There will then need to be discussion by the executive to see whether your proposal fits with the strategic aims of the Department, Faculty or School and the University. Documents then need to be drafted, and an external expert appointed. Other Departments and professional services may need to provide their input, and there needs to be rigorous academic scrutiny. Only once validated will you be able to start advertising and recruiting.

There are some other time constraints to consider. For a new undergraduate programme, there must be a Key Information Set. This needs to be ready fourteen months before the start of a programme, as it needs to be published a year before the programme starts. For at least one university with which I am familiar, the deadline for including an undergraduate programme in the printed prospectus comes 20 months before students enter the programme.

Top Tip

Make sure you do not miss key deadlines set by your institution. Missing key deadlines can delay the launch of the new programme, possibly by a whole year.

A similar schedule applies for major changes to existing programmes. The decision on when to launch would also depend upon being able to advertise and recruit. Ultimately, this may be the deciding factor in choosing how quickly to launch. Timescales are likely to vary from institution to institution.

5.5 Building the programme

In building the core of the curriculum, balance needs to be achieved across a range of dimensions. There needs to be a balance between theory and applied material, and between micro and macro. Decisions also need to be taken about the place of mathematics and statistics in the curriculum, being aware that the subject benchmarks indicate that a variety of approaches can be adopted. For example, it is recognised that some degrees that are not single honours economics programmes may not cover all of the core elements, and that 'the forms of analysis chosen may differ and may be tailored to best serve the skills that students bring with them into their degree programme'.[note 7] Choices here may therefore depend upon the characteristics of the student intake – or perhaps the curriculum will dictate the sort of students to be recruited.

Questions of balance also arise where a single honours curriculum may co-exist with a series of joint honours programmes or a major/minor approach. The core modules on a programme need to be designed in such a way that the programme outcomes set out in the programme specification can be met by all students who complete the programme successfully. However, students value choice in their curriculum, and if the outcomes can be met in a subset of the modules that make up the programme, then this can create flexibility for students to exercise some choice of what to study. This may take the form of choosing amongst a range of optional economics modules, or it may be that students can choose other modules (e.g. languages) from outside their core discipline. This may be one way of enabling students to enhance their employability.

The design of the core curriculum may also need to take into account the possibility that some students may wish to spend part of their degree programme studying abroad. Many programmes are designed to enable either a whole year study abroad, or a single semester.

5.5.1 Curriculum and audience

There are many economics programmes being taught across the UK, catering for a wide variety of different audiences. There are highly technical programmes with a heavy bias towards theory and a high level of mathematical content. There are other programmes that have a more applied focus, perhaps with a stronger, practical, employability focus. The curriculum has to be designed for its intended audience and to deliver the intended programme outcomes. This has implications for the entry requirements and for the balance of content across the curriculum. For example, requiring an A-level in Mathematics provides a signal about curriculum content.

It is also important to be aware that many students may not fully anticipate the mathematical nature of some programmes, only discovering well into the first term that they are not well suited to the approach being adopted. This seems to happen regardless of the information that we provide before they arrive, and may reflect the content and style of the A-level Economics specifications. For students that do find that their talents and abilities are more suited to a less technical approach, curriculum design may need to be framed in such a way as to provide an 'escape route'. This may be especially important where the admissions criteria do not require students to have studied economics before embarking on the programme.

5.5.2 Content, sequence, balance and engagement

In setting out to design (or to redesign) a curriculum, it is perhaps inevitable that much of the focus will be on what to include and in what order – as well as how to structure and organise the material. However, it is also important to be aware of the need to engage our students with their learning, and to design the curriculum to transmit the excitement of the subject. If we do not engage our students with the subject we will have failed.

Engagement comes partly through the way in which we deliver material, but curriculum design is also important. One way of capturing our students' attention through curriculum design is by using the 'Threshold Concepts' approach as outlined in the chapter in the *Handbook for Economics Lecturers* by Peter Davies and Jean Mangan.[note 8] These concepts offer a focus on key ideas that can begin to introduce students to the way that economists think. For many students, it is also important to highlight applications of economic theory in the early weeks, balanced against the need to demonstrate the importance of learning and polishing quantitative skills. It is also crucial to remember that our students come from diverse backgrounds and have diverse preferences. There will be those who relish the mathematical approach and are keen to engage with theory. We need to cater for them as well.

The financial crisis of the late 2000s launched widespread debate about the way in which we teach economics. You can read about this on the Economics Network website.[note 9] An important offshoot of this debate has been the development of the CORE project.[note 10] This project has produced an 'open-access, interactive ebook-based course for anyone interested in learning about the economy and economics'. When planning to design a new programme in economics, you should check out this material, which offers a novel approach to introducing students to economics, to see whether this approach would work well with your intended students.

Top Tip

If you do decide to use this approach, be aware that there will be an impact on how you design the curriculum beyond the first year of the programme.

5.5.3 Study abroad?

A further element influencing curriculum design concerns the opportunity for students to spend a period undertaking study abroad. Such opportunities can either be embedded within the curriculum or can take the form of a year out during the programme. Experience suggests that universities have been more keen to provide such opportunities for their students than students have been to take advantage of them. This is evidenced by the nation-wide tendency for UK universities to be net importers of exchange students, with many more European students coming for a year or semester in the UK than British students travelling abroad. It remains to be seen whether (or how) this will be affected by Brexit.

The language issue looms large here. In general, the language skills of British students are inferior to those of students from elsewhere. However, British students have also been reluctant to study abroad even when the language of instruction is English.

As far as curriculum design is concerned, the key issue is whether the credits earned by the student abroad are to contribute to the home institution's award or not. A student taking a term or semester abroad will need to have the credits recognised as part of the degree programme. This means that the institution will want to have quality assurance checks in place to ensure that the material studied abroad is at the appropriate level and that the foreign institution is of a recognised status. It will also be necessary to ensure that any programme outcomes that would have been achieved had the student remained in the home institution are adequately covered by the study abroad. For example, if the student would have taken a core micro or macro module, do the modules studied abroad align with the pertinent learning outcomes? This will require careful scrutiny of the module outlines to ensure that they cover similar material. A whole year abroad may pose fewer problems, if it can be regarded as an intermission in study, such that the credits do not have to be transferred and recognised locally.

For study that is embedded in the curriculum, the language issue must be considered – at least where the opportunities to study abroad involve study in a foreign language. Indeed, even if teaching is available in English at a university in Europe or elsewhere, the language for everyday living is still a potential issue. In order for the option to study abroad to be a serious offer, students need to have the opportunity to learn or improve their language competency. This should preferably be available within the curriculum and not just as an evening extra. This clearly has implications for curriculum design.

It is widely believed that studying abroad is a way of enhancing the student experience and improving employability, and to be able to offer students the opportunity when they visit on open or visit days seems to increase the attractiveness of programmes. However, persuading students to take up the opportunities seems to be the greatest challenge, perhaps because once students are caught up with their programmes, the risks of taking time out to study abroad loom large.

Footnotes

[1] http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/introducing-the-quality-code

[2] http://www.qaa.ac.uk/en/Publications/Documents/Framework-Higher-Education-Qualifications-08.pdf

[3] Ibid.

[4] CATS relates to the Credit Accumulation and Transfer System, whilst ECTS relates to the European Credit Transfer and Accumulation System, used across Europe.

[5] http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/quality-code-part-a (it's a bit hidden, see Expectation A2.2 on page 21)

[6] http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/quality-code-part-b

[7] http://www.qaa.ac.uk/en/Publications/Documents/SBS-Economics-15.pdf para 4.2

[8] http://www.economicsnetwork.ac.uk/handbook/threshold-concepts

[9] See http://www.economicsnetwork.ac.uk/resources

[10] See http://www.core-econ.org/

6. Meeting the demands of your institution

As well as ensuring that your new programme complies with regulatory demands, your institution may well impose other restrictions on the content and delivery of programmes, and you should find out about these as soon as you can. I will just mention a few common things that you may come across.

6.1 Graduate attributes

The issue of how to embed employability into the curriculum is by no means a recent phenomenon, and has become a key part of the mission of many universities. Much of the discussion centred around notions of what is meant by 'graduateness' – i.e. what are the characteristics that we look for in a graduate. Following much debate in Australia in the 1990s, this has developed into a debate about 'graduate attributes'.

The term 'graduate attributes' can be defined as the 'qualities, skills and understandings that a university community agrees its students should develop during their time with the institution and consequently shape the contribution they are able to make to their profession and society'.

A Google search on the phrase 'graduate attributes' shows that many universities in the UK and elsewhere have been devoting enormous attention to the identification of these graduate attributes. A sample list of attributes would be:

- academic attributes
- communication skills
- research and inquiry
- the ability to be a reflective learner
- global citizenship
- ethical leadership.

When designing a curriculum, you should check whether your institution has a graduate attributes framework, as you may be expected to ensure that students have opportunities to develop these attributes within the curriculum, although it may be that some of them will be more readily developed in the co-curriculum. Examples of attributes that can be developed within the curriculum include ensuring that students have opportunities for group work, for giving presentations and for learning about and practising research methods.

Equally important as providing students with opportunities to acquire these attributes is making sure that they are aware that they are acquiring them. Employers have commented that students in interview are often unaware of the skills and attributes that they have been building up during their studies.

Top tip

Check whether your institution defines a set of graduate attributes and whether students need to be given opportunities to acquire these as part of the curriculum.

6.2 Research-led teaching

The relationship between research and teaching has always been contentious, if only because of the tension that exists between competing demands on the time and energy of academic staff. This applies especially strongly in institutions where promotion (and appointment) depend more upon research excellence and publications than upon the ability to deliver learning and teaching effectively. It has been argued that students at a university, whether at undergraduate or postgraduate level, should be exposed to the research that is such a central part of a university's mission. The undergraduate curriculum is thus expected to deliver 'research-led teaching'.

Although there may be a widespread agreement that there should be research-led teaching, there is much less consensus on what this actually means, and it has been interpreted in different ways in different contexts. Broadly, we can identify four different approaches.

At one level, there are many university websites that include statements such as 'you will be taught by experts who are at the cutting edge of their disciplines'. This is one interpretation of research-led teaching. Students will be taught by researchers with a proven track record of excellence. The efficacy of this approach may vary. The mere fact of being taught by an active researcher in itself does not guarantee that the research will rub off on the students. A lecturer may spice up the lectures with anecdotes about research or present some of the results in an accessible way – or simply insist that students read his/her papers. However, the scope for this when teaching introductory mathematics or consumer demand may be limited.

The curriculum must thus present opportunities for researchers to inject research into their teaching. A common way of doing this is through the menu of options provided for students, so that researchers have the opportunity to present units that are closely related to their own area of expertise. It has to be admitted, however, that this form of research-led teaching, valuable as it is, is rather passive from the students' viewpoint.

A second level of research-led teaching is to ensure that the curriculum delivers the skills needed for students to engage in research. A unit in research methods might fit the bill here, and this could be fully or partly assessed by having students prepare a research proposal on a topic of their choice.

A third level would be to require students to engage in a research project or dissertation. This is indeed a common feature of many economics degree programmes. Students can find this one of the most rewarding parts of their programme.

Another rather different interpretation of research-led teaching is that teaching should be informed by pedagogic research. This goes beyond the scope of this chapter, as it is not a curriculum design issue as such. This is perhaps more to do with staff development and the need to expose academic staff to the results of pedagogic research.

6.3 Looking beyond the discipline

For students who proceed from undergraduate studies in economics to take a Master's degree and then follow this up by researching a Ph.D., an undergraduate programme that

focuses on economics alone may provide a good preparation. Perhaps for those who exit after the Master's and become professional economists, an intense focus may also work well. However, for students who enter other careers, such a concentration may produce tunnel vision. Indeed, it could be argued that even for the professional economist or Ph.D., some exposure to the world beyond economics may produce a more rounded and balanced individual. The increasing move towards interdisciplinary research gives further impetus to the desirability of allowing students to look beyond their discipline, and explore the big issues of our day through different disciplinary lenses.

A curriculum can readily be designed to permit this flexibility, given earlier arguments about the ability to achieve the outcomes associated with the subject benchmarks in a subset of the modules that make up a programme.

One approach is through the development of joint honours programmes that expose students to two related disciplines. One disadvantage of this approach is that students may achieve the benchmark levels of knowledge and understanding in each of their two disciplines, but may not have acquired the depth needed to pursue postgraduate work in either of them.

A number of universities are beginning to think more imaginatively about how to broaden the horizons of their students by creating opportunities to be exposed to different ways of thinking about the big issues of our day.

One example is the LSE100 initiative, which is compulsory for all undergraduates at the LSE from 2010-11 onwards. The following extract from the LSE100 guidebook summarises what is on offer:

> 'Whatever your degree course, LSE100 is designed to enhance your experience at the [LSE] by enabling you to complement your disciplinary training with an understanding of different ways of thinking; to learn from debating and collaborating with students from other disciplines and cultural backgrounds; and to strengthen your research and communication skills.'[note 1]

The LSE100 course covers a wide range of topics with contributions that present from a range of different disciplinary perspectives. It sits outside the curriculum, so is not credit-bearing, running in the Lent term of year 1 and the Michaelmas term of year 2. It is graded on a non-numeric basis, with categories of Pass, Merit, Distinction and Fail. The result appears on the student transcript, but does not contribute to degree classification. Part of the assessment is a two-hour unseen written examination, taken outside of term time.

Another initiative was launched by the University of Aberdeen in 2010; it reshaped its curriculum 'to produce graduates who are more rounded, better informed and more intellectually flexible'. The reforms aimed to maintain the 'quality and depth of the traditional Scottish degree', but at the same time expand the range of choice open to students. In the first and second years of their programme, students can choose either to 'study around [your] core subject to gain breadth and context; add a language, a science or business study as an extra subject … or choose from a range of new multidisciplinary course based on real world problems'.

This is an example of encouraging diversification and exposure to new ways of thinking that is embedded within the curriculum, rather than sitting alongside. The Scottish system of four-year degrees makes this an especially attractive way of offering choice and diversity, as there is less pressure to fill the curriculum with disciplinary units.

An example in England is the University of Southampton, which introduced a Curriculum Innovation Programme, aimed at encouraging students to escape from their disciplinary silos and broaden their horizons by taking modules away from their home discipline and to enhance the research-led nature of teaching by introducing students to some of the interdisciplinary research being undertaken in the institution, such as climate change, web science and sustainability. A range of modules was developed, delivered and assessed in innovative ways, with the objective that students are able to choose from a menu of optional modules at some point during their studies.[note 2]

Footnotes

[1] http://www2.lse.ac.uk/intranet/students/LSE100/GuideforFirstYearUGs.pdf

[2] See www.soton.ac.uk/cip

7. Coping with growth of student numbers

A major challenge in curriculum design is coping with the growth in student numbers that has been witnessed in many economics programmes in recent years. Evidence suggests that economics is one of the disciplines with a relatively high earnings premium in terms of lifetime earnings. For example, *The Complete University Guide* in 2017 reported that economists in graduate jobs earned salaries that only fell below those graduating from dentistry, medicine and chemical engineering. We can thus expect the discipline to maintain its popularity.

This has implications for curriculum design. Decisions will need to be made about the balance between core modules and options, and between lectures and class/ seminar group teaching. The big lecture offers economies of scale in delivery of core material, but affects the student experience. Smaller group teaching is costly in staff time, and students do not always appreciate being taught by doctoral students. Hard decisions may need to be made about the number of options that can be provided given student-staff ratios.

The physical infrastructure may have an impact on curriculum design as numbers grow. If the size of the cohort expands beyond the capacity of the largest lecture theatre, then this may necessitate double teaching, or the use of video-streaming. This may influence curriculum design indirectly, by limiting the staff resources available for teaching optional modules. Increasing and improving the use of technology-enhanced and blended learning may be crucial in coping with expansion without damaging the student experience.

More imaginative use of contact time may help. For example, given the extensive use of problem sets and exercises in economics learning, how important is it to run multiple small group classes to go through the answers to problem sets? It may be possible to keep the whole group together, and have a session in which the lecturer presents the solutions to everyone, and then back this up with drop-in surgery sessions with doctoral students. Curriculum design can thus be used to improve efficiency in delivery of learning and teaching.

8. Managing change

In general, we hate change — especially where this is seen as change for the sake of change. We build our lives around routines, reinforced by processes that enable things to happen in predictable ways. Change can be painful because we interrupt these routines and lose predictability. This should not mean that we never change, but it may mean that change is a process that needs to be managed. There is a large and growing literature on the management of change.

Undertaking a major reform of the curriculum is an example of a project for which change should be consciously managed. I would suggest that of most importance in this respect is to have a clear view of the destination. What will the curriculum look like at the end of the process, and what will be the advantages compared with the existing position? Be ready to highlight the benefits that will flow to staff — as well as to students. This is essential if staff are to be expected to devote time to redesigning their teaching alongside meeting REF targets. It helps if there are demonstrable benefits to be gained from reform that could not be tapped by tweaking current structures. It may also help to have a clear timeline over which the reforms will be completed so that life can return to a new normality.

A key decision may be whether to go for a short sharp shock of reform or to go for gradualism. Do we concentrate the misery and settle down, or insinuate the changes drip by drip so nobody notices?

9. Communicating with stakeholders

Let's be honest: curriculum design is not the most exciting topic in the world, and it is not the easiest thing to convey to applicants, students, staff and employers. The previous sections have argued that curriculum design must fulfil a range of objectives. It must ensure coverage of the subject benchmarks. It must deliver a learning experience to students that prepares them for their life as a graduate — in whatever direction they may choose to go after graduation. It must be attractive in offering challenge and flexibility. Graduates from the programme must have the qualities that potential employers are seeking.

Articulating these various qualities to the key stakeholders is a challenge. As soon as we start to explain the credit architecture and component modules, the audience is lost. So save the detail for a sub-page to which people can refer if they need to know. Focus on the key features — and remember when designing the curriculum that simplicity in design will be a major help when it comes to explaining the structure and content of a programme. No doubt individual programmes will also wish to highlight the special features of their offering that are totally unique to them and to them alone, as part of the distinctiveness that characterises their institutions. But I could not possibly comment on that.

Lectures

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Contents

http://www.economicsnetwork.ac.uk/handbook/lectures/

1 Introduction

"The first duty of a lecturer: to hand you after an hour's discourse a nugget of pure truth to wrap up between the pages of your notebooks, and keep on the mantelpiece forever." – Virginia Woolf

"College is a place where a professor's lecture notes go straight to the students' lecture notes, without passing through the brains of either" – Mark Twain

"Academic chairs are many, but wise and noble teachers are few; lecture rooms are numerous and large, but the number of young people who genuinely thirst after truth and justice is small." – Albert Einstein

"Some people talk in their sleep. Lecturers talk while other people sleep" – Albert Camus

"When I give a lecture, I accept that people look at their watches, but what I do not tolerate is when they look at it and raise it to their ear to find out if it stopped." – Marcel Archard

"Like all people who try to exhaust a subject, he exhausted his listeners." – Kingsley Amis

"The best teacher is the one who suggests rather than dogmatises, and inspires his listener with the wish to teach himself." – Edward Bulwer-Lytton

"My lecture was a complete success, but the audience was a failure." – Anon

Lectures have been employed for hundreds of years as a platform for disseminating ideas and knowledge and for guiding and motivating students, and they continue to be a cornerstone of higher education practices today. Lectures can be defined as the delivery of a course through a series of presentations by academic staff members to a group of students, usually with visual prompts and aids. The term 'lecture' can encompass a range of styles, approaches and formats that will be investigated throughout this chapter. Some of these involve considerable student participation. Traditionally, however, lectures have involved the one-way transmission of course content from academics to students.

But lectures have more than a mere dissemination role. If their intention were merely to provide the students with basic information on the course, then there would be good reason simply to abandon them and provide a competent set of notes in their place. Lectures should also motivate and challenge students and give them insights. This is elegantly summarised by a student who attended Alfred Marshall's lectures at the University of Cambridge at the turn of the century:

"He was certainly a unique teacher. He seemed to grip the mind of his hearer and force it through unaccustomed exercises, with many a violent jolt and breathless chase. He loved to puzzle and perplex you and then suddenly to dazzle you with unexpected light. 'Ages of darkness and moments of vision', was one description

of his lectures, I remember. But the vision was worth it, and was not to be appreciated without the preliminary bewilderment…. What we brought away from Marshall's lectures was certainly not any ordered knowledge of economics, not enough, as he had predicted, for passing an examination, but perhaps an awakened interest, a little more insight, the memory of some moment of illumination and a sense of the importance of economics." (As quoted in Groenewegen 1995, p.314)

This quotation captures a key potential difference between a lecture and a textbook exposition. Of course not everyone is capable of holding an audience spellbound throughout a lecture, especially when it is part of the routine of learning. Nonetheless, lectures can be used as an effective means of promoting student learning even if the lecturer is not inspirational. However, they can also be tedious and of little benefit to students. In large part, the success of a lecture depends on how engaged students are and whether it is providing an active learning environment.

This handbook chapter will investigate the costs and benefits of different types of lecture, and will suggest ways in which the traditional lecture can be improved. Although the focus of the chapter is on lecturing, it is not considered in isolation from the other teaching and learning formats that are likely to accompany and complement it.

1.1 Opportunities provided by lectures

Lectures provide key opportunities for students to learn in an efficient way about the subject they have chosen to study. The lecture will typically convey and prioritise information about the subject in a relatively condensed format. It can also enthuse students and provide a suitable framework for further study. Students are exposed, most likely for the first time, to a professional scholar who may be a researcher at the forefront of that aspect of the discipline. Lectures provide a traditional link between research and teaching. They help to preserve a culture of learning in Higher Education in which undergraduate study is viewed as an induction into an academic discipline, a way of viewing the world.

There are also clear benefits to the lecturer. Assuming that an academic is lecturing on a similar topic each year, the up-front costs of preparing a set of lectures are offset by their re-usability. Also, the traditional lecture, being teacher centred, can minimise the stress for those academics that are hesitant to relinquish control of the learning process to students.

Lectures have additional benefits for the institution. They are seen as making an efficient use of the lecturer's time, since they allow teaching to take place in classes with a very high student/staff ratio. This has become an increasingly compelling incentive when pressures on institutions in terms of research output and accountability to students and other stakeholders have grown. A greater use of

lectures, or of larger lectures, allows resources to be released to address these other issues – either by reducing lecturers' timetables or by releasing time for more small-group work, personal tutorials or online tuition.

1.2 Inherent problems with the traditional lecture

Notwithstanding the apparent benefits detailed above, newer approaches to teaching and learning, such as problem-based learning, are increasingly being introduced on the grounds that, even for an equivalent investment of staff time, the learning outcomes of students are far improved. The use of techniques that aim to generate a greater amount of student involvement is of course nothing new. Tutorials, seminars and other variations on student-centred learning have long been used to complement lectures. However, the justification for abandoning or reducing the number of lectures on a course typically focuses on two criticisms: that lectures are a poor medium, first for conveying information and second for developing student understanding.

Conveying information to students

Are lectures an efficient means of conveying information to students? According to Miller (1956), the average number of items that can be held in short-term memory is 7 (±2). Therefore, if students do not have significant time to process new information one of two things happens, either previous information is displaced or the new information is lost. Lectures which proceed quickly simply do not give students sufficient time to process information. Similarly, the ability to concentrate for an hour or so while taking adequate notes is not something that can be taken for granted. Indeed, listening and note taking can be mutually exclusive activities, especially for more inexperienced students. It cannot be assumed that an hour-long lecture will result in an equivalent sum of learning taking place within a student's head.

This problem can be compounded by the problems of a crowded curriculum. As new theories, research findings and policy initiatives emerge, space has to be found within the syllabus to accommodate them, and not always at the expense of existing content. If more and more content is crammed into a series of lectures it may encourage the lecturer to do little else but talk from the front from start to finish. The logical consequence of such practice is that the pace of lectures is forever quickening to ensure that the expanding syllabus is covered. A lecture could hardly be considered successful if it 'covered' the appropriate part of the syllabus and yet students retained little of what was said or were not guided in their private study.

Students are also more likely to remember information when it is structured in a logical fashion and if it is demonstrably meaningful to them. This again highlights

the important of context to learning. Students need to comprehend why they are being taught what they are and how they will subsequently be assessed on it.

Developing student understanding

To judge the 'success' of a lecture, it is important to identify its intended learning outcomes. Learning outcomes are often specified in module or course descriptors or handbooks. However, caution should be exercised in judging the success of a lecture against them, since these parts of the documents have often been prepared to meet university or QAA requirements, and compliance in this process by lecturing staff does not necessarily mean that the specified learning outcomes are the most appropriate or are even the ones that the lecturer would choose to identify.

In addition, whilst a lecture's success should be judged in terms of what students gain from it, it does not follow that lectures which students consider successful are necessarily good lectures. Students may prefer lectures that allow them to take notes which can be used directly in preparing for examinations or other forms of assessment. If their objective is to maximise marks subject to a time constraint, or to minimise time commitment subject to achieving a target mark, then this will almost certainly be the case. Similarly, a lecture might be very entertaining, and for that reason popular with students, and yet be a poor learning medium for students. Students are also likely to show a preference for the teaching format they are familiar with, as is equally the case with lecturers.

Assessment is clearly an indicator of student learning and hence of the success of lectures. But even if it were possible to separate the contribution of lectures from other learning media to assessment performance, the assessment itself may not capture the extent to which students have acquired and developed an understanding of the subject matter. To gauge this it is necessary to consider a theory of learning first developed by Marton and Säljö (1976a, 1976b) and since elaborated by Ramsden (1992), Biggs (1987, 1993) and Entwistle (1981). In these studies an important distinction is made between surface, strategic and deep learners. Surface learners are characterised as focusing on memorising words, formulae and theories rather than building relationships and connections. Surface learning is encouraged by:

- A heavy workload;
- An excessive amount of course material;
- A lack of independence;
- Assessment methods that emphasise recall and create anxiety;
- Poor or little feedback on progress;
- A lack of interest in the subject.

Deep learners seek to relate theory to practice in a range of different contexts. They are able to organise their impressions into a coherent whole rather a set of disassociated facts or formulae. Deep learning is encouraged by:

- Teaching methods that build on students' existing knowledge and experience
- Active involvement by students in their learning
- Students having choice over content and study methods;
- Long-term engagement with the subject

Strategic learners will adopt whichever approach they believe will maximise their grades. If they believe, rightly or wrongly, that the form of the examination rewards memorisation of disparate facts, they will adopt a surface approach. If they believe that the examination will reward a holistic understanding of key ideas and how these apply in different circumstances they are more likely to adopt a deep approach.

Most students cannot be so readily pigeon holed, displaying characteristics from two or more categories at any one time and may change their preferences over time. Nonetheless, this theory exemplifies the potential shortcomings of a wholly didactic model where it is assumed that what is not said is not learnt. The purpose of this chapter is not to debate at length the merit of this model (further reading references are provided at the end), but to establish that the intention of any economics course should be more than simply to allow students to adopt surface-learning strategies that promote the accumulation of transient non-contextualised knowledge.

Finally there is the issue of the diversity of ability and prior experience of students. This is especially a problem at level 1, where lecture groups tend to be larger, where some students are new to the subject and others have A' level Economics and/or Maths or equivalent, and where exit routes can vary from Single Honours Economics degrees to degrees where no further economics will be studied beyond level 1. How can a traditional lecture cope with diversity? To which students should the lecture be pitched? What back-up support will be necessary for the weaker students and what additional learning activities will stretch the stronger students?

2 Improving lecture practice

2.1 Student preparation for the lecture

In some cases, it may be appropriate for students to come to a lecture 'cold', especially if it is an initial scene-setting lecture. Generally, however, students will gain more from a lecture if they have done some preparatory work. You could assign them reading or specific tasks. If so, you would probably have to address

the question of incentives for students to do this work. This could amount to simple exhortation in previous lectures or in handbooks or online information, where the importance of the preparatory work was stressed. Alternatively, it could be built into a more formal process of study, leading to some specific individual or group work by students.

Top Tip 1: Giving preparatory work for the lecture helps students to see the relevance of the lecture and they will probably learn more.

Prior work could include:

- Using the Web to provide background information. For example, if you were about to introduce the theory of international trade, you could get students to find out about recent debates and issues, such as trade disputes, the agenda for WTO meetings or the views of various interest groups. Such groups could include the US administration, the European Commission, particular industries (such as farming or steel), environmental groups, or various Third World interests (see for example, www.oneworld.net). If you were about to look at competition policy, you could ask students to look at the summaries of Competition and Markets Authority reports on https://www.gov.uk/cma-cases.
- Revisiting relevant theory covered earlier. For example, in the case of trade, the students could be required to revise production possibility curves, opportunity cost, or general equilibrium theory, depending on whether the teaching is at introductory or intermediate level. In the case of competition policy, students could be required to revise relevant parts of the theory of the firm. The lecture could start with a quick 'quiz' using multiple-choice questions (see below on the technology for quizzes and tests in lectures).
- Asking students to identify a set number of issues to do with the topic. This will help them to contextualise the material and see its relevance. These issues could be posted to a discussion board, so that other students could read them. For example, as preparation for a trade theory lecture, you could ask the students to identify recent trade disputes and the arguments used by the various parties to justify their stance, or you could ask them to consider the arguments for and against providing protection for a specific ailing export industry.
- Assigning reading to be completed before the lecture. This could be an introduction to theory or relevant evidence, perhaps from a textbook or an article. A brief quiz on this could be given at the beginning of the lecture, so as to provide an incentive for the students to do the work.

In all the above cases, clear guidance will need to be given to students about what is required of them. This could be given in student handbooks, but should probably be reinforced by having a discussion early on in the course in seminars about the

role of lectures and how students can maximise the learning benefits from them. It would also be useful to remind students periodically in lectures about these expectations.

2.2 Effective presentation

Students are likely to learn more if a lecture is well structured and well presented. Not every lecturer has a charismatic personality, but students can still be engaged and find the lecture an effective learning experience if thought is given to the structure and method of presentation. This section reviews four issues in planning the structure of a lecture: aims and learning objectives; overview and clarity of structure; use of examples and pace. The second half of the section examines three aspects of method of presentation: presenting graphs and equations; displaying material; and using videos. The section concludes with some observations on dealing with disruption.

Aims and learning objectives

It has become commonplace for lecturers to give the aims and learning objectives at the beginning of a lecture, usually in the form of a PowerPoint slide, an overhead transparency (OHT) or a sheet of paper displayed on a visualiser. One of the main drivers for this has been university ‘quality’ procedures and accountability to external bodies, such as the QAA, and the stress placed on making intended learning outcomes transparent. Whilst it is good practice for students to see the purpose of what is to come in the lecture and what they are supposed to learn, beginning the lecture with a bullet list of aims and learning objectives in educational jargon can be a 'turn-off' for students. It is important to communicate in 'student-friendly' language. For example, if the learning objectives of a lecture include an understanding of a particular economic theory – its properties, its assumptions, how it can be applied and what its limitations are – then state this as such, rather than in terms of, say, the development of cognitive or analytical skills. It may also be helpful to the theory by looking at the problems and issues it can address.

The format of lecture objectives also gives students an indication of the approach to learning that is expected of them. For example, an objective in the form ‘Movements along and shifts in the demand curve’ implies that students are required to memorise a list of causes and how to depict these on a simple diagram. An objective ‘Analyse changes in the demand for consumer products using a market demand curve’ implies that the focus of assessment will be on understanding examples of economic behaviour in practice. The signals communicated by these objectives may indicate to students whether surface or deep learning is expected.

Top Tip 2: Students need to comprehend why they are being taught what they are and how they will subsequently be assessed on it.

Overview, contextualising and clarity of structure

At the start of a lecture it is even more important to give students a sense of how the lecture fits into the syllabus and how it follows on from the previous lecture. A ‘lecture map’ on, say, a PowerPoint slide or OHT can be used to outline the structure of the lecture in terms of main topics, issues and theory. This summary can be referred to as the lecture progresses, helping to retain and reinforce the students' grasp of the lecture's structure. This can also be referred to at the end as part of a brief summary of what has been covered.

Top Tip 3: If you give the students a 'lecture map' on a PowerPoint slide or OHT, this can be referred to as the lecture progresses, thereby helping to retain and reinforce the students' grasp of the lecture's structure. This can also be referred to at the end as part of a brief summary of what has been covered.

Use of examples

Brief up-to-date examples, or appropriate historical examples, can make the lecture much more interesting for students and help them to see the relevance of theory. Careful thought should be given to the number and nature of examples. Too many examples and the students might not be able to 'see the wood for the trees'; too few examples and the material could appear dry and disconnected from reality.

Examples could be very short: for example, reference to some current news item or to some real examples of something (e.g. of actual firms when discussing market structures); or for a quantitative lecture a very brief worked example. Students' understanding of economic concepts is likely to be much better if they can relate them immediately to the concrete. There is an opportunity cost of using examples in terms of time not spent covering additional material, but again, if the success of a lecture is to be judged in terms of learning outcomes, this may be a cost well worth incurring.

Pace

Pace is crucial to the success of any lecture. It is very easy for lecturers to imagine that if something has been said, then it has been understood and absorbed by students. Part of this mindset is the perception of students as receptacles: ‘At the beginning of the lecture, you lift the lid on students' heads, pour in an hour's worth of knowledge, close the lids and the students walk out an hour wiser than when they arrived’. Although we all know that this not how students learn, we are

frequently faced with the dilemma of how to ‘cover all the material’ in the lecture. Too many lecturers, when faced with the approaching end of the lecture and still having a lot of material to cover, talk faster and faster. The problem stems from two main sources.

The first is that courses have become tightly structured to meet the requirements of auditing and quality assurance. For example, each lecture’s content might be laid down in the course handbook. This can remove the flexibility of being able to vary the pace and content in response to student feedback or current events.

The second is an increasingly crowded curriculum. Whilst we strive to keep courses up-to-date and include new theoretical developments, policies and applications we are reluctant to delete an equivalent amount of old material. Take the case of a core level 2 Macro module. If we want to look at the development of macroeconomic theory, do we include both classical and Keynesian analysis, the monetarist critique, the rational expectations revolution, new classical theory, real business cycle theory, new Keynesian theory, including DSGE theory, post-Keynesian analysis, models to incorporate inflation targeting, such as the Romer model with aggregate demand considered as a function of inflation rather than the price level in addition to the traditional AD/AS model, the lead up to and aftermath of the financial crisis, the reassessment of theory and policy in the light of the crisis, the importance of balance sheets and regulatory frameworks, and so on? In other words, do we keep adding new developments to the existing course? Our module specifications say that in lecture x we will cover topic y, and yet in topic y we want to include more and more each year. What is the solution?

The solution is not to speak faster and faster! Students would almost certainly end up learning less, not more. Either you have to reduce the syllabus content so that it can be covered in sufficient depth and at an appropriate pace within the lecture time, or you have to abandon the notion that the lecture should be used to 'cover' all the material. If this latter is to be the solution, then you have to plan carefully how the lecture fits in with the remaining parts of the students' learning. Is it to be used to introduce topics, or to go thought the core theory, or to give pointers or examples not available elsewhere?

Pacing is not just about covering an appropriate amount of material. You will have to decide just what you want students to *do* in lectures. If you merely want students to copy down notes, it would probably be more efficient to give them the notes as a handout, or post them on your Intranet (unless a key purpose of the lecture is for students to learn the skills of rapid note taking, in which case some specific instruction in the process would probably be a good idea).

Presumably, you will want students to understand what you are covering, to see its relevance and to be motivated to learn more. In that case, the pacing must take account of this. The planning and delivery of the lecture will need to balance

demands on students' writing, listening, watching and understanding. It is too easy to put up a completed OHT, a sheet full of material on a visualiser, or a complete PowerPoint slide and then start talking about it straight away. What are the students to do? Are they to copy it down or concentrate on what you are saying? If you want them to take something down, it might be best to pause while they do so, especially if it is something they are unlikely to grasp immediately.

An important part of pacing is recognising the attention span of students. This tends to drop off quickly after 20 minutes, unless the students are particularly excited or fascinated by what you have to say (see Bligh, 1998). Part of the solution lies in varying the pace through examples or anecdotes when attention is likely to flag. You could vary the use of visual materials, so that sometimes the students would be concentrating on them and at other times on you; sometimes copying things down and at others just listening or composing their own notes. The key is to inject light and shade: to vary the tempo, the nature of the material and what is required of students. Alternatively you could move away from the lecture being solely a talk and engage the students in various activities. Some suggestions are given in section 2.3.

Presenting graphs and equations

If you are using PowerPoint slides, an overhead projector or a visualiser, an effective way of presenting graphical or mathematical material is to give the students a half-complete diagram or proof which is completed in the lecture. For example, if you were presenting a model which shows an initial equilibrium position and then the effects of a shift in one or more curves, you could give the students the initial position on a handout (with or without the equilibrium marked) and ask students to complete the diagram. This is particularly useful for complex diagrams, such as general equilibrium diagrams. Not only does it save time by avoiding the need for students to copy down the initial part of the diagram, but it also ensures that students can focus on the key points you are making. It is also likely to mean that the finished diagram that the students are drawing is accurate.

This approach allows learning to be an active, yet efficient, experience. Learning is likely to be more active if you ask the students to complete the diagram or proof first and then you go through it. But even asking students to copy down the additional material is likely to make learning more active and effective than students rushing to copy a complete model. If they are copying the key parts (e.g. the effects of a shift in a curve), they have more time to reflect on what is happening in the model.

Resources provided in this way may cause problems in terms of cost and equal opportunities. Can your department afford to make copies free to students? If you make them available electronically, what will you do about students with no personal access to a PC or a printer, or who simply forget to print them off

beforehand or cannot be bothered? Is it acceptable to sell these materials to students? One solution adopted by several departments is to produce detailed course handbooks with lecture outlines. These outlines could contain the partially complete diagrams and proofs. The handbooks could be sold to the students at cost, with all students expected to purchase them. However, this practice incurs up-front cost in preparation time, and reduced scope to amend the teaching programme in response to student feedback.

Displaying material

Whether using the whiteboard/blackboard, a visualiser, OHTs or PowerPoint slides, it is important to give careful thought to what you want the students to do. In lieu of any other guidance, students will assume that you intend the displayed material to be copied down. If used well, visual materials can considerably improve learning by providing a clear structure for the lecture. If the structure remains on the screen, or is referred back to at the start of each new section, students will find it easier to see how the various parts of the lecture are related, even if their attention wanders for a period of time. Similarly, if students lose the thread of an argument, they will be able to pick up the thread from a 'lecture map' presented on a slide or board.

But how much material should you display? If you display a lot, students will spend a relatively large proportion of the lecture simply copying things down. Is this an efficient use of their time? Would it be better to give them a handout or post the material on the Intranet or VLE (such as Blackboard or Moodle)? If you do want them to copy things down, then you must allow enough time for them to do this.

An advantage off using a board is that your writing speed imposes a natural brake on the rate at which students have to process new information. However, if you are talking while you are writing, students will have great difficulty in listening to what you say, copying what you write, and adding notes on what you are saying. Also, some students may find difficulty in reading your handwriting, or in hearing what you say if your back is turned while you are writing. To some extent this can be overcome by writing on a sheet displayed on a visualiser, but students may still struggle with some lecturers' handwriting.

If you use PowerPoint slides or OHTs, the problem of note taking can be worse, as the slides are already complete. Too often, lecturers display a slide and then start talking about it straight away. What is the student to do: copy the slide or take down your comments? For experienced lecturers, this may sound obvious, but it is easy for all of us to fall into the trap of expecting students at one and the same time to copy a slide *and* to listen to our commentary on a slide and annotate their copy of it accordingly.

One solution to the time constraint is to give students your lecture slides in advance, whether in hard copy, or as Word, PowerPoint or other file. If the slides are merely headings, the students can then make their lecture notes under them.

Top Tip 4: Whatever media you use, it is important not to display too much material and to give students time to take things down.

If you are using PowerPoint, you can animate your slides so that bullets or paragraphs or stages in a mathematical demonstration appear one at a time. Similarly you can animate graphs by having lines appear one at a time. They can easily be made to shift in the required direction. A little playing around with the 'Slide show', 'Custom animation' feature can enable you to display diagrams in an interesting and effective way. Increasingly, textbook publishers provide OHTs and/or PowerPoint files of lecture outlines. While these can save you time in preparation, there is the danger that they can make the lecture too 'pre-programmed' in a way that does not necessarily match your style of delivery or the content you wish to cover. In this respect, PowerPoint files are clearly much more flexible than OHTs, since you can customise them to suit your particular lectures.

If you do use the animation features of PowerPoint, be careful not to make them too ‘whizzy’. The animation should be designed to help understanding, by, for example, showing the direction of a shift, and not distract the students from the model’s properties and the points being made.

It is also important, especially in diagrams, to make a consistent use of colour. For example, original lines could be in one colour, initially shifted lines in a second colour and further shifted lines in a third colour. Alternatively, one type of line (e.g. revenue curves) could in in one colour and another type (e.g. cost curves) in another colour, and so on. Shifted lines would be in a lighter or darker version of the original colour. Either scheme, if consistently applied, makes it much easier for students to understand what is going on in a diagram.

Use of videos

Many lecture theatres permit the playing of DVDs or streaming video clips through the lectern PC or laptop and data projector. Videos, if used with discretion, can add substantially to the impact of a lecture.

Two important questions to consider in using videos are ‘What length of clip should I use?’ and ‘What are the best sources of video material?’ If the video is being used to illustrate a point it is best to keep the clip to no more than five minutes. This change of media and pace can aid students’ concentration and help them to see the relevance of points you are making. Even with a short video clip, the relevance of the clip may not be obvious to all students. You may well need to

introduce the clip so as to prime students about what you want them to gain from it.

Top Tip 5: Video clips, if used carefully, can considerably enhance student learning by helping to contextualise material through the provision of examples. By providing interest and variety in a lecture, they can increase student motivation and interest.

Sometimes you may wish to show a longer extract. For example, you may wish to use the video as a case study. There is a potential problem here. With the exception of videos made for educational purposes, the pace and structure of the video may make it difficult for the student to make notes. If this is the case, you might find it useful to display some bullet points on an OHP while the video is playing. These could help to make the structure of the video more transparent.

One of the most effective uses of video is to give a topical illustration of a point or to set the scene with something in the news. Probably the best sources here are news magazine programmes, such as *Newsnight* on BBC2 and Channel 4 News. Other broadcast sources include *Panorama* and *The Money Programme*. Alternatively, you could stream clips from news sites, whether from broadcasters' sites or from newspaper sites.

Most universities hold an ERA (Educational Recording Agency) Licence. This allows free use of TV material for educational purposes. The licence permits you or any other university employee to record programmes off air at home or at the university, to make multiple copies (e.g. for depositing in the library) and to compile extracts. You can edit, but not adapt the recordings. You can show all or part of a programme, so long as it is for educational purposes. The DVD should be labelled, 'This recording is to be used only for educational purposes'. Open University recordings require a separate licence. There is no licensing scheme to cover cable or satellite broadcasts and you are free to copy and show these. It is advisable to check with your university the precise nature of what you can and cannot show.

Dealing with disruption

Hopefully, you will not experience this. If you do, you need first to be aware of why the disruption is occurring. It is likely to stem from lack of student involvement and boredom. While it would be nice to think that you are so charismatic that this could never occur, the solution lies not so much in how good a performer you are, but rather in what the students themselves are being required to do in the lecture.

If they are merely being required to listen for an hour, they are very likely to get bored unless you are a superb entertainer. To keep students engaged, try the following (several of which are examined in more detail below):

- ensuring that they have a clear understanding of the structure of the lecture and its relevance to the rest of the module;
- changing the pace;
- giving students different activities (such as short questions to test their understanding);
- making it possible for them to take notes by not going too fast;
- making careful use of visual aids;
- illustrating points with examples;
- giving them one or two short breaks.

Sometimes, students studying economics are doing so reluctantly, either because they had no choice (e.g. they are studying an economics module as a compulsory module on a non-economics degree) or because the subject has turned out to be different from what they had expected. The solution here is to focus on the relevance of the subject to their degree and more generally to important social issues. If they can see that economics grapples with real-world problems, and if what you are doing with them helps them to gain a better understanding of these problems and possible solutions to them, they are likely to be much more sympathetically disposed to studying the subject.

If, despite the above, students are disruptive (by talking, leaving the lecture, coming in late, etc.), then deal with it directly. If you ignore it, it will probably get worse. First try talking to the whole lecture group about your expectations of them and why 'good behaviour' is vital. Then, on any subsequent occasion when disruption occurs, address the culprits directly and, if necessary, ask them to leave.

2.3 Activities in lectures

An hour (or even 50 minutes) is a long time to listen and concentrate. As we have seen, concentration and retention rapidly diminishes after 20 minutes. Not only should student learning be as active as possible, it should be efficient. Ideally, a student should be able to:

- Identify main points;
- Distinguish the important from the diversion;
- Identify when the same point is being presented in different ways;
- Perceive connections (e.g. between one theory or part of a theory and another);
- Relate examples to concepts and theories;
- Relate evidence to propositions.

These can all be aided by a careful use of activities in lectures and this section examines different types of activity that could be used. The inclusion of activities comes at the expense of time the lecturer would otherwise spend in talking to the students. The case for using activities is that the breadth and depth of students' understanding is increased even though the sheer quantity of information covered by the lecturer is reduced.

Top Tip 6: The more active the participation of students, the longer and better will they be able to concentrate.

Tests/quizzes

One of the most effective ways of making learning a more active process and helping students to check on their understanding and learn from their mistakes is to give them questions. The simplest forms include multiple-choice, true/false or listing, or doing a calculation. The questions can be displayed on a PowerPoint slide, an OHT or using a visualiser, although, as Case Study 1 illustrates, there are more sophisticated ways of doing this, for example by using an audience response system (clickers).

The questions could be at the beginning of a topic. For example, if you were about to look at monopoly, you could give the students a list of companies and ask them to identify which are monopolies. Having done this, you could then look at the difficulties of identification, when the boundaries of an industry are 'fuzzy'; the importance of market power; the measurement of market power; types of barriers to entry, etc. In each case you could use the examples from the quiz. Students would then grasp the theoretical points you were making, having first considered some examples and being able to relate your arguments to them.

Alternatively, the questions could be given at the end of a section. This could then test students' understanding. If you then asked for responses (e.g. hands up those who answered A…), this would give an indication of how well key points had been understood. Again, as Case Study 1 shows, a good way of doing this is to use an audience response system. You might also ask students to write down their answers and pass them to their neighbour to mark. When students see what their neighbour has written they can learn from each other as well as from the lecturer, especially if they are asked to spend a couple of minutes justifying their answer to their neighbour.

Top Tip 7: The use of multiple-choice or other simple response questions two or three times per lecture can help to provide a break in pace, an opportunity for reflection and reinforcement and a check on students' understanding.

Worksheet or material on the screen or board

An alternative to short questions is to give the students a problem or some data to consider. This could be on paper, with the students picking up a worksheet at the beginning of the lecture, or it could be displayed on the screen or board. It is normally a good idea for students to attempt such questions in pairs as they can learn from each other. It also makes the exercise more fun. You can then go through the question from the front.

You might also ask students to read a passage that you hand out and then to answer one or two questions on it. The passage could be from a newspaper, book, journal or magazine. It is probably best to make the questions relatively closed. For example, if the lecture focuses on exchange rates, you could give them a brief news article reporting changes in exchange rates between two or more currencies and then ask them to identify possible causes of these changes. More open-ended questions are normally best considered in seminars, where students have the opportunity to discuss their answers with the group.

Completing diagrams or proofs

Copying down mathematical arguments or diagrams can be a fairly mindless exercise. Giving students a partially complete proof or diagram and then asking them to fill in the extra material can help (as argued above), since the student has time to reflect and to focus on the key points you are attempting to convey. For example, if you were looking at income and substitution effects using indifference analysis, you could present the students with a diagram which included the indifference map and the initial budget line, and then ask them to draw the new budget line and the income and substitution effects. Presenting the students with the diagrams in this way would allow you to ensure that they could clearly distinguish between normal, inferior and Giffen goods.

You can make this process more active by stopping part way through presenting a model and getting students to fill in the next step. They can do this individually or discuss it with their neighbour. Alternatively, you can test their understanding at a particular point by asking them which way a particular curve shifts if you change a particular variable, or getting them to repeat a particular mathematical step using different numbers.

Making lists

These can be useful for getting students to think expansively or to think about policy or other implications. For example, you could ask them to identify a list of possible determinants of a shift in a curve or a list of advantages and disadvantages of a particular policy. They could do this individually or with their neighbour; or

they could start by doing it individually and then compare their list with their neighbour's or get their neighbour to mark them against a list that you supply.

The hybrid between a lecture and workshop

You might restrict the formal lecture on a topic to 20 minutes and then set students some work to do, either through a worksheet or questions on the screen. The questions could be in the form of calculations or data response, preferably of the closed variety. You could go through the questions at the end, or post the answers on your Intranet. This practice is illustrated in Case Study 2. Alternatively, you might give students a set of questions on a case study or an article.

The formal lecture might be presented as a follow-up to the questions or it might be used to introduce the key ideas that will be investigated further through the questions. Either way, it is important for you to integrate the case study or article carefully with the lecture to ensure that students are getting the best from both parts.

2.4 Use of breaks in lectures

Given the decline in student attention after some 15 to 20 minutes, it makes sense to give students a break during the lecture. When the lecture resumes, attention is likely to be restored to its original or near original level. This does require, however, that you avoid the temptation to fill the lecture time with you talking, under the mistaken belief that the more you succeed in saying, the more students will be receiving.

If you do opt to give students one or more short breaks, there are several things that you can ask students to do with this time. Some are related to the lecture; some are not.

Breaks related to the lecture

You can ask the students to use the break to reflect on what they have learned so far in the lecture. A good way of using this ‘pause for reflection’ is to get them to look through the notes they have taken and ‘revise’ what you have covered in the first part of the lecture. They could also ‘tidy up’ their notes. One way in which they could do this is to re-work the material into a ‘Mind-Map’ diagram (Buzan and Buzan, 1994). If this lecture follows on from a previous one, you could also ask them to check that their notes follow on from the previous lecture.

An alternative is for students to exchange notes with their neighbour and for the neighbour to comment on them. This both provides useful feedback to each student on the notes they have made and also helps students to learn from their neighbour’s notes. The process should help to clarify understanding and to identify gaps.

Top Tip 8: You could ask students to compare and discuss notes with their neighbour. Students will benefit from giving as well receiving feedback.

Breaks unrelated to the lecture

The simplest form of break is to give the students a few minutes just to stop and have a bit of quiet time or to chat to their neighbour. If the room lends itself, you could let them move around. Such breaks can get noisy and so it is important to set 'rules' that allow you to end the break quickly so that the lecture can resume.

An alternative to the 'pure' break is to provide some form of entertainment. Many lecturers may feel uncomfortable about this, but it can prove very popular with students and the complete change can be very effective in helping to restore concentration. For example you might show an entertaining video clip or read a diverting and interesting text. The video clip could be a cartoon or a comedy sketch, or anything that you feel the students might like (within reason). You could even serialise a programme.

Alternatively you could show an economics item from the week's news which, even if unrelated to the lecture, can reinforce the relevance of economics to current issues. This can be very useful at level 1 for students who will not study the subject again, or who might be persuaded to do so if their interest can be sufficiently aroused.

You might choose some text from a news extract or even a poem. You could even arrange with a colleague to come into your lecture to read something (a 'favour' you could reciprocate). You could assign students in rota to bring something to read out – although you may have to vet their contribution in advance!

Top Tip 9: A short 'entertainment' break is likely to prove popular with students and thereby improve motivation. The break would improve concentration afterwards. If students end up learning more, it could be time well spent.

2.5 Overcoming barriers to more active learning in lectures

Section 2 has presented a number of alternatives to traditional practice in economics lectures. Whilst these approaches are becoming increasingly common in practice, there are various barriers which restrict their adoption:

- Preparation time: preparing materials (e.g. PowerPoint slides), rewriting lecture notes, etc.;

- Other time costs: maintaining a virtual learning environment (VLE), answering student questions in an online environment, the time taken to gain and evaluate student feedback;
- Risks: students may react adversely to being challenged (at least initially); the new methods may not be successful in terms of learning outcomes as hoped; you may feel uncomfortable in a new lecturing environment;
- Reactions of colleagues: if you take a 'radical' approach to lectures, and the students like it, there could be an adverse reaction from more conservative colleagues; there may be a departmental expectation of what a lecture should be and this may be a very traditional model of 'covering material';
- Financial considerations: the use of technology (such as an audience response system or aspects of a VLE) may require hardware, software and technical support, all of which may be blocked for financial reasons.

Given the above, it is often easier to introduce change iteratively. Try some small activity in a lecture that takes no more than a few minutes, or try introducing a break for a couple of minutes. See how successful it is.

Try revisiting your learning objectives and asking whether the lecture really addresses them. Revisit how the seminars build on the lecture material. Consider whether you are making the best use of the materials you make available to students. Do they contain too much or too little material? Should they be made available before or after the lecture?

Consider how you present information, for example, on PowerPoint slides. Do you want students to copy them down? Why? Are you giving them long enough? What work do you expect your students to have done before the lecture? Should you assign specific preparatory activities?

This is not to say that you should not introduce radical change, but a progressive approach is probably safer, less costly and more practical. Try limiting changes initially to things that do not take up more time. Once you have learned how to manage the new processes efficiently, they may save you time. For example, students may use more forms of self-help and rely less on coming to see you, or you may be able to rely more on FAQs on a discussion board. This could then allow you to devote more time to other forms of student support or to developing materials.

3 Building on lectures and student support

What do you expect your students to do to build on the lecture? What support do you offer them and how can this be provided in a cost-effective way?

3.1 Work for seminars and tutorials.

Typically, lectures are directly related to seminars or tutorials and it is worth stressing the importance of carefully integrating the two. You will need to address the following questions.

- How much time do you want students to spend on follow-up private study after the lecture before coming to the seminar? This should be made clear to students, so that they can maximise the benefits from the seminar. It is unwise to assume that students will know what is expected of them.
- Do you want to refer back to material or activities in previous seminars? If you do, this is likely to give students a greater understanding of how the course is structured.
- Do the seminar questions directly relate to the material covered in the lecture? Here you will need to decide whether the lecture material needs reinforcing through seminar questions or whether the seminar could be used for follow-up work, such as examining policy implications. For example, a seminar following a lecture on fiscal policy could involve students preparing a Budget based on information provided to them beforehand or examining the details of a particular Budget.
- If you are going to use various short activities in lectures, including diagram and table manipulation, completing proofs, etc., does this enable you to do more creative things in seminars? For example, you could reduce the amount of 'drilling' in seminars (such as going through numerical exercises) and increase the amount of debate on policy issues (see chapter on seminars).
- Do you use some of the time in seminars to allow students to ask about points they did not understand in the lectures? Do you actively encourage them to do this? If so, are there any other ways of achieving the same objectives that you might consider using, such as discussion boards to which you reply or student self-support groups (see archived chapter on VLEs)? These alternatives could release seminar time for other activities and prevent them becoming in part a repeat of the lecture.

It is impossible to give answers to these questions that are appropriate to all circumstances. For example, the most appropriate answer will depend on the nature of the learning objectives and the type of work students are expected to undertake outside of lectures and seminars. However, it is important to stress the need to integrate the lectures and seminars and to use each to complement the other.

3.2 Online materials

Posting materials, such as lecture notes and copies of PowerPoint slides, has become commonplace. These could be within a virtual learning environment (VLE), such as Blackboard or Moodle, or on the course web-site, intranet or shared drive. If learning in lectures is to be an active experience for students, you will need to have a clear strategy for the use of these materials. If they are too detailed

and follow the lecture very closely, they could be seen as a substitute for the lecture by the student. You may well want them to be so, thereby giving students greater flexibility in their modes of study. In this case, however, you will need to address the issue of students merely downloading the materials and not actually using them, but being lulled into a false sense of security that they can use them 'later'.

Online materials can support student learning more effectively if they are integrated with the seminar programme and related to assessment. If your course is in a VLE, you can use its features to organise the materials within the scheduled programme and, if you choose, make them available for only a specific period of time. This can provide an incentive for students to access the materials shortly after the lecture.

More creative use of online materials as a follow-up to lectures would include interactive 'study guide' questions. For example, if you were covering a particular model in the lecture, you could set a series of questions online for students to test, consolidate and deepen their understanding of the model. These questions could be multiple choice, problems or manipulating graphs. You could choose whether to make the answers available online. Question sets are readily available, whether through the Economics Network question bank, the Economics Network links to resources section or from textbook publishers' sites or electronic resources.

If you are using online study guides, you will need to decide what incentives there will be for students to use them. How closely will you link them to assessment? Will you encourage students to work in small groups and what are the incentive mechanisms for encouraging them to do so?

Lecture capture

Many lecture theatres nowadays are equipped with the facility for recording the lecture. The simplest form is a recording where the audio is what you say and the visual is whatever is presented on the screen, perhaps just from the lectern or your laptop computer, but perhaps also from a visualiser or interactive whiteboard. Another form is similar to this but with the addition of a 'talking head' of you, which appears in a small panel on the screen when the students play it back. When no PowerPoint or other image is displayed on the screen it can be set up so that just the image of you appears in full screen.

Students can access the recording through the module VLE or intranet and play it back in their own time. Normally you can choose when to make the recording available. You might make it permanently available – at least until the end of any resits – or you might prefer to make it available for just a short time after the lecture to encourage students not to get behind.

The advantage of lecture capture is that students can revisit the lecture as many times as they like until they feel they have fully understood it and/or have a comprehensive set of notes. It is also a safety net for students who have missed the lecture, say for reasons of illness. What is more, it allows students to concentrate on understanding during the lecture and not to worry too much about noting everything down.

A possible disadvantage is that lecture attendance will fall as students know that they can always access the lecture online. Where lecture capture has been used, however, most lecturers report that attendance has not fallen, but rather that students see the live lecture and the recording as complements, not substitutes.

The handbook chapter, *Creative uses of in-class technology*, looks at lecture capture in more detail.

Flipping the lecture

The practice of 'flipping the classroom' has developed in many universities and colleges, especially in the USA. In the context of lectures, the flipped classroom is where the lecture is recorded in a studio or empty classroom, or in the lecturer's office or home, and the students access it and watch it in their own time. Alternatively, the lecturer may select online material for the students to watch or read, which may be in the form of podcasts of lectures in the public domain. Or it could be a mix of the two.

Having watched the material, students then come to class – which might be in the full-sized lecture group – and have an interactive session. This can involve exercises, problem solving, case study work, role playing, etc. The session may be in the form of a workshop (see case study 2) where students work individually or in pairs; this is more suited to a traditional fixed-seating lecturer theatre. Alternatively, it could involve small-group work if the room has loose chairs and the students can move around.

Flipping has proved particularly suitable for many US courses, where often there are solely large classes rather than separate lectures and seminars. This allows work done in class to be more interactive and for deeper learning to take place. In the UK system, however, it is less relevant, given that interactive learning can take place in seminars/workshops – if appropriately designed (see the handbook chapter on Seminars), especially if the lectures themselves also contain interactive elements.

Nevertheless, the advent of facilities to record lectures and to integrate external materials within them does give universities greater flexibility in allocating both staff time and rooms. One way in which flipping could take place would be for all the lecture materials to be pre-recorded and for the 'lecture' sessions to be used

solely for workshops on more technical issues and for the seminars to concentrate more on debate and policy issues.

Recording of lectures in the studio/office/empty classroom, which could be of varying lengths to suit the material, is particularly suitable for courses which use problem-based learning. This is examined in the handbook chapter on Problem-Based Learning.

3.3 Use of interactive facilities in VLEs

The use of VLEs is discussed more fully in a later chapter, now archived. This section provides a brief overview of possible links between lectures and a VLE.

Discussion boards

One useful mechanism for encouraging students to make full use of their learning in lectures is to set up a discussion board. This is easy to do in a VLE. Alternatively, you could set up a Facebook page specifically for your module. But even a conventional email list can serve the purpose. You can post questions on the lecture that follow on directly from its content and students would be expected to respond. For example, if the lecture was examining market failures, the discussion could be based on particular examples of market failure and possible policy solutions. You can 'require' students to make a set minimum number of contributions. You can log their contributions and decide on an appropriate encouragement or 'penalty' for students who do not contribute.

If you do set up a discussion board or Facebook page, you will have to decide what students can expect of you. If you merely 'pump prime' it and then expect students to make all the contributions, it can be relatively undemanding in terms of your time. If used in this way, it can be a very useful mechanism for promoting a culture of mutual self-help. It is important that students clearly understand what use they are expected to make of the medium and what your role is.

Chat rooms as virtual seminars

As an alternative or addition to using a discussion board, you could set up a chat room in a VLE. Students could log on at a particular time and you could choose whether or not to lead it, merely start it off or not be present at all. The virtual seminar could last for a set length of time or could be open ended. The advantage of the former is that it requires a clear commitment of time by the student and is seen as something structured. The open-ended seminar has the advantage that it can continue as long as it is valuable to the remaining students.

Either way, the seminar can be seen as a discussion session on the lecture, whose purpose is to help students to sort out problems they may have. These may be

simple questions of clarification or they may be issues of contextualisation or application. Alternatively, you could start the seminar by giving some follow-up material from the lecture – an example, case study or problem – and posing the students some questions based on it.

To get the students used to using the chat room facility and to the protocols for 'synchronous' debate, it is a good idea to hold the first of these seminars in a computer lab with you present to answer questions about how to use the facility and to ensure that people are contributing. Thereafter, students can take part in the seminar from any computer with Web access.

It is important to recognise an important limitation of chat rooms: they have poor graphical and algebraic facilities. This makes them unsuitable for technical discussions. They can be excellent, however, for exploring policy implications and for examining issues where there is scope for differences in opinion. They can also provide a medium in which shy students can feel comfortable in contributing, especially if you allow them to use an alias, with their true identity known only to you.

If one of these virtual seminars is held after each lecture (in addition to normal face-to-face seminars), it can significantly deepen students' learning from the lecture and make them feel that they have an opportunity to contribute.

If you have time, you can post edited 'highlights' from the seminar. Failing this, you can simply leave the contributions on the site for students to revisit in their own time.

For a more general discussion of virtual seminars and how they can be used, see the case study, Use of Virtual Seminars in Economic Principles, on the Economics Network site.

Follow-up questions by students

You could encourage students to contact you if they have queries about the lecture. If you do not want to answer the same question over and over again, then you could again use a discussion board or Facebook page with a 'frequently asked questions' (FAQ) section. Once you have answered a question and posted the answer, then you will not answer the same question again, even if asked by a different student. The students would be expected to consult the FAQ section to check that any question they ask you has not already been answered. This can save you a lot of time and is very useful for encouraging a culture of self-help in learning, rather than students simply expecting 'to be told'. An FAQ section could be substituted for half of your office hours and you could dedicate the released time to answering the online questions.

Top Tip 10: Encourage students to answer questions posed by other students after the lecture on a discussion board. You need only intervene if the students were not working their way to the 'right' answers. This is a mechanism for encouraging self-help.

3.4 Assigned work

Assigned work: private study

Rather than merely expecting students to follow-up the lecture by reading or working through questions, you could assign them work to do. If you are not assessing this assigned work, whether summatively or purely formatively, you will need to provide incentives to encourage students to complete this work.

You could emphasise the intrinsic benefits of the work in helping them to improve their understanding and, thereby, their final grade. You might also emphasise the development of subject-specific and generic skills that will be of benefit to them later in their studies or in their career. The use of log books or a system of personal development plans/portfolios (PDPs) would help to encourage this more holistic and reflective approach.

The assigned work could help students to prepare for the next lecture. For example, if in the next lecture you are going to develop a theory that you have introduced, you could set students a couple of case studies that put the theory into an applied context or set a couple of problems that require the students to use the theory. For example, if you have been looking at Keynesian goods market analysis, or *IS/LM* or *IS/MP* analysis, and were planning to look at fiscal policy in the next lecture, you could get the students to study particular features of the last Budget and how they relate to projections made in the government's *Budget* document. This type of work can help students to see how the lectures are linked. It is useful to pose one or two questions at the beginning of the next lecture to evaluate this work. These could be in the form of multiple-choice questions, e.g. on a Powerpoint slide. A show of hands would be a simple way of checking how well the students had answered them. An audience response system is a more sophisticated approach (see Case Study 1 below).

Assessed work: formative and summative

There are several ways in which lectures can be linked to assessment.

First, students' understanding of the material may be tested directly. A seminar shortly after the lecture could begin with an objective test, a short essay, a problem, or a case study.

Second, the lecture could be directly relevant to an examination or formally assessed assignment. Students are likely to be motivated by the knowledge that a specific lecture covers material directly relevant to a question posed in the examination. However, while this might be an effective means of getting students to attend the lecture and to concentrate, it could encourage surface learning if it merely provides an opportunity for students to regurgitate material. If deeper learning is to be encouraged, then students would need to know that the form of the assessment will require them to apply, rather than reproduce, the understanding gained through the lecture.

Third, students' lecture notes could be assessed. This could form a small part of summative assessment, if clear marking criteria have been given to students. Alternatively, students could read and provide written comments on each other's notes. This commentary could then be assessed. This approach provides benefits to students through the commentaries they receive from peers and the reflection on note-taking that the assessment encourages.

Fourth, each student could be asked to provide a commentary on one lecture which would be distributed to other students and formally assessed. The number of students commenting on each lecture would vary according the size of the lecture group. Once students have prepared their commentary they could be disseminated through a VLE, Intranet or shared drive. You could require that word processed notes should have appropriate diagrams and tables in PowerPoint or Excel, pasted into the document. With a large lecture group, you could assign some students to act as editors of the notes. These types of activity not only encourage students to take a more reflective approach to their learning in lectures but also help to develop précis and critical skills. They also signal the importance of lectures and provide useful feedback to you.

4 Evaluating your lecture

Most universities have systems of formal student evaluation of lectures, involving some form of questionnaire. Sometimes these simply involve students scoring particular aspects of the lectures, such as clarity, pace and relevance. Sometimes they give the opportunity for students to make comments, and sometimes both. If these are to be used to allow you to make improvements to your lecturing, it is important first to establish what that the questions are seeking to evaluate and what assumptions are being made. For example, the questions may focus largely or wholly on you as a 'performer', rather than on the student learning experience. A lecturer may be very entertaining and popular with students, but that does not necessarily mean that lectures have been effective in terms of student learning.

If the most effective form of lecture is one where the students are actively learning during and after the lecture, then evaluation questions should reflect this. Students may prefer lectures that allow them to get a clear set of notes which are relevant to

their formal assessment. As discussed above, some students prefer to be ‘passive learners’, and may resent lectures that are challenging in terms of material and activities.

The formal student questionnaire is only one means of evaluating your lecture and gaining useful feedback. This section reviews other methods of evaluating the success of a lecture programme.

Self-evaluation: judged against criteria

One of the most valuable means of evaluating your lectures is to reflect on what you are planning to do or have done in terms of student learning objectives. Before the lecture you might consider the following:

- What do you want students to get from the lecture?
- How will the lecture achieve this?
- Are you planning to cover the right amount of material, given the abilities, experience and motivation of the students?
- Are there any other better ways of organising your material?
- Are the examples appropriate?
- Are visual aids clear and the right length? How could they be improved?
- What activities for students are planned? What do you want students to gain from these activities?
- How will the materials you provide to students complement the lecture? Will they encourage or discourage attendance and/or attention?
- How will the lecture be related to assessment?

This list is by no means exhaustive, but it does illustrate the importance of reflecting on the links between what you are planning to do and what the students will actually do and learn (as opposed to what you would like them to). After the lecture, it is important to reflect on what you believe students have learnt and whether you could improve on delivery, content and student activity. It is vitally important to be realistic and not to believe that just because you have said something, students will have understood it. Try to judge honestly what you have achieved in terms of the learning objectives you have set. While self-evaluation is important, this should ideally be backed up with more objective forms of evaluation.

Feedback during the lecture

If you are brave, you could ask the students periodically to judge your lecture against some clear criteria. This could be in the form of multiple-choice questions, perhaps using an audience response system. This allows students to ‘vote’ on various aspects of the lecture and the results are instantly displayed for you and the students to see. A less threatening alternative is to ask students to complete short

question slips and to deposit these in a box at the end of the lecture. These could be questions about specific aspects of the lecture, or they could be more general. For example, you could ask students to name two things they liked about the lecture, two things they found difficult and two ways in which the lecture could be improved.

It is best to avoid asking students to comment orally on aspects of the lecture, unless the group is small and the students feel very comfortable to state that they are having problems. Whilst traditional forms of lecturing sometimes include asking students orally whether they have understood, this is normally a waste of time as they will generally prefer not to respond.

Feedback after the lecture

If you are using a virtual learning environment (VLE), such as Blackboard or Moodle, you could set up a discussion board inviting comments on the lecture. You could arrange this in sections. For example, students could be asked to identify topics they have not understood, questions they would like to ask, and discussions to which they would like to contribute. You could have a section devoted purely to general feedback on the lectures. You could have an FAQ section, where you post the answers on the strict understanding that if a student asks a question, you will answer it only if you have not already answered the same question (or very similar) from another student. As well as providing useful feedback for improving the quality of your lectures, such a system supports students' learning.

If you do not have access to a VLE, an email list can serve the same function. You could also use email, if you want students to be able to comment to you privately. Alternatively, you could ask students to submit written comments on the lecture, and then come to see you personally to discuss their comments. Provided this is set up in a spirit of being mutually helpful, it could be a very useful and a profitable use of the office hours system. Alternatively, some time could be set aside in seminars to discuss these comments.

Some lecturers provide students with their mobile phone number and encourage students to ring them with any queries. These can be much quicker to resolve than through email as the query can be discussed. To protect their privacy, some lecturers may prefer to have a dedicated pay-as-you-go mobile for this purpose.

Submission of notes by students

Another useful way of assessing how well you have communicated is for students to submit their lecture notes to you for comment. Use of this practice depends on how much time you have to devote to making comments, but verbal comments could be delivered quickly and individual students could see you with their notes in

your office hours. This approach can provide the lecture with valuable feedback on the effectiveness of lectures and students with valuable comments on their note-taking.

Peer observation

Many departments have instituted a formal system of peer observation of teaching as part of an appraisal system. Others use it as a confidential and more informal form of staff development. If it is used to enhance teaching, rather than merely judging performance, it can play a very valuable role in improving student learning from classes.

A pairing system, where the two lecturers take it in turns to be observer and observed, can be a relatively unthreatening process and a very useful means of finding out how to improve your lecturing skills. This is especially so if the process is carefully structured, with prior discussion of learning objectives between observer and observed. The action of observing and giving feedback can be as instructive as the feedback from being observed. There is a danger, however, that the partners merely reinforce each other's prejudices. For this reason, it is normally good practice to rotate partners and also to provide some staff development activity in observing and giving feedback.

5 Case studies

5.1 Case Study 1: The use of an audience response system

John Sloman, The Economics Network, and **Dr. Caroline Elliott**, Lancaster University

One way in which lectures can be made more interactive is to use an audience response system (ARS) or 'clickers'. Universities are increasingly making such systems available in lecture theatres and other classrooms and they are beoming more and more popular with lecturers.

An ARS allows lecturers to ask students questions displayed on the screen. Students then, either individually or in pairs, use a handset to answer the questions. If you are not familiar with it, the system is similar to the 'ask the audience' feature in the popular TV show, *Who Wants to be a Millionaire?* The handset, or 'clicker' as it is often called, is similar to a TV remote control. It has number and/or letter buttons. The students press these in answer to a multiple-choice or numeric question. The handsets communicate with the lectern computer, or the lecturer's laptop, which has a receiver inserted into a USB port.

The questions can be given verbally, on an overhead projector, or in PowerPoint or Word using a data projector. The responses are then displayed on the screen at the front, either separately or, if PowerPoint is used, integrated into the PowerPoint slide where the question has been displayed.

The system

There are two market-leading systems in UK higher education. The first, and original leader, is InterWrite PRS®, also known simply as a Personal Response System or PRS. It was developed specifically for education. The original version uses an infrared system (as with TV remote controls). This entails having receivers strategically placed around the room, probably wall or ceiling mounted. Up to 40 handsets can be used with each receiver, which must be within 18 metres (60 feet) of each handset. The handsets have 10 alphanumeric buttons and high- and low-confidence buttons.

A more recent version of PRS uses a wireless radio frequency (RF) system. This is the InterWrite PRS RF®. The system allows up to 2000 handsets to be used. These communicate wirelessly with a hub, which can be in the lectern, and which connects via a USB cable to the lectern computer or laptop. Radio frequency systems such as this, unlike infrared, do not require 'line of site' to operate. This is useful where there are likely to be obstructions to line of sight, such as the heads of students in front.

The large RF handsets have 10 numeric buttons plus positive, negative and decimal point buttons, A, B, C, D and E buttons, and True and False buttons. The handsets also display the student's answer. Although the wireless radio version is more expensive in terms of equipment, it can work out cheaper by saving on wiring costs.

The other popular system and now the market leader is TurningPoint®. TurningPoint itself is software designed to run an audience response system, but it comes supplied with ResponseCard® handsets. It can, however, be used with other makes of handset.

As with PRS, TurningPoint with ResponseCard handsets comes in an infrared and radio form. The wireless RF version is better for lecture theatres and has a range of 60 metres. One RF receiver can work with up to 1000 handsets. The ReponseCard handsets are simpler than the large PRS RF version handsets, with only alphanumeric buttons. They are, however, light, thin and robust, and easy for the lecturer to carry around. The latest version has a few more features, including a LCD screen, but is not quite as compact as the simple version.

A recent development for TurningPoint is ResponseWare®. This allows students to use any Internet-enabled device, such as a smartphone, tablet computer or laptop,

as an alternative to a handset. Students simply connect to the ResponseWare login, enter the session number, which you have previously set up, and then a voting screen will appear each time you pose a question and then they simply click on their chosen answer. Universities can purchase licences for users. If, for example, they purchase 100 licences, up to 100 students can use the system at any one time. The licences can be used by anyone in the university – they are not restricted to specific students.

Use with PowerPoint

The software supplied with both PRS and TurningPoint is designed to make it easy to construct questions to be used in freestanding mode, or in PowerPoint or other formats. In the case of PowerPoint, both products add a toolbar to PowerPoint. This enables you to incorporate questions into an existing PowerPoint presentation, which can then be used in lectures with the audience response system.

In PRS, you can simply write your questions on a PowerPoint slide, which could be freestanding in its own file or simply as one of the slides in a presentation. The software then allows you to add PRS functionality to the slide. Each student is represented by a cell in a grid at the bottom of each question slide. When students answer the question, their cell changes colour. The larger the class, the more of the slide is taken up by the grid. With groups larger than 40, it might be preferable to put the question on an OHP acetate while allowing the PRS results to be displayed through the computer projector.

With TurningPoint, you can either create a PowerPoint question slide from scratch directly into TurningPoint format, or you convert an existing PowerPoint slide. TurningPoint allows greater use of the PowerPoint slide than does PRS because it records only the numbers of students who have responded at the top of the slide.

Modes

You can use either system in anonymous mode, which is probably suitable for most lectures, where the objective of using an ARS is to improve student learning and to provide feedback to the lecturer rather than to assess or track students.

Alternatively you can identify responses by handset. Thus if these are allocated to particular students you can grade these students' responses. This might be useful for purely formative assessment or merely to track students' progress or attendance. In certain circumstances, depending on universities' regulations and where cheating is not possible, the systems could be used for summative assessment too.

The rest of this case study focuses on the learning and feedback benefits of an ARS. First, Caroline Elliott from the University of Huddersfield discusses the use she made of PRS at Lancaster University in a second-year Microeconomics Principles course. It is an extract from an article in the *International Review of Economics Education* (Elliott, 2003).

Use on a Microeconomics level 2 module at Lancaster University

"Having taught second-year microeconomics for a number of years, I was aware that it was a course that students have historically often found challenging. Further, in a lecture environment students may be unwilling to volunteer information regarding their level of understanding of material covered. Consequently, I primarily used the PRS questions as a means of anonymously testing students' understanding of material recently covered. If, after observing the results of a question, I was concerned that students had not fully understood the material on which the question was based, I could briefly review the material for them, and also tailor follow-up tutorial content accordingly. I also used multiple-choice questions as a way of introducing a subject, asking students to apply their economic reasoning skills prior to being formally introduced to a new Microeconomics topic. In addition, I used the PRS to gauge how much information students had remembered about a topic from the first year of their economics degree studies. …

I can confirm that the PRS has provided a very useful means of checking students' understanding of material covered, both quickly in the lectures and also after the lecture. This has meant that I can more accurately determine what material should be revisited in tutorials, as well as in the lectures. Further, I appreciate that it has offered students an easy method of gauging their own understanding, and comparing their performance against that of their peers. While some of these benefits also transpire from the active learning methods reported by Harden *et al. (1968)*[1] *and* Dunn (1969)[2], the PRS has additional advantages. Bar-chart summaries of students' answers are produced and visible to the lecturer and students alike, while responses can also be accurately recalled after the lecture has ended, including the responses of individual students when the PRS is used in the named mode.

I have also found that the PRS has had a very significant effect on students' performance in lectures, stimulating their interest and concentration, as well as their enjoyment of lectures. It has proved to be an excellent method of encouraging active learning, while offering a means of varying the stimuli received by students in a lecture environment. Furthermore, they have found the PRS very easy to use. …

At the end of the lecture course, I asked the students (anonymously) to complete a questionnaire about the PRS as well as a standard lecturer feedback questionnaire.

The PRS questionnaire contained five statements to which students could respond by selecting answers 1 to 5, 1 indicating strong disagreement and 5 denoting strong agreement. Students were also given the opportunity to add any additional comments at the bottom of the questionnaire.

To the statement 'The PRS is easy is use', the median response was 5 and the mean response was 4.96. I fully expected this result and believe that it was helpful that I introduced the students to different features of the technology gradually. Hence, I only explained about the high- and low-confidence buttons on the handsets after the students had used the PRS in a couple of lectures. Similarly, I only used the named mode of operation after a number of lectures in which the PRS was used in the anonymous mode.

The statements 'Using a PRS has increased my enjoyment of lectures' and 'Using a PRS has helped my concentration levels in lectures' both gave rise to encouraging median responses of 4 and mean responses of 4.3. Clearly, not only was I aware that using the PRS improved students' alertness, but also the vast majority of students recognised that their concentration levels improved when using the technology. Unfortunately, it cannot be deduced to what extent this reflects greater active learning or the changes in stimuli received during lectures. 'Using a PRS has encouraged me to attend lectures' produced a median answer of 4 and a mean response of 3.6, with some students pointing out that they would have attended lectures anyway."

Potential benefits of using an ARS in lectures

There are several potential benefits from using an ARS system, depending on the context in which it is used. The first and probably most obvious one is that a lecture can be easily transformed from a simple transmission process, where essentially the role of students is the passive one of receiving, assimilating and recording information, to a much more active learning experience. By encouraging students to think about and respond to carefully tailored questions, students' understanding and retention of material, both factual and theoretical, can be greatly increased.

The second benefit is that it makes the lecture more interesting. Not only is the student more engaged with the material, but the lecture becomes more fun. Most people enjoy a quiz. The instant results and immediate sense of achievement from answering a question correctly are great motivators – as is the desire to get the next question correct if you get the wrong answer! Lecturers may be cautious about using 'fun' as a motivator, but if students learn and remember more, then it would seem to be well justified.

This leads to the third main benefit. More interesting lectures and lectures where more is learned are likely to improve student attendance.

In addition to these benefits, there are some others, depending on how the system is used.

- It is a very efficient way of asking questions. The results can be shown immediately in the form of a bar chart.
- It eliminates the 'crowd' effect of getting students to respond to questions by a show of hands. With a show of hands, for example, answer A tends to be selected much less frequently, and a popular answer is likely to encourage the 'don't knows' to raise their hands too. With an ARS, it is virtually impossible to see what other students are selecting, except perhaps for their neighbour.
- Sharing one handset between two students and allowing them to discuss the answer to each question can improve understanding as they can learn from each other.
- At the start of the course, it can be used to establish personal characteristics of students, such as age, sex, what degree they are on, whether or not they have A-level Economics or Maths, whether they are straight from school, whether the course is compulsory or optional for them, and so on. Not only does this provide useful information for you as lecturer, but it is also a way of building awareness by students of the community of which they are part.
- It provides instant feedback to the lecturer on students' understanding. For example, a large majority with the correct answer would suggest that students have understood and hence you can progress to the next section of the lecture. If, however, the answers are evenly spread between the alternatives is would suggest a general misunderstanding and you might want to go though the material again, perhaps in a slightly different way. If a large number of students have selected a particular wrong answer it can suggest a particular misunderstanding and you might want to address this.
- The system can be used to give the lecturer instant feedback on the students' perception of the quality of the lecture. You would need to be brave to do this, but by asking the students what are the best and worst aspects of your lecturing, you can adjust to this immediately rather than waiting for the class satisfaction survey or relying on anecdotal comments. Other questions might be on whether the pace is too fast or too slow, or whether there are too many or too few examples. Also any point of concern raised by individual students outside the lecture can be put to the whole class to test whether this is of general concern.
- It can be used to check on prior learning from prepared work. This not only provides an incentive for students to prepare for lectures, but again provides useful feedback to the lecturer. Similarly it can be used to check on understanding of material from the previous lecture.
- It can be used to establish students' opinions on open-ended topics or policy issues, such as whether income should be redistributed from rich to poor or whether the government should cut taxes and also government expenditure by a corresponding amount. This helps the lecturer to balance discussion of

advantages and disadvantages by directly addressing the views of the students.
- Classroom experiments and games can be easily conducted. These can be an excellent way of illustrating theoretical or conceptual points. You can find many such games on the Classroom Expernomics site.
- Revision sessions: a large proportion of a lecture could be given over to questions as a way of giving students practice for a forthcoming exam.

If the system is used in the named mode, it can also be used to keep a record of attendance. In addition, students' answers can be stored and used for identifying students who are in need of support. In certain controlled conditions, it could also be used for summative assessment.

Possible drawbacks of using an ARS

Some lecturers worry about the time taken to distribute handsets and collect them in at the end. Typically, however, if distribution is carefully planned, this should take no more than a couple of minutes and hand-in even less, especially if students deposit their handsets into a box on the way out of the theatre. If students have their own handsets or if ResponseWare for students' own smartphones/tablets/laptops is used, then there should be no set-up costs at all. Some universities distribute personal handsets free to students at the beginning of the course and only charge for replacements. This too eliminates hand-out/hand-in costs.

Another concern is whether so much material can be 'covered' in lectures, given that the questions inevitably take time that could have been used for talking by the lecturer. The obvious answer to this question is that it is better to sacrifice some words for the sake of better learning. What is more, the sacrifice is likely to be small, given that the total amount of time devoted to questioning need be only a few minutes out of the whole lecture.

The use of audience response sytems is also discussed in the handbook chapter on Creative uses of in-class technology.

Alternatives to an ARS system

One alternative, also discussed in the handbook chapter on Creative uses of in-class technology, is to use mobile phone text messaging to answer questions posed by the lecturer, to give feedback or to ask questions of the lecturer. Various software packages allow the lecturer to capture text messages and display them on the screen (see the section on mobile phones in the above handbook chapter). As that section states:

"The use of mobile phones in the classroom has the advantage of opening up discussions in situations where most students would not otherwise participate. Students' anonymity and the ability to have more time to think about the question encourages larger numbers of students to participate. Students tend to enjoy the interaction and the activity helps to maintain concentration and focus."

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[2] W. R. Dunn, 'Programmed learning news, feedback devices in university lectures', *New University*, vol. 3, no. 4 (1969), pp. 21–2.

5.2 Case Study 2: The use of lecture time for workshops

John Sloman, The University of the West of England

I was module leader on the level 1 Economic Principles module at the University of the West of England (UWE) for several years in the 2000s. At the time it was a year-long 30-credit module. Students on other 30-credit modules on the programme had 2 lectures per week and 1 seminar (in a group of 20) per week. There were 240 students on the Economic Principles module, and if class contact were to have followed the pattern of the other modules, this would have meant having 12 weekly seminar groups. Total staff hours would have been 14 hours per week.

The material that would be covered in seminars would be a mix of formal theory (such as constructing models and working through graphical and numerical problems) and the consideration of policy issues, cases and other more open-ended questions where there is room for discussion and debate.

The decision was taken several years previously to introduce a third type of class. This was a workshop. Workshops were for the full lecture group in a lecture theatre seating 310. They were taken by two members of staff. Students had 2 lectures per week, 1 workshop per week and 1 seminar per fortnight. Student class contact was thus 3½ hours per week (rather than 3) but staff hours were only 10 hours per week (rather than 14). Workshops were used for technical material or for questions where there is a clear right or wrong answer. Seminars were reserved for discussing policy issues, case studies, debates, small group work, etc.

Students were given 3 lecture hours per week on their timetable but were not told in advance which would be lectures and which would be workshops. They did know, however, that workshops would be based on material covered in lectures.

When students arrived at a workshop, they picked up a problem sheet. This contained a series of questions: graphical, algebraic, numerical problems (set out in sections), multiple-choice questions, making lists, etc. There was room on the sheet for them to write their answers. The students worked through one or two questions, discussing them with their neighbours as they did them. The lecturer then went through the answers from the front. Then the students did another one or two questions, and so on.

The lecture theatre was tiered, and so the students were asked to leave one row free in every three. The students soon got used to this and it was an easy process to organise. Leaving every third row free in this way allowed the lecturers to go round giving help to students if they were stuck. Although such a workshop involves two (or three) members of staff, there only needs to be one experienced lecturer. The others can be graduate teaching assistants (GTAs).

Workshops proved very popular with students and a good medium for learning and applying basic economic concepts. They consistently scored high 'satisfaction' ratings in student questionnaires. There are significant economies of scale in such classes and yet virtually nothing is lost by doing the workshop exercises in such classes rather than in groups of 20. In fact the gains can be substantial:

- Students enjoy the variety of having three different types of class.
- Seminars become very lively and can be much more problem- and issues-focused.
- The workshop format makes efficient use of GTAs. They need a far lower level of teaching skills on the one-to-one basis in which they are helping students in workshops. In fact, it is almost a form of peer support; students like being helped by GTAs who were recently undergraduates themselves.
- The lecturer time released can be reallocated to extra office hours support (again this could be by GTAs) and support in an online environment, such as running a discussion board to answer follow-up questions to the lectures or workshops.
- Workshops can lead directly into extra practice work for students. At UWE, additional 'homework' questions were attached to the workshop sheet, again with space to write the answers. Students handed these in to seminars. As the questions could all be marked simply right or wrong, they were very quick to mark. Tutors did not write comments on the answers. Instead, they stapled a worked answer sheet to the student's homework.

The frequency and total number of workshops that are feasible to run in a department depend on the nature of the module. On 20-credit one-semester

modules, the workshops could be run weekly. On 20-credit year-long courses, or 10 or 15-credit one-semester modules, the workshops could be organised on a fortnightly basis.

Rather than having a whole hour devoted to a workshop, an alternative is to introduce workshop activity into lectures. If lecture hours are increased by 50 per cent, then approximately one-third of each lecture could be devoted to workshop activity, without any reduction in the time for traditional lecturing. The mix of lecturing and workshop activity in each lecture hour could make for a very active learning experience for students.

6 Where next?

Suggested Reading

The majority of existing pedagogical research into the use of lecturing and student learning continues to be generic. The best sources for economics-specific educational research are the journals the *International Review of Economics Education* and the *Journal of Economic Education*.

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Small Group Teaching in Economics

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1. Introduction

Small group teaching is an essential part of economics instruction in higher education worldwide and most instructors will engage in this mode of teaching in some way. Examples of small group teaching can be traced far back in history; for example, in the Middle Ages, scholars read original resources to small groups who listened and took notes. In the present day, most small group teaching in higher education takes the form of tutorials (also called seminars or class sessions), which run alongside lectures for a module. Students taking the module are split into smaller groups to recap and apply the lecture material. In addition, instructors of, for example, optional modules with fewer students may also encounter a teaching environment with a small number of students. Higher education instructors of economics small group teaching will often be economics research students but may also be academic staff. Ultimately, teaching in both settings follows very similar pedagogical principles, and the discussion in this chapter covers any teaching environment where the instructor works with a small number of students, say of approximately 3-30.

Universities typically use small group teaching sessions to give students a more individualised learning experience. However, these sessions are very expensive for institutions. To justify these costs, small group sessions – hereafter tutorials - should make a significantly positive impact on student learning. Yet in practice, the delivery of tutorials often lags behind its potential, with poor attendance a widespread phenomenon and students' feedback pointing at their ineffectiveness. In a student survey at a UK university, students said:

> "I do not see the point in coming to the class: the teacher just goes through the solutions with no value added."
>
> "The seminars were dire and I don't feel they benefited my learning at all and at some point even just lead to more confusion over the subject."

Current pedagogical research clearly suggests that effective learning happens when students construct their own knowledge in an engaging and student-centred learning environment. This is true for both large and small group teaching. What makes small group teaching special is that it lends itself to interactive and student-centred teaching and thus has the potential to be an incredibly effective mode of instruction, when appropriate teaching approaches are adopted. Nevertheless, much of economics small group teaching still takes the form of front-led seminars, where the instructor develops answers to a set of questions with limited focus on students' process of actually understanding the material. This chapter provides a guide on how to make small group teaching student-centred and engaging so as to facilitate the effective learning of economics.

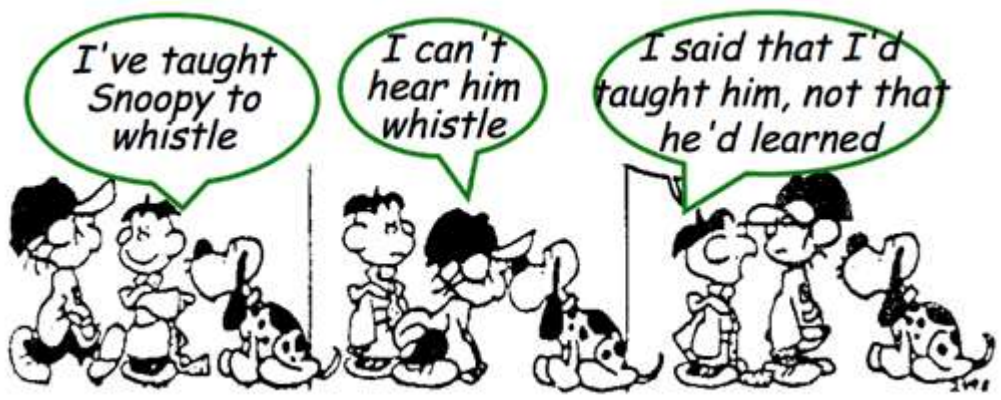
2. How students learn

> "Learning takes place through the active behavior of the student: it is what *he* does that he learns, not what the teacher does."
>
> Ralph W. Tyler (1949)

Tyler (1949) just rephrases the old adage that we learn best by doing. This idea is the basis for all constructivist learning theories (see particularly Piaget (1950) and Bruner (1960, 1966)), which essentially suggest that learning happens when students 'construct knowledge with their own activities' (see Biggs, 2007, p. 22). From an instructor's perspective, it is vital to create a learning environment where the student can engage with the study material instead of one where the educator only presents knowledge.

Far too often the instructor thinks that just because she/he went through certain material, students will have grasped those concepts and be able to apply what has been taught. However, this is not necessarily true (see Figure 1).

Figure 1



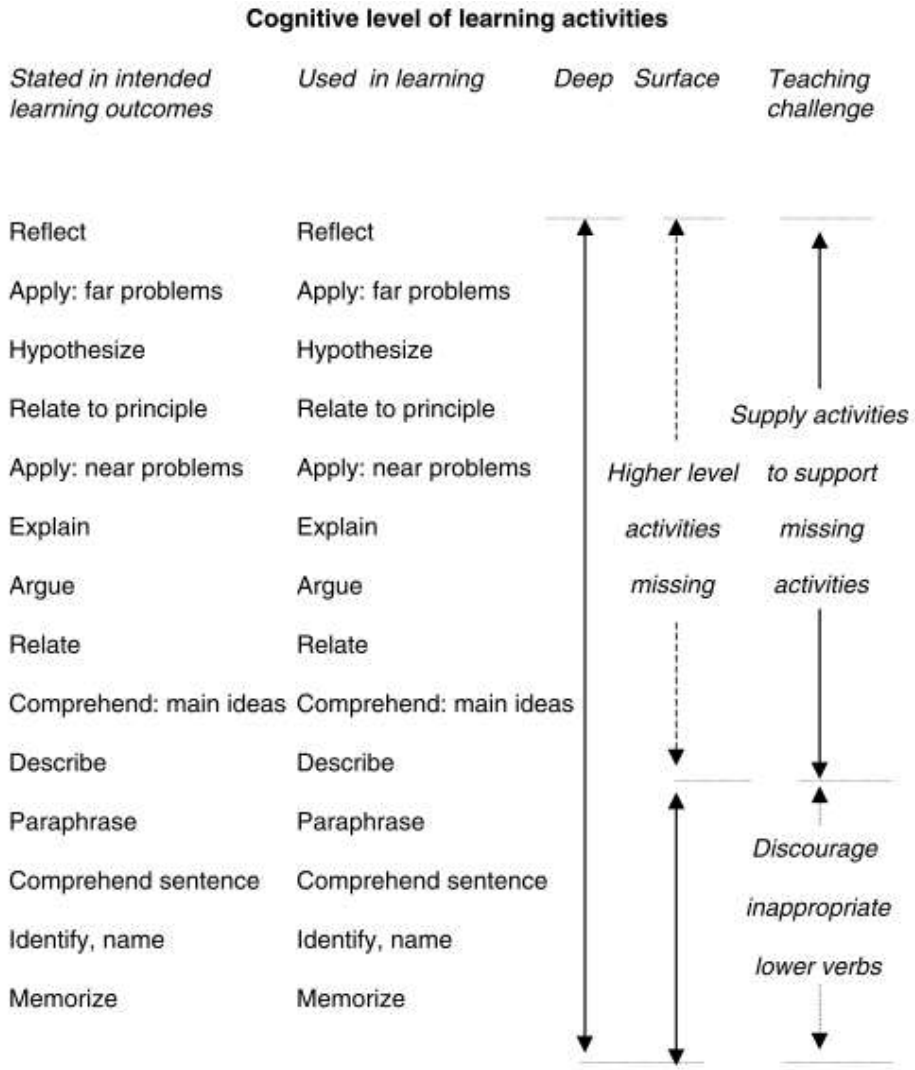
Suggesting that students need to create knowledge and practice themselves is not unique to small group teaching. Indeed, it applies to all kinds of learning environments. Yet, while in large group settings instructors often rely on audience response software and other technologies, in a small group setting the implementation of interactive learning activities is far more straight-forward.

Biggs (2007) identifies different learning activities that can be implemented, often depending on the group size. For larger groups simple peer discussion, the use of audience/personal response systems, e-learning projects such as Wikis, Twitter or Facebook and Moodle forums can be effective. However, with small groups, there is the possibility for effective use of class discussions, games and experiments, think aloud tasks, role play, research projects, presentations or collaborative group work. Such learning activities put the student in charge of her/his own learning.

Research suggests that when students create knowledge themselves, retention rates are much higher. The so called 'learning pyramid' matches retention rates to different learning activities. Sousa (2006) ranks different learning modes according to their average retention rates after 24 hours: lectures (5%), reading (10%), Audiovisual (20%), Demonstration (30%), Discussion Group (50%), Practice by Doing (75%) and Teach Others (90%). While the educational literature still debates the validity of these estimates, there is a general consensus about the effectiveness of participatory teaching methods.

What lies behind the higher retention rates is that certain learning activities engage the student to construct new knowledge, for example through reflection, hypothesizing, explaining and arguing, thereby facilitating so-called deep learning. Creating a teaching environment where deep learning can happen is a key aim for a successful instructor. Figure 2 orders some learning activities in their relation to deep and surface learning.

Figure 2: Bigg's Adjectives to Describe Cognitive Engagement (from Biggs, 2007)



Small groups ideally lend themselves for activities which facilitate deep learning and which can create a constructivist learning experience. Table 1 is an overview of activities that an instructor can implement:

Table 1

Suggestions for small and medium sized group sessions	**Activities**
Working in pairs	• Prepare answer to a question • Clarification of ideas • Compare individual answers and arrive at a joint answer • Marking each other's work
Working in threes	• As with pairs • Speaker/listener/observer
Working in fours or fives	• Debating topic and arriving at a team view • Preparing answer for plenary session (use of flip-chart paper) • One or more members present team view to whole seminar • Project team with division of labour
'Pyramid' or 'snowball group' (combining groups or adding individuals to groups one-at-a-time)	• Group problem solving • Bringing together and comparing work/answers/views of small groups • Getting the different constituent groups to focus on a particular aspect of a topic and then bringing the aspects together to form an overall view/report
'Fishbowl' (the 'fish' discuss an issue, while outside observers note criteria used etc)	• Group problem solving & discussion • Exploration of an issue
'Envoys' or 'crossover groups'	• One person from each group joins a different group to inject new ideas into discussion. • Groups are split up and re-formed to share ideas.
Formal debate (four speakers, formal debate rules, contributions from floor, vote at the	• Individuals assigned roles in advance, so that they can prepare their speeches.

Table 1	
Suggestions for small and medium sized group sessions	**Activities**
end, possibly vote at beginning also and then two votes compared)	• All students required to prepare the topic in advance. Then groups assigned to each side and prepare their speeches. • Individuals then chosen by tutor or by lots to make the speeches.
'Your witness' (modelled on Radio 4 programme)	• A panel of students is chosen, primed to represent different views on a topic. Other students are given a specific part of the topic to prepare and to be the 'expert'. They are called upon one-at-a-time and the panel quizzes them. Tutor chairs the proceedings. • Seminar split into several panels and the 'experts' move from group to group. Each group then prepares short report in the light of the evidence it has gleaned. Reports are then presented to the whole seminar or handed in to the tutor for marking.
Quiz show (individuals or preferably in teams)	• There are many shows that could be copied or adapted, such as University Challenge, The Weakest Link, Who Wants to be Millionaire? or Brain of Britain. • Students could prepare specific topics
Presentation with primed respondents	• An individual student is assigned to prepare a short presentation/paper and one side of A4 of key bullet points/diagrams/ equations, which are distributed to the rest of the group in advance or tabled. Another student is assigned to be the respondent. The rest of the students are assigned to particular aspects of the topic and asked to prepare one question. • Two or more students are assigned to prepare particular aspects of a topic, and then as above. • Advance reading is done, and then the final draft of the paper is prepared in small groups, and one student is allocated to make the presentation.

Table 1	
Suggestions for small and medium sized group sessions	**Activities**
Role playing	• Students allocated specific roles and given a scenario. (Examples of role playing include: price setting under oligopoly, wage negotiations, international trade negotiations, pre-Budget ministerial/interest group negotiations.) The tutor can introduce new evidence as the exercise progresses. • Watch a video with at least two points of view. In small groups, students each take on the role of someone in the video and debate the issues.
Game, simulation or experiment (there are many games or simulation exercises available)	• Whole class games (single session) • Games in small groups (single session) • Games played lasting several weeks, where a round is played either weekly or at less frequent intervals. The time taken playing a round in class may be only a few minutes. Much of the playing/negotiation can take place outside the class.
Computer lab session (using instructional software, such as WinEcon or the Virtual Economy, or using data sets and/or statistical packages: see Economics Network site for details of software)	• Tutor led. Tutor introduces the software (maybe using a data projector) and then students work on an assigned task, individually or in pairs. • Tutor supported. Students work at their own pace and the tutor is available or provide support of the student is stuck or has questions.
Virtual seminar (distance-based learning, using chat room facilities of a virtual learning environment/conferencing system, such as Blackboard or Moodle: students contribute from a terminal on site or at home)	• Tutor led, real time. Students log on at a particular time and then the tutor leads a debate, with students contributing on-line. Can be done anonymously, with students identified by number or fictitious name. Seminar can last for a normal period of time. • Tutor led, open time. Student log on when they please and contribute postings to a debate. • Student led (no tutor present): either real time or open time. Tutor can come online afterwards to post comments.

Table 1	
Suggestions for small and medium sized group sessions	**Activities**
Video (preferably not longer than 20 minutes)	• Students then prepare answers to set questions and report on them. • Quiz on video material • Debate (whole or small groups) on issues raised. Students can be allocated specific roles.

While implementing many of these activities may seem daunting at first, they are likely to improve student learning immensely. In addition, they are fun both to organise and perform in the classroom.

3. How to approach small group teaching

As suggested above, all learning should facilitate student engagement and ensure students construct and design their own learning path. In small group settings, instructors have a variety of options to achieve this goal and the choice of tools may depend on the particular setting. A small-group 'lecture', which introduces new material will demand a different approach to a tutorial where the main aim is to practice and apply what has already been learned. Furthermore, instructors may work differently with a 'very' small group of below 10 people to a group with 30 students. Section 4 discusses different modes of teaching for small groups of students.

3.1. The role of the instructor in small group teaching environments

> "Teachers should guide without dictating and participate without dominating."
>
> C.B. Neblette

It is often tempting as an instructor to plan a small group teaching session where the onus is always on the tutor: maybe to revisit material covered in large group teaching sessions and then to provide answers to questions set for the students, or to even 'lecture' new material to the students. In fact, if we as instructors always talk, there may also be less risk of students asking challenging questions. As highlighted elsewhere in this chapter, students may also be temporarily satisfied that the onus is not on them, as this means less effort for the student. However, students are highly unlikely to engage properly with the material taught in such a tutorial, and are unlikely to experience deep learning. To facilitate such learning, the role of the tutor is instead to organise the session, facilitate discussion and learning, and hopefully to inspire students.

One way to do this is to demonstrate to students what made us fascinated you in economics, motivating you to teach and research the subject. Instructors need to plan learning activities which make students responsible for learning. Such activities may be discussions, group work, student presentations and many more, which we discuss throughout this chapter.

A recurring theme of this chapter is planning: to facilitate interaction and learning requires careful planning. Tutorial activities and stimuli for the students should be planned, but at the same time sufficiently flexible to accommodate where the students' learning journey leads. This is demanding for the instructor, as the overall coherence of the session must also be preserved. In this sense, the role of the instructor is one of a moderator who provides guidance and structure to the

students' learning journey. Alongside activities and stimuli, instructor may need to present some material, but this should not be the principal focus of the tutorial.

The instructor's role is an incredibly important one. For students to willingly engage in the planned learning activities the instructor organises, they must feel at ease so as to be comfortable contributing. The instructor's role extends to providing helpful comments and suggestions, encouraging students to work effectively with their peers; this might require the instructor to lead initially and then increasingly facilitate student discussion and student contributions. The objective is for students to have the confidence to ask questions, not only of the tutor, but of each other, and of the economics discipline. The instructor's role is certainly not easy, but it can be immensely rewarding.

Finally, tutorials are ideal for fostering students' transferable skills, including the ability to think critically, work effectively in small groups, present and articulate their ideas. The lack of such skills is a recurring complaint of employers when hiring economics graduates (for example in the Economics Network Employer Survey).

3.2 The first session

Even for experienced academics, the first teaching session can be daunting – especially where the tutorial is interactive and students are unfamiliar with the instructor and potentially each other. Ultimately teaching is partly a performance, and we need to appear confident even if we do not always feel so. However, confidence needs to be balanced with approachability. Students should always feel that they can speak to lecturers and tutors.

Students expectations about the module and the instructor are largely formed in the first session. Moreover, student perceptions display inertia - it can be very difficult to change students' views about the module later on. During the first class, the instructor can set the tone and familiarise students with the 'rules of the game'. When done properly, the learning atmosphere is then more likely to remain positive throughout the term. Therefore, the first session needs to be planned carefully. The first tutorial should ideally be scheduled early on in the term. In fact, a session during the first week can be particularly useful as little material may have been covered yet and time can be used to get to know each other and create a good learning atmosphere.

Things to include in the first small group teaching session (see also Appendix 1):

1. It seems a basic point but do not forget to introduce yourself; not only your name, but also contact details, location of your office, hours when you are available for student consultations etc.

2. Ask students to introduce themselves. Wherever possible it is immensely helpful to learn student names. Students appreciate it, but it may be particularly helpful if a student has problems. By knowing a student's name you can more easily access further support services or resources for a student.

   It will be useful to find out more than a student's name. Student cohorts can be very diverse. There may be students in a class studying for different degrees, with different previous qualifications, very different motivations for taking a class etc. Hence, it can be invaluable asking students about, for example, the degree that they are enrolled on, their quantitative background etc. This can be done verbally, using Personal Response Systems (clickers) or software that allows students to answer questions using mobile devices. If technology is used, this can serve as an introduction to technology that will be used in subsequent tutorials. It can also be done by a short activity, which introduces students to the active learning tasks they will encounter in the module.

Teaching Tip:

Consider asking students to interview their neighbour and then present their peer to the class. This way students already practice presenting and speaking up, something which you as an instructor will expect them to do on a regular basis.

3. Students should all receive information on their modules, in the form of a module handbook. However, it may still be very valuable to spend a few minutes checking that students know where to get the learning resources they need for the module, understand the structure of the module, as well as how and when they will be assessed.

4. Finally, set expectations of what is required of students and what will happen in sessions more generally. If it is not acceptable to come to class late, then indicate this. Similarly, tell students if you expect them to turn mobile devices off. Most importantly, tell students to what extent you expect them to participate in class. Prepare students for group work, for giving presentations, or for coming to the front of the class to discuss answers on a white board. Make clear to students if you do not plan on covering all material, for example all questions on a question sheet or everything from the book chapters, in every session. You should make sure that students know what they are expected to do on their own and whether you will focus on only the challenging content or questions. Crucially, make clear to students what work they are expected to do before coming to the session, as well as after.

Teaching Tip:

Having noticed that students increasingly were forgetting to turn their mobile telephones off or turn the ring tone to silent, invariably leading to disturbances when a telephone rings, I established a rule: if anyone's mobile (including mine) rings during class they have to bring sweets / chocolate / biscuits for the rest of the group to the next class. I have found that I do not even need to police the rule as students themselves are very keen to identify fellow students who should bring treats.

3.3. Planning small group teaching

For every teaching session, assign some time for introducing the session and ending it. Even though tutorials often seem too short, we must take time to introduce a subject, check that students are comfortable with the concepts to be discussed, and make sure that students are clear about the link between lecture and tutorial content and how they complement each other.

"It looks as if there is not much communication between lecturer (module organiser) and class teacher. Often the class teacher is unaware of the progress made on the module or of what and how some material has been taught in the module."

As highlighted above, students complain if they see no link between lecture and tutorial content. However tempting, avoid 'diving into' solving problems or delivering core material, even if concerned about limited class time. Similarly, always end by summarising what has been covered, any follow up work expected or that might be beneficial to students, and if possible, linking material covered with the material to follow in the module.

Generally, take care to explain to students what is expected of them, not only during a teaching session, but also before and after in terms of work. Also try and provide an appreciation of the progression of material covered in the module. This can also be done via an online learning environment such as Moodle or Blackboard. At university there is a much greater onus on the student to engage in independent learning – something students may not be aware of or understand what this entails, especially first year undergraduates whose learning will have been more closely guided prior to university. The first class may be a particularly crucial teaching event where one can use some time to introduce this.

Individual teaching sessions are part of the larger learning journey students embark on. Be it a lecture, a class session or an online session, the question arises how the individual teaching sessions fit together.

Teaching Tip:

Do not view small group teaching sessions as stand-alone events. Rather, consider how they fit with, and support, previous and future teaching sessions in the module and communicate this to students.

When thinking about sequence, first think about the aims of the individual teaching session within the larger context of the module (i.e. does the session introduce new material, does it take up ideas from the last lecture(s), etc.) and then consider what students should do before and after the tutorial. A guiding question when planning teaching should always be what students do before, during and after the session.

Table 2 summarises some ideas about student activities before and after the session.

Table 2

Student Activities	
Before class/seminar	**After class/seminar**
Check understanding of lecture material	Extend beyond core reading
Make notes on further reading	Check notes are complete on a topic
Attempt relevant online quizzes	Check question sheet answers are complete
Prepare answers to set questions	Collect relevant past examination questions
Consider applications / examples	Attempt past examination questions
Formulate questions for the instructor	Check understanding of how a topic ‘fits’ into a module

3.4 Teaching in a team

As well as understanding and explaining how the different teaching sessions and topics in a module 'fit together', there is also a complex set of relationships underpinning any successful module. These include the relationships between the various staff involved and the relationship between staff and students. When teaching on a module, check where responsibilities lie. Is the teaching shared between lecturers and tutors? What is the aim of the small group sessions? Who is to decide such aims? Do we use question sheets for the tutorial, and if so, whose responsibility is it to produce such material? Will solutions be provided by the lecturer and are those given out to students? Who has responsibility for marking coursework and final assessments? To answer such questions, it is important to get in touch with colleagues to discuss responsibilities.

For some of the tasks related to small group teaching, there will be administrative support, and it is important to enquire about how to share the module administration appropriately. For example, you may want to enquire whether student attendance monitoring is the responsibility of the tutor, or automated in some way, such as with a student swipe card system. Similarly, find out who has responsibility for following class missed attendance, who has responsibility for inputting student marks etc.

Instructors often collaborate with other tutors, especially for large undergraduate modules. While inspiring and potentially a lot of fun, teaching with others can also be a demanding task. Subsections 3.4.1 and 3.4.2 explore the possible relationships with other instructors that may arise.

3.4.1 Working with fellow tutors

If you are coordinating a team of tutors consider ways to ensure they get to know each other and meet regularly to discuss teaching and assessment matters that may arise. You may even schedule regular meetings with all instructors where you discuss the approach taken in the upcoming tutorial. While it is important that teams meet with each other, it is equally vital that seminar instructors have sufficient opportunities to meet with a module convenor to discuss any issues arising.

Consider the length of time colleagues have to prepare materials. For example, if small group teaching is designed to support and follow up on large group (lecture) teaching, check that staff always have sufficient time to work through lecture resources before and to prepare materials for the small group sessions. Decide whether guidelines need to be given to staff as to how long in advance of a small group teaching session all the materials need to be made available to staff, and how these materials will be made available, for example via email, the VLE, on paper

etc. Colleague should not be expected to prepare for small group teaching the evening beforehand, because of delays in circulating materials.

Also think about how to coordinate marking across small teaching groups to ensure consistency, both for marking that takes place regularly, such as the marking of formative assessments including answers to question sheets, as well as the marking of summative assessments for example examinations, essays and dissertations. An initial meeting before teaching starts may actually be time saving, so that all relevant colleagues agree on a marking scheme and how to implement it, rather than moderating very different mark distributions after marking has been finished. Alternatively, consider asking colleagues to mark a sample of work and then agree marking conventions, rather than waiting until all the marking has been completed.

3.4.2 Coordinating groups of tutors

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4. Alternative forms of small-group teaching

Broadly speaking, economics instructors will focus on either technical material (i.e. the mechanics of a model or derivations) or engage with interpretive material, based on case studies, research papers, policy reports etc. One may encounter both aspects in the same tutorial, where technical material is introduced within the context of research papers or case studies. More commonly, however, there may be more of a separation. While knowledge construction and student engagement serve as guiding principles for both, instructors may adopt slightly different pedagogical approaches in each settings.

Generally, tool-based, more technical classes may have practice and repetition as an important element in them, while interpretive sessions may focus more on critical discussion.

Of course, students should be engaged in both settings, but instructors may choose different activities to facilitate this.

This section focuses on tips and techniques for planning tutorial teaching in a number of different settings: teaching problem sets (subsection 4.1), research based teaching (subsection 4.2), computer lab teaching (subsection 4.3), revision classes (subsection 4.4) very small teaching groups (subsection 4.5), small group lectures (subsection 4.6) and the use of classroom games (subsection 4.7).

4.1 Teaching question-based problem sets (quantitative, model-based and interpretive)

Most commonly economics tutorials provide students with the opportunity to develop the knowledge gained in lectures. Each tutorial relates to particular lectures and students are required to prepare answers to a set of problem set questions either in advance or during the session. Such problem sets are common for technical material, including model work and derivations. However, they can also be used for interpretive material, where essay-type short answer questions are set on – for example - an assigned reading.

It can be tempting for a tutor to simply go through the answers to the problem set questions on the whiteboard at the front of the class. Students often seem to favour this, as the onus is on the tutor to provide solutions, which is what students might be ultimately after. There are several problems with this approach. Pedagogically, learning happens best when students construct knowledge. As discussed in section 2, retention rates and understanding remains low when students copy results without attempting the questions themselves. Furthermore, this is a very expensive mode for just ‘giving out sample solutions’. In fact, printing solutions and running an office hour in case a student has questions may be an easier way of achieving

the same goal. In addition, if the tutor presents the answers to all the questions set during the teaching session, students have less incentives to prepare the work prior to coming to class, or even to attend class. Interactive and engaging teaching sessions, by contrast, encourage students to prepare for sessions in advance, will help students identify material that they find difficult, will facilitate 'deeper learning' and thus improve recall at a later date.

When planning a problem-set based teaching session, work through the question sheet and consider which questions to cover in the session. Do not feel under pressure to go through every question but if you decide not to discuss particular questions make sure you explain to the students why you chose not to cover certain questions. Potentially coordinate with other tutorial teachers and discuss the fact that you will not cover all aspects with the module leader. However, also be prepared to be flexible. Ask students which questions they found most challenging, either during class with a show of hands or online voting or in advance of sessions; this information will help you prepare. Plan approximately how much time to spend on different activities in the session. For example, you may want to allot time for students to check answers with each other, to prepare answers to present to the rest of the group, time for students to play a short, illustrative economics game etc. Consider whether sessions can be planned so that there is a mix of individual, small group and whole class activities, so as to keep students engaged.

> "Spoon feeding in the long run teaches us nothing but the shape of the spoon."
>
> E.M. Forster

Evidence (for example, see Springer *et al.* (1999)) points to benefits for students working in small groups, The question therefore arises how we can get students to work effectively in such settings? In the following boxes we share some ideas on possible approaches. Remember, for any interactive teaching session, it is vital to plan carefully in advance.

Group work:

Ask students to work in small groups - each group may work on a different question - with each group expected to present their answer to the rest of the class. To save time, the student groups can be asked to prepare their presentation prior to the session so that minimal class time needs to be spent by groups. If presentations on different questions are prepared in advance they can be uploaded to the Virtual Learning Environment (VLE) to create a bank of student answers. However, the answers should be checked by the tutor for accuracy before being uploaded.

Once students gain confidence from presenting their work in groups, it is easier to ask them to contribute individual answers.

Student Discussions:

Especially effective for interpretive sessions, this is a good mode of getting students to reflect on different sides of an argument. Students could be split into two groups (there are several ways of forming groups and you may wish to mix them up) and each group asked to reflect on arguments for a specific position. Make sure students use economic evidence to support their arguments. It is vital to ensure the level of the discussion is appropriate to the academic setting. Let students prepare a 5 minute speech to formulate some of their arguments and then start the discussion. During the discussion, your role is one of moderator. You may allocate speaking time, ask groups directly how they would counter a specific argument, ask clarifying questions etc. You may also stop the discussion for a short time to review some economic arguments.

Teaching Tip

For example, a discussion about the appropriate amount of abatement to combat climate change may be put on hold when students talk about discounting. You as an instructor may review the concept of discounting before getting back into the discussion. It is your role to clearly define the learning outcomes (the concepts and arguments the students should grasp) and moderate the session to achieve these.

Role Play:

Role Play could be a variation of the student discussion. In particular, you could assign specific roles to students.

Teaching Tip

In a discussion about environmental damage after a large oil spill I once [u1] let students discuss ways of estimating compensation payments to local fisheries. I assigned the role of the oil company, an economist, an environmentalist, and the local fishery to different groups and 'played' a discussion about the appropriate compensation payments. The exercise enables students to reflect about different approaches to calculate economic value and that the choice of method and aspects to include may strongly depend on personal preferences.

Student Presentations:

You may ask your students to prepare presentations on a specific topic or a research paper, where you use the questions in the problem set to guide the flow of the presentation.

There are several advantages to letting students present problem set answers. First, the problem set questions can be micro-tuned to assure a specific flow of the presentation. Second, by explaining to others, students can show whether they have really grasped to concepts and workings of a model. Third, the students gain transferrable skills important for the workplace. In principle, student presentations can be used for both interpretive and more quantitative material.

Students can either present answers by themselves or in small groups. In the first case, students may be asked to prepare material, for example read a research paper. A first question could be to summarise the article in a few sentences. One could then pick out some specific concepts and questions and let students reflect on these. For more technical material, one could ask students to prepare a short presentation of a specific technique, explain the steps of a derivation or use a graphical model to run through a specific economic argument.

As an instructor, you want to make sure the whole group is engaged, rather than one individual. This can be easily achieved by stopping the presentation and asking the group questions like: “Why did the student do a specific step?”, “What is the potential problem with this approach?” or “How else could one have answered the question?”. The structure of a problem set may also lend itself to mixing up presenters.

Teaching Tip

Instructors often claim it is difficult to get students to the board. One way of achieving this is to ask students first for an answer. If the answer is correct, congratulate the student and ask if she/he could write it up on the board. Once in front of the class, the student can be asked another question.

4.2 Research-based teaching: projects and case studies

In research projects, students can embark on their own research journey and can apply what they have learned to real world scenarios. Following the constructivist learning approach, research-based education enables students to create their own knowledge and gives them the opportunity to guide their own learning journey. Research-based education can be implemented as an individual or group task and may take the form of an essay, an online project (i.e. a Wiki) or result in other outputs, such as a video.

Students may complain that they cannot see how the research-based tasks links to the main lecture material. Small group seminars are an ideal place to let students work and discuss their ideas and get guidance and feedback from the instructor.

Often students just need a few suggestions or assurance that their work is going in the right direction, or maybe just a reminder about a specific link to the lecture material so that they can continue their work.

Small group sessions can be used to facilitate students' learning alone or in a group. While costly, individual feedback is most valued by students, so spending some time to guide the learning process is well-invested time. In this scenario instructors may give a short introduction about what is planned for the session, maybe showcase some particularly good work in progress, discuss some general feedback comments which apply to most or all cases and then speak to students individually, while they are working on further developing their projects. Students may also present their ideas to their peers while instructors walk around, listening into conversations, giving customised feedback or asking questions to help students progress.

It is important to frame such student-led sessions with a beginning and an end. To finalise the session instructors may share some of the questions which emerged in the discussion, ask students to present some of the ideas they came up with, and provide some general guidance about how to proceed in their work.

Teaching Tip

In one of my modules students were asked to create a Wiki on income and commodity taxation around the globe. They first individually collected information about the tax system in an assigned country. Then students worked in groups of around 8 to write an online comparison of the tax systems of their assigned countries. I used small group sessions to facilitate student discussion, showcase especially successful work and to guide their next steps. This feedback was vital for the students to progress successfully and to understand the link between their project and the module material more generally.

4.3 Computers in small group teaching

Small group teaching environments may also be used to enable students to work with IT. You may find yourself leading a computer lab seminar using software packages such as STATA, R, Mathematica, Maple, or Excel. Increasingly, universities are investing in trading rooms such that students can become familiar with trading platforms (Sharma, 2015). The focus of such sessions is that students work through material to familiarise themselves with the software package. Learning by doing is crucial in these kind of classes, with students working individually, pairs or small groups to work through a specific problem.

Problem sets or pre-prepared notebooks, where students are guided through specific material are ideal for these kind of seminars. Most software packages

enable the instructor to pre-prepare notebooks and do-files. This may have the advantage that students can work through a skeleton where some of the tasks are already prepared and examples are given, instead of having to programme everything from scratch. In such a teaching environment, the instructor may want to motivate the session at the beginning, then let students work through parts of the problem while walking around and answering specific questions. After 15-20 minutes it is worth discussing the material with the whole group and resolve queries before giving students' time to work through the next part individually again. A well-prepared data file would allow students who did not manage to complete one task to be still be able to continue and work on subsequent tasks.

Teaching Tip

In an Environmental Economics module I used seminars to expose students to work with Mathematica and simulate models to better understand the interaction between the economy and the environment. I pre-prepared Mathematica notebooks that guided students to first understand the code, add to it and amend it and then interpret graphs and model outcomes. Students worked through the material with their neighbours but could ask me questions throughout the session, at which point I would go to their computer to help. Four to five times during the two hour session I discussed parts of the material in plenum. As students worked through the material themselves they experienced that things did not always work as expected. The programming code entered may be incorrect, or the output not intuitive. This is when students must stop and rethink the model set-up. It is the failures and struggles that make students learn; the tutorial environment is ideal to support this learning process.

4.4 Revision classes

Revision classes need to be prepared carefully. It is tempting, especially as teaching draws to a close, to think that all that is required is to turn up and answer student queries without divulging too much information about the forthcoming assessment. However, revision classes require careful planning and preparation to ensure that students gain as much benefit as possible from them.

First, consider if there is any information (other than the topics of unseen assessments that students invariably ask for!) that can usefully be provided to students. Examples include:

- A brief overview of the overarching structure of the material covered in the module

- Guidelines as to the format of a forthcoming assessment and any information that will be provided, for example an equation sheet, copies of statistical tables etc.
- Past assessment questions
- Specimen past answers
- General assessment feedback documents that were circulated to students who sat the assessment or examination previously
- Module or assessment specific marking criteria
- Details of the marking process
- Resit provision

We often assume that students are informed about the format of assessments and marking criteria, but we should not lose sight of the vast quantity of information that students receive in paper and/or electronic formats. When providing information, such as the items suggested in the list above, also set aside time to talk through the documents, and give students an opportunity to ask questions. For example, marking criteria statements may be easy to understand for an academic or PhD student, but challenging for students.

Students may not be aware of the rigorous marking procedures in place in universities. It can be reassuring to students to know their work is marked by one (internal) marker, with at least a sample marked by a second (internal) marker, with a sample also being looked at by an external examiner. Further, that attention is given to the distribution of marks across a cohort and any papers that receive marks close to classification borderlines are given particular attention at multiple stages of the marking process.

Check whether any past scripts have been saved and whether former students gave permission for anonymised answers to be circulated. Students often find it enlightening to see examples of good and weak answers by former students. By seeing examples of high quality work students can be inspired, while both stronger and weaker past work can be evaluated against marking guidelines to help students appreciate what is expected of them.

Consider whether you would like students to undertake any specific activities in advance of a revision class. Revision classes can be daunting for less experienced staff as students may ask questions from across multiple weeks of a module. To help both staff and students prepare, students can be invited to submit questions to be covered in a revision class in advance. Similarly, students can be asked to prepare draft answers to previous years' questions.

Teaching Tip

Consider using an online forum to collect questions. In such a forum students can also answer questions of their peers. This will facilitate student discussion and

enable students to explain material to others, which is the ultimate check of whether the material has been truly understood.

Ideally a revision class should remind students of the overall narrative of a module and provide students with an opportunity to clear up any niggling doubts about material covered, while providing an opportunity for students to appreciate what is required for a first class / distinction level answer. Revision classes should be interactive with lots of opportunity for students to ask questions and contribute.

Teaching Tip

A competitive element can also be introduced. Asking questions using personal response systems or mobile devices can help students discover where they may have gaps in their knowledge. Similarly, a team game based on 'Noughts and Crosses' can be used to encourage students to answer questions and also set questions for another team, in so doing offering an additional opportunity for students to revisit their module notes. This game is outlined on The Economics Network website:

https://www.economicsnetwork.ac.uk/showcase/elliott_0x

Consider whether advice can be given as to specific activities students should undertake after the revision class. Students know they need to learn material but may less clear about how to learn. A student may take in little from reading a text book for even an hour, and may need suggestions as to how to vary their revision activities. As such, consider whether recommending any of the following:

- Diagram drawing practice
- Self-testing on frequently used mathematical or statistical methods
- Past question practice, maybe writing essay plans rather than full essay answers
- Reading relevant recent newspaper articles for illustrative examples to support answers
- Revising with other students
- Discovering academic references beyond those recommended on module reading lists.

Finally, do not forget to advise students on where they can receive further support when preparing for assessments. When will staff be available to see students in their offices? Will a VLE discussion board continue to be monitored? etc.

Teaching Tip: Reviewing previously submitted work

One activity that students find hugely beneficial is reviewing work previously submitted by students. This could be work submitted for module assessments or answers to past examination questions. You must remember to get students'

permission to use their work and ensure it is anonymised. Give examples of very good and also weak answers. Students can be asked to read answers in advance or in class, and then asked as a group to comment on the strengths and weaknesses of the answers, offering suggestions as to the appropriate marks. Consider doing this in conjunction with the marking criteria. The resulting discussion is often very lively and revealing to students, highlighting what is expected of them.

"I found the evaluation of previous projects extremely helpful in understanding what was wanted from me - it would be great if other courses took this up!"

4.5 Very small "small group teaching"

You may find yourself working with a very small group of people, perhaps 2-4 students, either in a formal tutorial setting or in office hours. The dynamics of such sessions are likely to be very different. As instructor you have the chance to monitor very individually a student's progress and consider how to support the student in her/his learning journey.

These sessions work best if students pre-prepare material, for example an essay or problem set or engage in some independent research and write up a short summary, which can be submitted to the instructor before the actual teaching session. This way the instructor can read and target the session more precisely to the students. These sessions should be interactive, with the students talking most of the time and the instructor steering the discussion with the right questions.

Such sessions can be incredibly inspiring for students as they feel they can directly benefit from the expertise of the instructor. But at the same time it can be daunting as small group sessions are harder to prepare for and the instructors' knowledge and confidence in the material is directly tested. To avoid difficult moments, looking at work in advance of the sessions and asking students if they had particular problems with the material may help.

Teaching a very small number of students can be beneficial for the weakest students as well as for the brightest students in the group, as the instructors can find out where exactly a particular student struggles but at the same time really push the able student to intellectual heights. Furthermore, instructors can stimulate a learning environment where peers can learn from each other and beneficial peer effects are maximised.

Teaching Tip

With a very small group of 2-4 students, why not ask one student to explain a particular complex concept to the other student(s)? Or let one student discuss a possible viewpoint while the others need to argue against it?

4.6 Small group lectures

If you are teaching a very specialised optional module you may only have a few takers each year and will end up with a group of only 15-25 students. Lecturing to a small number of students can be a real treat, as many of the interactive teaching modes we suggest in this handbook can very easily be implemented.

The aim is again to provide an environment where students create their own knowledge and small groups lend themselves to interactive teaching modes, such as flipped classroom teaching, where students pre-prepare material from books, videos and other resources, while the instructor uses the time in class to introduce applications, discuss questions and more demanding material or test understanding.

Instructors sometimes question how students will be able to understand the complex material without the instruction of the lecturer, but there are excellent textbooks where much of what we teach is available, and which can provide a good first read. In addition, there are many videos which clarify concepts available online. Instructors may also film their own videos or can use lecture recordings from previous years to make material available to students before the lecture. The valuable and expensive class time can then be used much more interactively. For example, instructors could apply the material to current issues, or clarify especially difficult content.

Teaching Tip

Instructors could open a twitter feed or message board where students post questions about particularly difficult material before the lectures. A part of the lecture could then be used to focus on these questions, before covering some applications.

4.7. Small group teaching and games

How long students can typically concentrate remains a contentious issue, but there is a consensus that we need to vary our teaching methods and the stimuli that students receive in class to ensure that they remain engaged and focused. A fantastic way to break up a class with a short activity is to use a game or experiment.

There are a number of advantages: besides remaining engaged students may remember a theory or concept better if it is demonstrated in a game/experiment. Games/experiments are typically fun to use in the classroom, and outcomes can stimulate discussion as to the extent to which theories are in line with individuals'

real-life behaviour and economic decision making. See Guest (2015) for a discussion of the benefits of using games/experiments in Economics teaching.

For example, Dictator and Ultimatum games are very quick to implement in classes and work particularly well with small classes:

https://www.economicsnetwork.ac.uk/showcase/elliott_gametheory

These games also provoke discussion as to whether economics agents are actually selfish profit-maximisers as neoclassical economics often assumes. A favourite Microeconomics game that can be used with small or large class sizes is the Tennis Ball game that demonstrates Diminishing Returns to a Variable Factor of Production:

https://www.economicsnetwork.ac.uk/themes/games/tennis%20balls

Further examples of Microeconomics games appropriate for small group teaching can be found in, for example:

https://www.economicsnetwork.ac.uk/showcase/guest_games

https://www.economicsnetwork.ac.uk/showcase/guest_experiments

See also Guest (2015) for a detailed exposition of the Public Good game.

There is a section of The Economics Network website devoted to the use of games/experiments in Economics teaching:

https://www.economicsnetwork.ac.uk/themes/games

Many of the games are suitable for small group teaching or can easily be adapted for it. Further, the games are not restricted to Microeconomics / Game Theory applications such as those highlighted above, but also encompass Macroeconomics; Development Economics; International Economics. Instructors can enjoy exploring the resources available.

5. Self-reflection and evaluation of small group teaching sessions

Annual teaching appraisals are standard across UK universities. Hence, instructors should expect someone to observe their teaching at least once a year. However, regardless of the extent to which formal teaching appraisal schemes are imposed, watching how others teach and obtaining constructive feedback on one's own teaching is invaluable.

Observation opportunities

1. Instructors may ask to observe other instructors, particularly those with excellent reputations for teaching. Observing others gives us an opportunity to see what 'works' for colleagues and provides insights into small group teaching methods that are effective. Yet, we should also be aware of our own strengths and weaknesses and have the confidence to recognise that different approaches may suit different tutors.
2. Ask trusted colleagues to observe and provide feedback on your own teaching, even outside of formal teaching appraisal processes. Colleagues can often offer valuable suggestions, and through observing may also be able to confirm whether students really are engaged and working in the small group sessions.
3. As well as observing other instructors, it is often very helpful to observe lectures that are given in modules where lectures are accompanied by tutorials. This gives an incredibly valuable insight into how the students are taught in the large class sessions; the pace of delivery, level of technical difficulty and level of detail of coverage of material. This can provide real insight into the student experience with instructors then able to adapt small group sessions so that students gain maximum benefit from them. Note that with greater use of lecture capture in universities across the UK it is often now easier to watch lectures at a time convenient to the tutor as they can watch a recording of the lecture rather than attending the 'live' lecture. However, there are benefits from attending the actual lecture as it is easier to gauge how students respond to the material covered when experiencing the lecture alongside them.
4. 4. With greater adoption of lecture capture in universities across the UK it is now also possible for instructors to watch recordings of their own teaching to review their own performance. This can initially be very daunting but hugely beneficial.

In addition, all universities survey students at least annually to obtain module level feedback. This feedback may only be sent to module leaders, but make sure that you see it so that you can reflect on successful and any less successful aspects of a module, your own input into the success of a module, and measures that you can

take to improve your teaching. Common issues that are raised about the quality of small group economics teaching either when colleagues are observed or in module evaluation feedback include dissatisfaction that all material is not covered in the class; complaints that sessions are not interactive and that the tutor 'talks at the class'; a related issue is that classes are dull; and that feedback on work submitted is inadequate.

Teaching tip:

At the end of every module think about identifying at least one thing you can change to improve your teaching on that module in the future. We should all be continually trying to improve the quality of our teaching, even if just in small ways.

Finally, as well as talking to Economics colleagues, observing them, asking them to observe you, if you are still concerned about the quality of your teaching all UK universities have a staff development department. This department will be able to offer support.

6. Further resources

Economics is a fantastic subject to teach as it helps us understand so many aspects of individual consumer and firm behaviour, as well as highlighting the inter-relationships between the many important macroeconomic concepts. As such, there is a wealth of resources instructors can draw on, either to clarify content, to provide examples, to stimulate discussion or to simply break up a teaching session to ensure student concentration is maintained. In particular, teaching with films and videos has become increasingly popular.

Various media can offer particularly valuable resources. As well as a vast array of popular books being published in recent years on often entertaining applications of Economics, news and media are also full of material which can be used for teaching. The resources could be used in class sessions as well as small group lectures and may be the basis for a flipped classroom teaching scenario and we recommend considering using some of the following resources in your teaching:

YouTube videos	There are lots of videos, television and film clips that you can find to illustrate many aspects of Economics. ○ https://www.youtube.com Have fun searching!
Research article on Economics as portrayed in films	Leet, Don, Houser, Scott (2003) "Economics goes to Hollywood: Using Classic Films & Documentaries to Create an Undergraduate Economics Course", *Journal of Economic Education*, volume 34, number 4, Fall, pp. 326–32. DOI: 10.1080/00220480309595226
The Economics of Seinfeld	http://yadayadayadaecon.com/
News stories	• The Economist • Newspaper articles • Television news
Blogs on Economics	For example • http://freakonomics.com/blog/ • http://www.economistsdoitwithmodels.com/
The Stand Up Economist	http://standupeconomist.com/videos/

CORE 'The Economy'	CORE offers an alternative, free to access, set of first year Economics Principles teaching resources. There are several videos and other multimedia content in the e-book. http://core-econ.org/
Films that support teaching Mathematics and Statistics for Economists	• http://www.metalproject.co.uk/METAL/Resources/Films/index.html • http://economicsnetwork.ac.uk/statistics/videos
For a general discussion on the use of media in Economics teaching see:	https://www.economicsnetwork.ac.uk/handbook/media

7. Conclusion

Small group teaching in practice often lacks behind its potential. Working with only a small group of students opens up various possibilities to create a learning environment where students can follow a more individual learning journey and actively engage in the learning process. This mode of teaching can be extremely fulfilling. At the same time it is demanding, as interaction also means unpredictability. Planning small group teaching sessions carefully is vital, even if one teaches in a fairly standard form using for example question sheets.

The chapter has suggested various activities to increase interactivity in the classroom. There are of course many more resources out there reflecting on small group teaching or providing material to be used in small group teaching. Our aim is to suggest some teaching ideas that can make small group teaching sessions more interactive and student focused. Readers may also want to engage with the wider literature on small group sessions such as Strawson et al (2013) or Tiberius (1999).

While in large classroom settings instructors may find it difficult to know all students' faces and names, small group sessions can help to bring the learning journey to a more personal and individualised level. This is not just beneficial for the learning outcomes of the student but also a much more fun way to engage with students, for hopefully both the student and the instructor.

Appendix 1: Top Tips for making small group teaching more effective

Start off on the right foot	by getting to know your students' names; encouraging them to learn each other's names; contracting; establishing ground rules; setting objectives and orientating them to the module.
Help students to prepare for discussion	by briefing seminar leaders; helping them to prepare both the content and the process; ensuring they get helpful feedback; encourage them to evaluate their own performance.
Use 'structures' to manage group learning	by arranging the furniture in the room suitably; breaking up the group, breaking up the tasks; using sub-groups (pairs, triads, pyramids, debate etc).
Encourage students to participate	by using structures (e.g. rounds, brainstorming); using students' interests; using students' questions; asking different kinds of questions; managing the vociferous students effectively.
Encourage students to take responsibility	by distributing group roles; encouraging students to work alone or in groups in class; leaving the room; asking students to present their work; establishing and supporting self-help groups; awarding group grades.
Evaluate the work of the group	by encouraging group self-monitoring; having group observers; checking up on group process; tape-recording the session; consulting the group.
Use written material	such as posters; group charts; students' notes; handouts; essay preparation; open-book tutorials.
Help students express their feelings	by dealing with 'what's on top'; self-disclosure; praise and encouragement; managing closure.

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The Use of Media and Technology in the Classroom

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Contents

1. Introduction

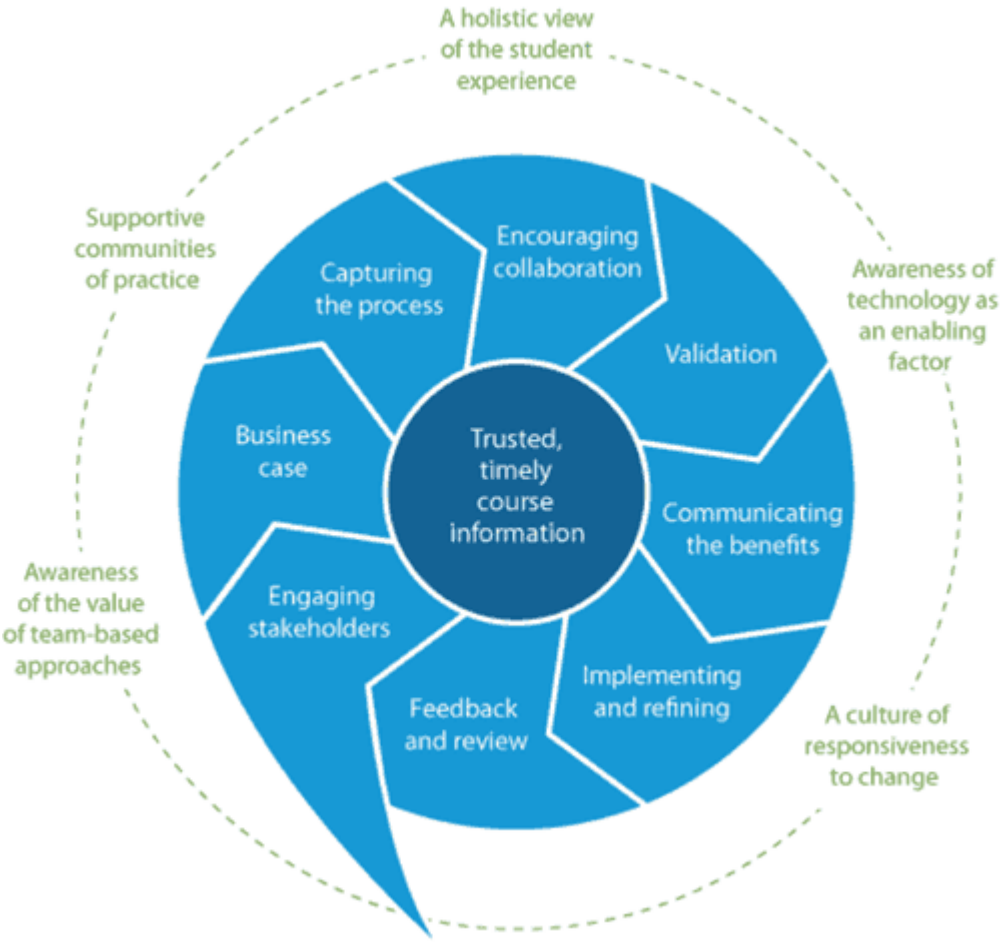
Thanks to recent technological advancements, reduced costs and ease of access to online digital media, instructors in higher education have been increasingly adopting forms of media and technological innovation in their curriculum.

Nowadays, instructors can embed digital media in their teaching, instantly and remotely communicate with students via social media or discussion boards provided in virtual learning environments, create videos and record lectures to be shared online, or test students' preparation online. Similarly, most students now possess devices that allow them to access, anywhere and often at negligible cost, digital resources provided by module convenors.

For instructors considering various forms of teaching innovation, it is important to have an idea of students' own preferences regarding technology in the classroom. In summer 2013 the non-profit organisation Jisc released a Student Innovation Competition[1]calling for student-led projects to explore novel uses of technology in learning. Interestingly, the submissions provided very useful insights regarding what students really want[2] from technology in higher education. Two main areas could be highlighted. First, *personalised learning*; specifically, students seemed keen to personalise lectures (for example communicating and interacting—possibly anonymously—with instructors during lectures), tracking their learning progress online and have effective tools for revision. A second area was *networking*; students were interested in platforms that would connect them with students in different years and with those studying the same subject at other universities.

The use of technological innovation applied to teaching should also be considered when designing the whole curriculum. According to the *curriculum design cycle*[3] a curriculum should meet the changing needs of students and employers. The use of technology as part of the curriculum design would include ways to improve communication with stakeholders to facilitate discussion and collaboration, to capture and record information, to increase consistency both in terms of the learner experience and quality assurance.

Figure 1: the curriculum design circle



The aforementioned recent improvements in software and hardware offers a number opportunities for instructors to improve students' experience. In addition, the costs are now significantly smaller. Indeed, instructors entering the higher education sector can now find, not just useful software and advanced devices, but also helpful support, guidance and the experience of colleagues who have been pioneering new technologies and reported them in the literature.[4]

While technology has become widely available and it clearly meets some of the requests of students, economics instructors have been historically reluctant to consider innovative forms of teaching in favour of a more traditional "chalk and talk" approach.[5] Nonetheless, in the last decade instructors have increasingly opted for a *blended approach*, where innovative use of technology and media has been integrated with more traditional forms of teaching.

This chapter is a guide to the most popular forms of technological innovation in higher education teaching, with a particular focus on economics. Given the continuous advance of technology and practice, the guide cannot exhaustively cover all possible forms of innovation. Rather, our objective is to offer a critical description of the most common practices currently in use. Our approach will be

based on personal experience and indirect experience of other instructors and students, as reported in a growing body of literature. We shall point out where the technologies' features align with students' preferences. We shall also point out possible issues, pitfalls and problems associated with some of the technologies considered. What we hope will be clear is that innovative uses of technology are important for any instructor to consider. They are sometimes a necessity; indeed, due to the large number of students attending introductory modules, online material (for example slides, video clips, online practice and assessment) often provides a coherent and consistent substitute to personal interaction.

The use of media and, in general, technology can also help freeing valuable time during lectures that can be used in more effective ways. We shall stress the advantage of asking students to contribute in producing digital material (this is case with social media, but also videos/photos). Digital, online accessible, interactive material would also prove very helpful for those students affected by disabilities. All in all, the use of media can improve students' engagement and improve their learning experience.[6]

A caveat to keep in mind is that innovation often comes at a cost. This is true for instructors, who need to learn how best to apply a new tool; for students, who need to learn appropriate use of the technology and for the institutions that will be asked to pay for the innovation. The increased availability of technology inside and outside the classroom decreases these costs, but they are significant nonetheless and the pedagogical advantages should always be compared to the potential costs (see Stephenson and Cortinhas (2013)). Innovation for the sake of it would not improve students' learning experience.

Each section of this chapter focuses on a particular type of technological application. In Section 2 we discuss the use of lecture recording. In Section 3 we discuss the use of media files (for example visuals, audio files, video clips, online media) embedded in classes. In Section 4 we describe the use of personal response systems (sometimes called *clickers*) that allow students to answer multiple choice questions interactively and anonymously during lectures. In Section 5 we describe the use of mathematical software to produce dynamic images and to create adaptive online assessment. Finally, in Section 6 we consider the use of social media to communicate and interact with students. We shall discuss how each technology can be used to improve students' learning (for example, digital media can provide examples and applications), provide learning support to students (for example via the use of recorded lectures and social media), entertain and engage students (see Mann and Robinson (2009)), provide practice and revision opportunities (for example using clickers during lectures or recent platforms for online assessment).

[1] https://www.jisc.ac.uk/news/digital-savvy-students-offered-5k-grants-20-may-2013

[2] https://www.jisc.ac.uk/guides/what-students-really-want

[3] https://www.jisc.ac.uk/guides/using-technology-to-improve-curriculum-design

[4] See for example https:/www.jisc.ac.uk/guides/online-learning

[5] See, for example, Watts and Schaur (2011) and Goffe and Kauper (2014).

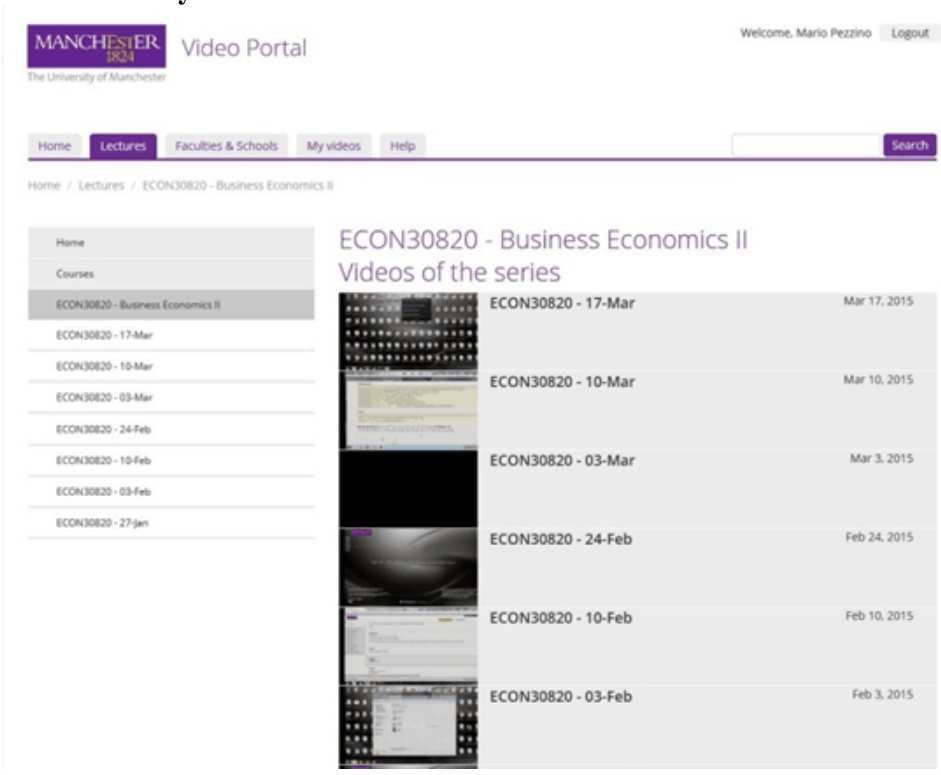
[6] See Manochehr (2006), Olczak (2014), Raymond et al. (2008).

2. Lecture recording

Lecture recording allows instructors to capture lectures as a media file that is then released online to students. The technology varies. Sometimes the system films the instructor and their presentation. The advantage of this is that it records a very realistic lecture experience.[1] On the other hand, the disadvantage is that the instructor is kept close to the podium and this may result in less engagement with the students in the room. Nevertheless, the technology continues to advance, for instance using cameras that follow the instructor's movements in the room.

Other systems, instead, capture only the slides of the presentation given in the lecture, together with the audio recorded using a microphone. While these recordings may tend to feel less personal and interactive, they may give the instructor more flexibility (a wireless microphone also gives more freedom of movement) and induce a more natural teaching experience since instructors do not need to worry about how they look on camera.

Figure 2: list of lecture recordings available for the Business Economics II students at the University of Manchester



Lecture recordings offer numerous potential advantages. Recordings may provide useful support to those students who have missed a lecture. Also, since videos can be paused, rewound and fast-forwarded, students can revise multiple times particularly challenging aspects of the material covered during lectures. Indeed, recordings can be useful for revision in general before an important piece of assessment.

In what follows we consider two questions. First, we discuss whether students value, and indeed use, recordings. Second, we discuss whether instructors value the use of recordings.

Do students use and value recordings?

In practice, there are important questions that each instructor should consider when releasing a lecture recording. For example, do students use recordings? When and how? What is students' willingness to pay for recordings? What are the effects that these media have on students' performance? These issues have been explored in the literature.

Agarwal and Day (1998) showed that various forms of internet enhancement to teaching (email, discussion boards, etc.) may have a positive effect on students' performance. Flores and Savage (2007) and Savage (2009) studied economics students' demand for recordings and the effect of recorded lectures on their performance. Specifically, Flores and Savage (2007) considered a type of recording that films the instructor and requires them to stay close to a podium. The authors used choice experiment data to estimate economics students' willingness to pay for recorded lecturers compared to instructor movement away from the podium. The analysis showed that groups of students have different willingness to pay for recordings. In particular, those who appreciate recordings were willing to pay an additional $90. The authors, in addition, found a positive correlation between the use of recordings and exam grades.

Savage (2009) studied the effects of the release of recordings on an intermediate microeconomics module and found a positive, but not significant, effect on students' performance. It is important to notice that Flores and Savage (2007) and Savage (2009) considered rather small sample sizes. A larger sample size was considered in Chen and Lin (2012). They studied the relationship between the use of recorded lectures and exam performance among 312 microeconomics students in Taiwan. They showed that particular groups of students are more inclined to use recordings. In particular, students who tend to skip most classes and male students are more likely to access recorded lectures. In general, most students tend to access the recordings just before exams. The authors showed also the existence of a significant and positive relationship between the use of recorded lectures and grades.

In general, when asked, students tend to report that they appreciate the opportunity to be offered lecture recordings, claiming that they are a valuable support to their learning and revision. Interestingly, students' claims reported in surveys may not correspond to the actual willingness to pay for a service. Taplin et al. (2011) estimate the willingness to pay of accounting (UG and PG) students for recordings. While students claimed to appreciate the resource, only a small number of them would actually be willing to pay for it. The authors also found out that

many students in reality did not access the recordings regularly. What Taplin et al. highlight is the need for a deep understanding of students' willingness to pay and their use of recordings.

Elliott and Neal (2016) used a revealed preference approach to answer these questions. The authors monitored for two years the frequency of access to recordings, the time of day and the length of viewing for students taking a large year 1 economics module. They identified spikes in access in the days before pieces of assessment were released. They also detected regularities in the use of the lecture recordings. Interestingly, the authors reported a significantly higher use (84% and 95% in each respective year) of the resources than previously reported in the literature.[2] The authors argued that lecture recordings are treated by students as a supplement to lectures rather than a perfect substitute. Finally, they mentioned how lecture recordings may provide invaluable support to students with special learning needs. Indeed, instructors should not forget that such students may welcome the opportunity to pause or go multiple times over a lecture.

Jones and Olczak (2016) studied the effect of lecture recording on the cohort of a large introductory economics module taught in a Business School.[3] They showed that students' performance in other modules and previous economics experience are the key determinants of performance. Lecture recording, nonetheless, tends to help counteract the lack of previous economics experience of some students.

Sometimes students may be asked to contribute to a lecture. In particular, they may be asked to present in front of the class. In this type of situation lecture recordings may become a powerful tool to improve students' confidence, communication and presentation skill.[4] Students would be able to watch the recording of their presentation and, accompanied by feedback from the instructor and the rest of the class, can learn and improve their communication skills.

Do instructors use and value recordings?

While evidence appears to point toward a general appreciation by students of the resource and a positive effect on their performance, instructors may sometimes be uncomfortable with lecture recording. In general, their reasons are that recordings may have a significant negative effect on students' attendance and instructors' performance may be affected by the awareness that they are being recorded. Regarding the first issue, evidence is inconclusive about whether release of recordings affects lecture attendance.[5] In addition, we would invite instructors to consider whether lecture attendance should be valued *per se*. In other words, is a reduction in lecture attendance necessarily a problem (especially when evidence seems to show that students' performance is nonetheless positively affected by the recordings)?

We see two considerations that need to be discussed. First, students will be inclined to attend lectures that provide some element of useful interaction. A lecture based on a one-way delivery of information would be completely captured by a recording and students would have no incentive to attend. For this reason, the use of technological innovation (some of which we shall discuss in this chapter) that allows instructors to better interact with students would prove to be an excellent ally to the instructor who values lecture attendance and interaction. Second, if the students almost exclusively learning from recordings are able to perform at least as well as those students who attend the lectures, this may imply that module assessment may need some re-thinking. In particular, assessment should be tailored in a way to favour critical thinking, discussion and communication skills. In other words, if students knew that they will be assessed on their critical understanding of the subject and lectures provided a platform for critical discussion and interaction, then students would be incentivised to attend lectures and recordings would be a very useful supplement, but not a substitute, to classroom teaching.

Instructors should also try to overcome the fear that their performance may be negatively affected by the awareness that their words and teaching are being recorded. Indeed, even if institutional lecture recording were not in place, nowadays students possess portable technology to record lectures. It is a fact that our teaching is already being recorded, even without our knowledge or consent. It would be, then, advisable if instructors embraced the fact and used the recordings as an opportunity to improve their delivery.

A final note on lecture recording. There may be some legal considerations that should be taken into account, especially when students present during lectures.[6] We advise instructors to seek advice from their institution's eLearning support.

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[1] See Flores and Savage (2007).

[2] See also Andrews et al. (2013).

[3] See also Davis et al. (2009), Al Nashash and Gunn (2013) and Woo et al. (2008) for similar contributions in engineering departments.

[4] See Smith and Sodano (2011).

[5] See Toppin (2011).

[6] https://www.jisc.ac.uk/guides/recording-lectures-legal-considerations

3. Digital media

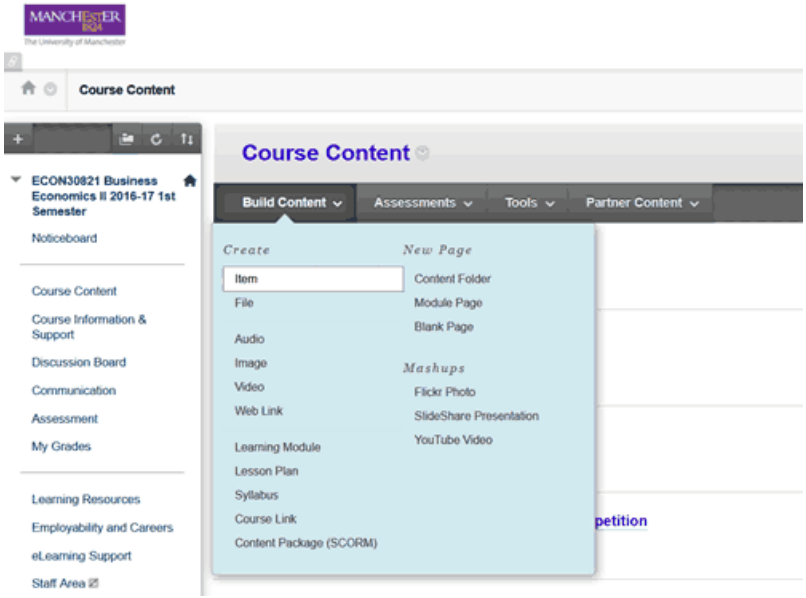
Nowadays, technology allows instructors to produce more effective and engaging digital media at ever lower cost. Instructors may decide to release digital media for various reasons. Ultimately, media can help students with understanding difficult concepts, they engage their attention and entertain, and, if used in a *flipped classroom*, free valuable lecture time for discussion and interaction.

Digital media and flipped classrooms

In a *flipped classroom* (see Lage et al. (2000), Yamarik (2007), Bishop and Verleger (2013) and Roach (2014)), students are expected to watch videos (or any other type of digital resource) before coming to class, replacing time that would be spent in a conventional lecture. Specifically, video can convey essential information that may be a prerequisite to a specific lecture, including dry and technical material such as the proof of a theorem, solutions to long exercises, etc. Particularly abstract or complicated concepts may be best conveyed using visual support (see for example Vazquez and Chiang (2014)) such as video and dynamic plots produced using mathematical software. This would free time during contact hours to test students' understanding and to discuss more advanced and engaging material, including real life examples and applications.

Before providing a critical description of types of media that can be used, we offer a general caveat. It is important to make sure that students understand when and why they are expected to access particular media. They have to know what they are required to do and what role the media play toward their learning. In other words, instructors need to make sure that media that are deemed essential for the learning of students are clearly indicated (for example with the description accompanying the link on the learning environment). In addition, students need to be told when and why they are expected to access the media. Flooding lectures and virtual learning environments with digital media without providing guidance would be confusing and counterproductive.

Figure 3: example of media available in the virtual learning environment Blackboard



In what follows we discuss the advantages and disadvantages of various types of digital media that could be produced and released to students.

Audio files

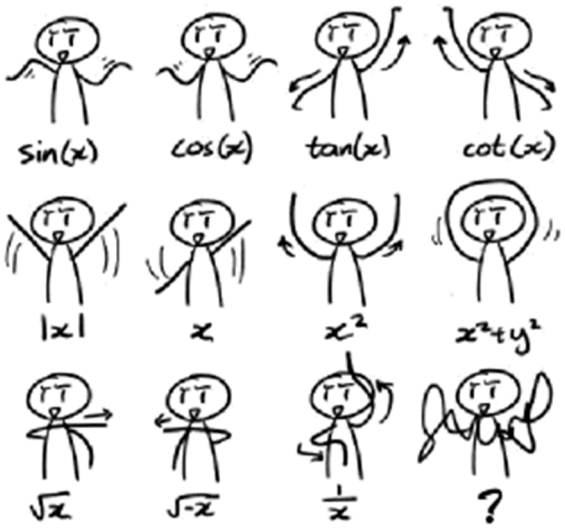
The advantage of audio files (for example MP3) is that they are easy and cheap to create and they can be easily accessed by students.[1] For example, standard mobile phones would allow instructors to create audio files and students to play them in environments where other forms are learning are not feasible, such as while running or at the gym). Audio files can provide an introductory description of a lecture or a topic, or personalised feedback on the work submitted by students[2]. It is important to keep in mind the possibility that students with hearing disabilities may be part of the cohort. In this case, instructors should make sure to provide the same information contained in the audio files using a visual medium. Disability support colleagues can advise on alternatives.

Visual material

Learning via visual experience tends to be effective and long-lasting.[3] Visual media can provide accessible, immediate and sometimes interactive information. Photos, diagrams, graphs can be easily created[4], outsourced[5] and shared with students, whether as part of a lecture presentation or linked in their own right. To be most effective, visual media should be effectively labelled and properly integrated in the presentation (for example adequately introduced and accompanied by text/audio description).

Pictures with humorous content, sensitively chosen, can entertain and engage in an otherwise long and technical section of a lecture.

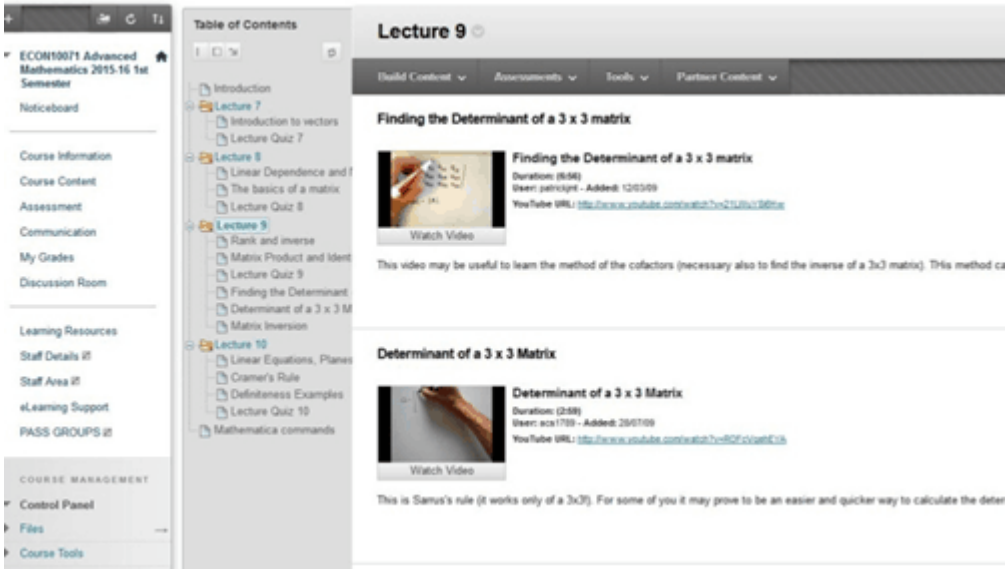
Figure 4: a humorous description of elementary functions according to the "maths dance"



Videos

As well as images and audio files, economics-related videos are increasingly available online to instructors and students. Online videos on statistics and mathematics are provided via, respectively, the DeSTRESS[6] and Metal[7] projects. Videos from public sources (for example YouTube) can be embedded in virtual learning environments and support the other course material, by illustrating an aspect of it or by providing an alternative mode of explanation.

Figure 5: examples of Youtube videos uploaded on Blackboard for the Advanced Mathematics students at the University of Manchester.



In addition, videos can stimulate discussion, if played in suitably equipped lecture rooms. It is advisable that, before playing a video during lectures, instructors

provide some preliminary information to students, for example asking them to consider specific issues that will be then discussed after the end of the video.

It is well-known that the attention span of individuals is significantly less than the one hour of a standard lecture. A video can break up the monotony and re-engage students.

Economics in popular culture

There is an increasing number of sources providing videos that convey economics concepts via the medium of popular culture. For example, Dirk Mateer's site provides a large number of economics-related videos making use of pop culture examples. A list of "distractions" (including films, video clips and songs) for economics students and instructor is also available on the StudyingEconomics.ac.uk site. There are also sites that present economics concepts using clips from popular TV series. See, for example, The Economics of Seinfeld, Economics of "The Office" or, more recently, Bazinganomics which provides clips from the popular show "The Big Bang Theory" where economics/mathematics concepts are mentioned or hinted at.

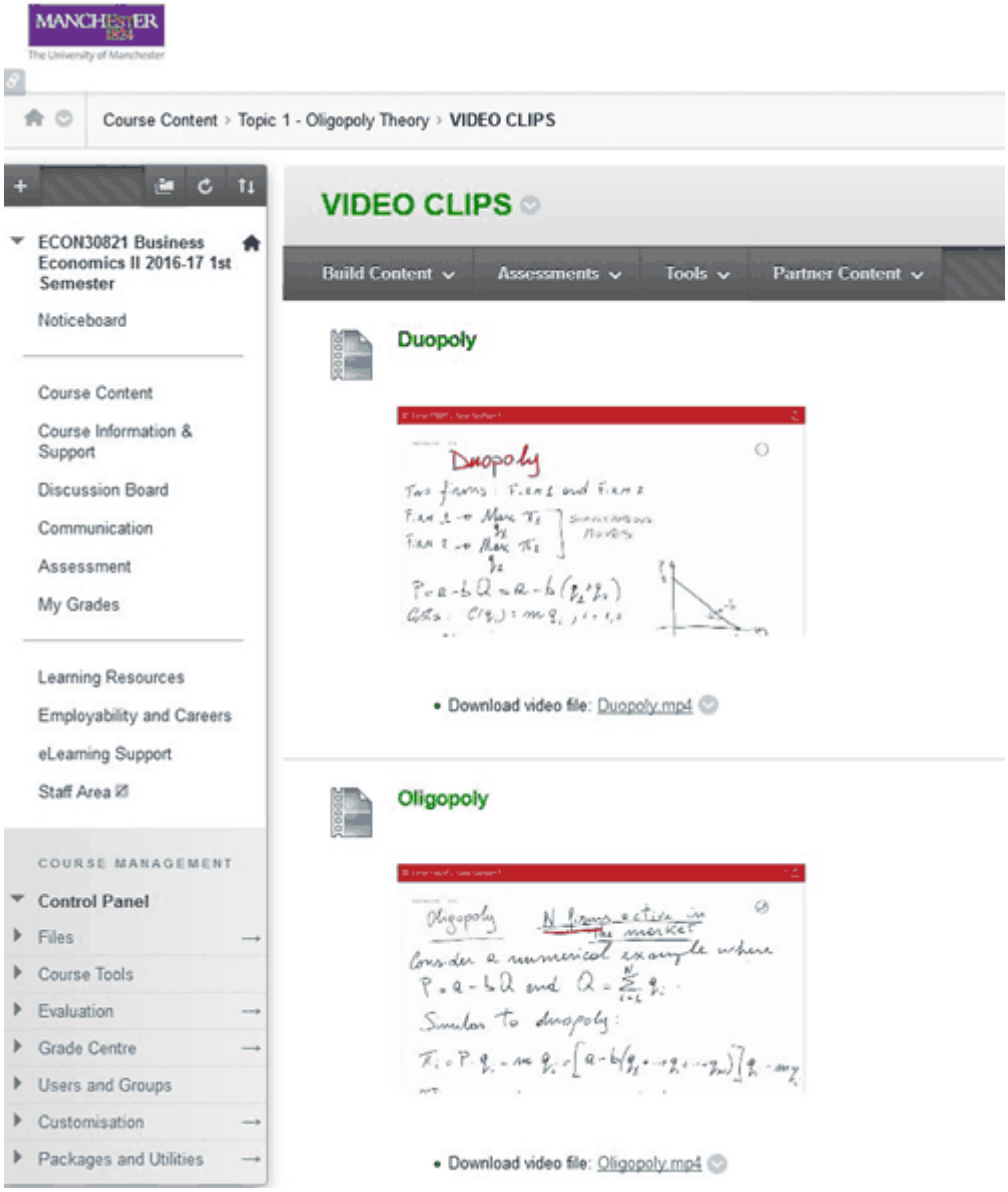
Figure 6: the homepage of Bazinganomics.

With these and similar sources, there is a potential to find a clip that lightens the tone and re-engages students (if that is needed) while still connecting to the content of the lecture.

Homemade videos

Instructors do not need necessarily to outsource videos. Advancements in hardware (for example the increasing affordability of tablets provided with a stylus pen) and software[8] allow instructors to create their own videos, populate their own YouTube channels and, ultimately, provide material that students can access online or download. For example, preliminary introductions to a topic, proofs of theorems, or solutions to exercises can be all captured in a video for students to watch before the lecture. As well as providing helpful support to students that complements the lecture, videos also free up contact time for interaction and discussion of more advanced and engaging material, including real-world applications.

Figure 7: Videos on oligopoly theory, created with Camtasia software, available in Blackboard to Business Economics II students at the University of Manchester.



With modern smartphones and tablet devices having quite sophisticated cameras and editing software, students are in a position to produce their own audio and video material. Instructors should consider challenging student groups to create their own material applying economic concepts.[9] This involves students in collaboration, subject knowledge and information skills as well as employable communication skills. We shall discuss student-made media in some detail in Section 6.

Figure 8: Recording and editing a video clip with Camtasia software

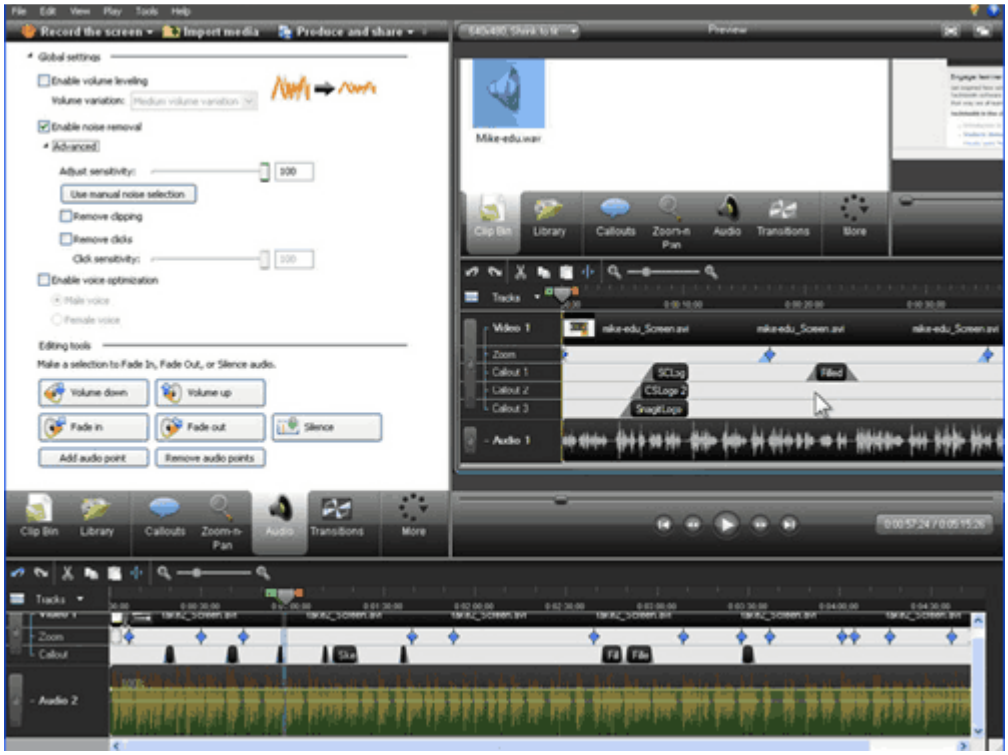
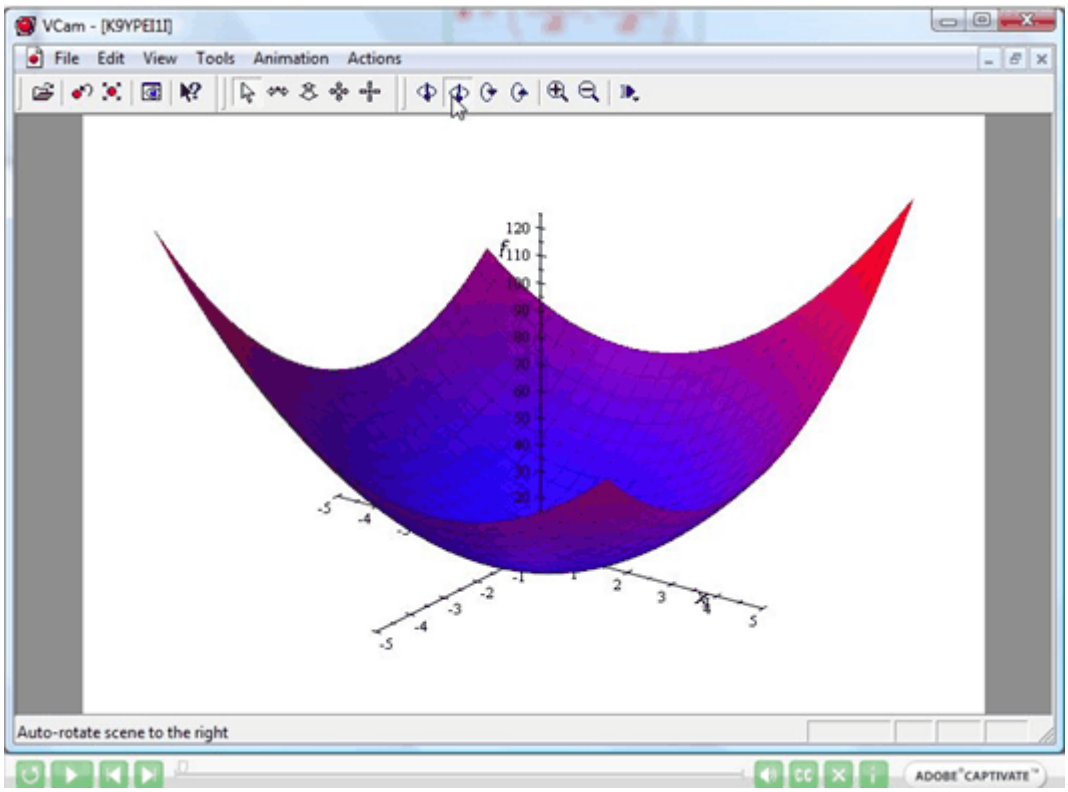


Figure 9: a flash video embedded in lecture slides for Advanced Maths students at the University of Manchester.



[1] Text-to-speech tools help instructors to turn digital text into audio files. Text-to-speech tools can be found in Microsoft Office and Acrobat Reader and plugins are available in popular internet browsers such as Google Chrome and Mozilla Firefox.

[2] Online assessment tools, such as TurnitIn (see Stephenson and Cortinhas (2013)) and the assignment tool in the virtual learning environment Blackboard allows instructors to record audio feedback for students.

[3] This pedagogical approach has been adopted by the Montessori method of teaching mathematics to primary school children. Interestingly, algebraic and geometric concepts and procedures (for example how to calculate the cube of a binomial) can be easily and effectively be taught to students using visual objects like the Montessori binomial cube. See also Vazquez and Chiang (2014).

[4] Graphs and diagrams can be created with the Microsoft Office package (or similar open source alternatives). More advanced (for example 3D plots) can be created with mathematical software such as Mathematica or Maple. Pezzino (2016) discusses the use of dynamic plots created with the software Mathematica to teach economics concepts such strategic interaction in oligopoly models.

[5] Alternatively, copyright-cleared images are easy to source from a range of collections including Pixabay, Flickr CC and Wikimedia Commons.

[6] http://www.economicsnetwork.ac.uk/statistics

[7] http://www.metalproject.co.uk/

[8] Screencast-o-matic, TinyTake or Jing are examples of screen capture software that allows instructors to add audio (such as music or their voice) to the capture of their computer screen and produce video files. Latest versions of Microsoft PowerPoint have a screen recording tool under the Insert options. Features such as video editing and online sharing in Youtube channels are also provided in applications such as Camtasia.

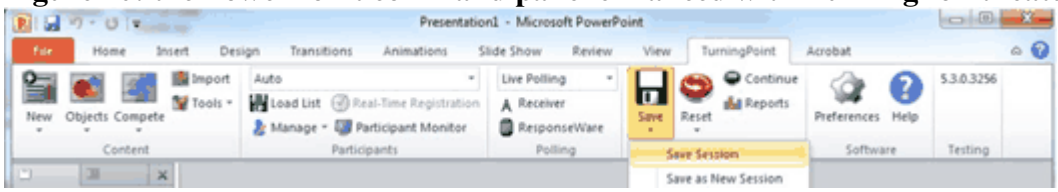
[9] Getting students to produce audio/visual material to be used and reviewed by their peers is in the same spirit as using wikis to create text-based material (see Stephenson and Cortinhas (2013)).

4. Personal response systems (“clickers”)

We have mentioned above the importance for students of interaction during lectures. Interaction is essential to engage and motivate students and, ultimately, to incentivize them to attend classes, especially if lecture recordings are available online.[1] Of course, interaction is not always easy, especially in larger classes. One way to interact with the class involves posing (multiple/discrete choice) questions which students answer by raising their hands or, for more variety of response, coloured cards. While commendable, this approach has at least two drawbacks. First, students' answers are not anonymous and this may affect responses. Second, it is not always easy to extract and record information from a sea of raised hands.

Fortunately, technological advancements include personal response systems that anonymously collect and record the answers of students. A popular system is TurningPoint.[2] Specifically, instructors can embed MCQs in Microsoft PowerPoint presentations which students answer using remote controls (“clickers”) that have been distributed at the beginning of the lecture. These are wirelessly connected to a USB dongle on the lecture theatre PC. The advantages of clickers have been reported by various contributions in the literature. Laurillard (2013) discusses the role that questions, rather than answers, may play in encouraging understanding. Draper and Brown (2004) and Bruff (2009) stress the benefits to students' learning of giving them a more active role.

Figure 10: the PowerPoint command panel enhanced with TurningPoint features.



The software records the answers and produces reports that can be shown and discussed with the class.

Figure 11: the new QT2 handset (on the left) and a smart phone (on the right) showing the result of a poll.

Personal response systems are particularly useful when teaching large classes. Carrying, distributing and collecting a large number of (expensive) clickers may be, however, a little discouraging for many. Recently it has been noted (see Middleditch and Moindrot (2015b)) that an increasing number of students have portable devices (smartphones, tablets and laptops) with internet access during lectures. Recent software developments[3] take advantage of students' own hardware and make the use of clickers unnecessary. Essentially, students are given a web link through which they can provide answers online.

Figure 12: TurningPoint/Responseware on multiple devices.

Personal response systems can enhance a lecture in a variety of ways.[4] Of course, questions are ideal to make the lecture more engaging and interactive.[5] Instructors can ask a question at the beginning to introduce a topic, store the answers provided by students, and then ask the question again at the end of the class to see changes in students' understanding. Questions can be released at the end of a lecture or topic to recap or test students' understanding. Thanks to their anonymity, and new systems that allow free-text input, personal response systems can also collect more varied information from students, including feedback on the lecture.

Peer Instruction

A very interesting way to employ a personal response system is *peer instruction* (see Crouch and Mazur (2001)). Peer instruction uses structured questioning and small group discussion tasks. This approach has the potential to engage students through discussion. Employing peer instruction, Middleditch and Moindrot (2015b) discuss how personal response systems can facilitate interaction among students during a lecture. Students may be asked to discuss and motivate their answers with peers. The instructors then reiterate the questions and discuss with the class any change in the distribution of answers.

If carefully planned and adequately managed,[6] personal response systems allow instructors to engage students while providing them with useful information, practice and interaction. Well-chosen questions can enhance the lecture material, giving students another level of involvement and giving the lecturer useful feedback. In section 6 we shall discuss how instructors can also use social media to interact with students.

Student surveys report a positive evaluation of the use of clickers. Elliott (2003), in particular, describes a very positive experience related to the use of clickers in an

intermediate microeconomics module. Similarly, Middleditch and Moindrot (2015a) point out an increasing use of student-owned devices to access the personal response system and a consistent positive effect in student satisfaction in (year 1 and year 2) macroeconomics modules.

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[1] See Simpson and Oliver (2007).

[2] https://www.turningtechnologies.com

[3] There are various platforms in the market that provide solutions that allow students to submit answers using their smartphones/tablets. Among others, instructors can consider Responseware, Socrative and PollEverywhere.

[4] For a collection of case studies see: https://www.turningtechnologies.com/case-studies

[5] See Broussard (2012), Freeman et al. (2007) and Koenig (2010).

[6] Draper and Brown (2004) suggest that spending time carefully developing effective questions is essential to maximise the benefits of a personal response system.

5. Online assessment and the use of media

Online assessment is very common in economics modules. Its key advantage, especially for large classes, is immediate feedback to the students. Moreover, online practice with objective-answer questions, can be very useful for students to reinforce their understanding and can be used by instructors as formative and summative assessment. Indeed, many textbooks provide companion websites that supply supplementary material including assessment based on multiple choice quizzes.[1]

Popular learning environments provided by publishers include Pearson's MyEconLab (and new arrival Revel), McGraw Hill's Connect, Cengage's Aplia and Wiley's Wiley Plus. Virtual learning environments, such as Blackboard and Moodle, allow instructors to construct assignments from multiple choice, true/false, fill-the-blanks, and other types of questions. In addition, questions can embed figures, diagrams and audio or video clips.

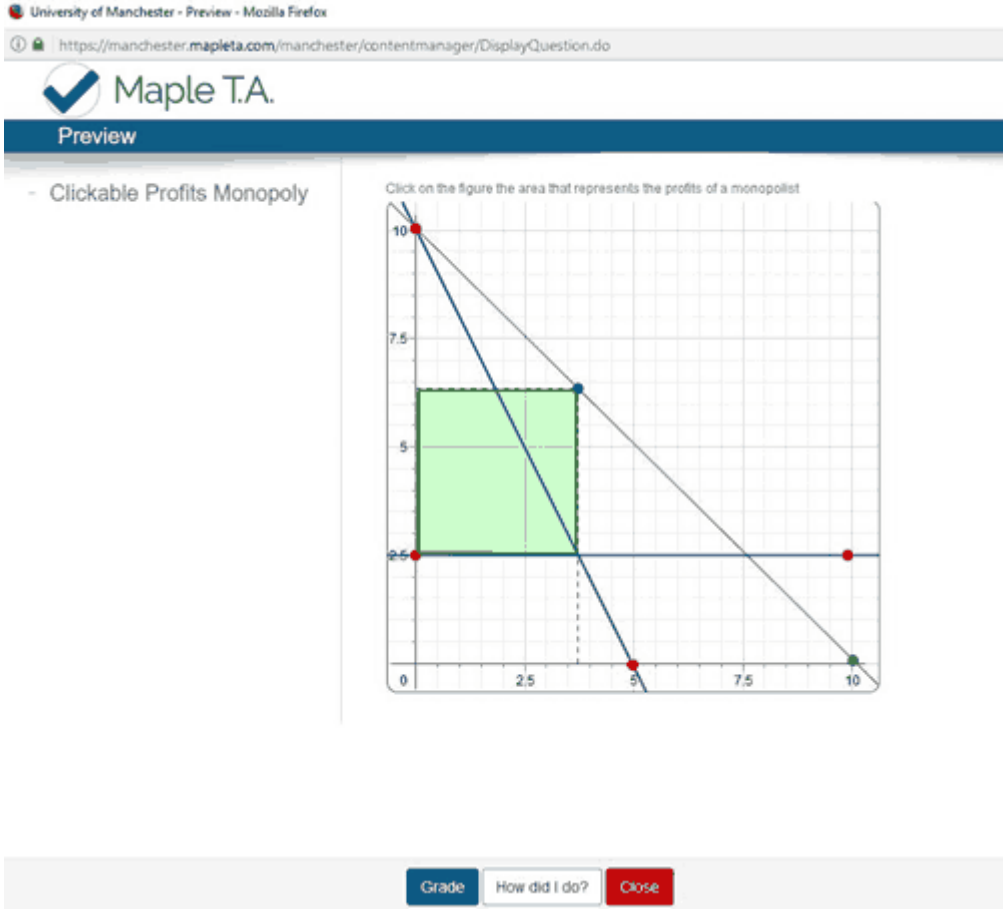
Standard online assignments have drawbacks, however. Questions and feedback tend to be standardized. Especially with MCQs, students are not incentivised to understand the material in its entirety, but only have to identify (often by a process of sequential elimination) the answer most likely to be correct.

There are two recent developments that could allow instructors to move away from standard and repetitive MCQs. The first is the use of more interactive visual material, such as clickable images and interactive diagrams. The second is the possibility for questions to *adapt* to students' performance; for example, questions that, if answered incorrectly, provide additional questions and hints to help the student towards a correct answer. The platform MapleTA,[2] built around the mathematical software Maple, supports the creation of algorithmic questions and analytic manipulation.[3] It can also create adaptive questions and clickable diagrams. A very important advantage of MapleTA is full integration with virtual learning environments such as Blackboard. This means that taking an assignment does not require logging in to a different site.

Clickable images / Sketch-the-graph questions

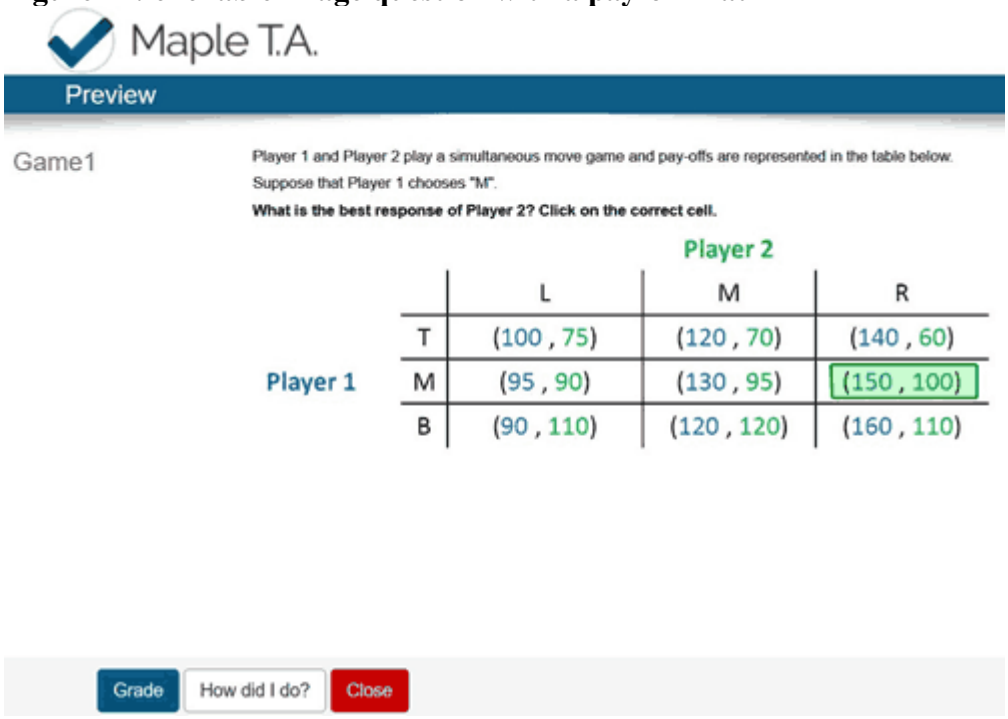
MapleTA allows instructors to create questions that show a visual item (for example a diagram, a figure, even a table with data) where students are asked to identify a particular portion and click on it. Figure 13 shows a question asking students to identify the area of the graph representing the profit of a monopolist. The advantage of this type of question is that students interact directly with the figure, instead of picking the most likely alternative among a set of possible answers.

Figure 13: example of clickable question in MapleTA



The visual content does not have to be a diagram. Figure 14 below shows a question asking students to study the payoff matrix of a very simple 2x2 simultaneous move game and identify a player's best response. Again, students will have to understand and interact with the whole payoff matrix, not just a subset as is often the case with MCQs.

Figure 14: clickable image question with a pay-off matrix



Ideally, instructors may want students to be able to reproduce diagrams.
The *sketch-the-graph* question type requires students to use MapleTA's graphic toolbox to draw a diagram. Figure 15 shows a question asking students to draw the demand function and profit maximisation choice from figure 13.

Figure 15: an example of "sketch the graph" question in MapleTA

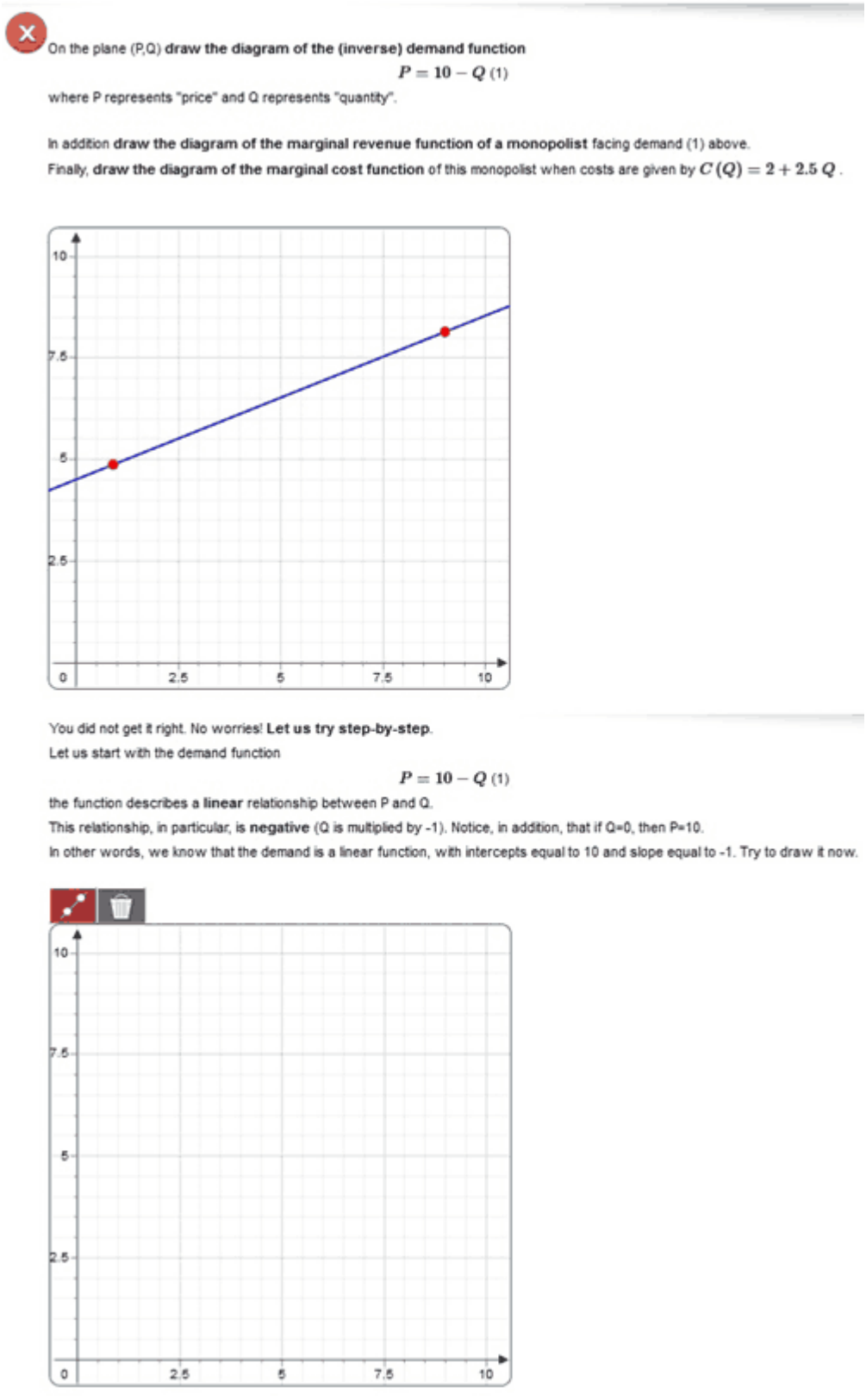
Adaptive questions

In a standard multiple choice question, a wrong answer gets no mark (or negative marks) and, possibly, feedback including the correct answer. This may be a little frustrating and disheartening to some students, in particular to those who have a general understanding of the material. Ideally, instructors would give students a combination of encouragement ("You did not get it right. It's OK, let's approach the question step-by-step"), technical information (for example "recall the concept of...") and questions (not necessarily multiple choice) to test their effective understanding. The student would thus learn to identify important concepts and apply them correctly. Eventually, the student should be awarded at least a partial mark. This is what any instructor would do in one-to-one or small group teaching.

This personalised approach cannot be replicated with standard online assignments. Fortunately, MapleTA allows adaptive online questions that do precisely what we are suggesting. Students can be prompted with an additional, and related, sub-question if they get the main question wrong. This way, instructors can guide students step by step and support them in finding alternative ways to answer the original question. If carefully designed, essentially every question in MapleTA can be adaptive and combine various question types.

Figure 16 shows an adaptive version of the graphical question from Figure 15 above.

Figure 16: adaptive question in MapleTA



[1] Olczak (2014) identifies a positive effect of publishers' web-based resources on student learning.

[2] http://www.maplesoft.com/products/mapleta/index_personas.aspx

[3] These features should be particularly welcome by those instructors teaching modules with mathematical content. The fact that MapleTA can process algebraic expressions implies that expressions $2a+b$ and $b+2a$ are considered to be equal. This would not be true in assignments created within standard virtual learning environments. In addition, MapleTA allows instructors to access all Maple packages and use algorithms to create randomised mathematical objects such as variables, equations, matrices, etc.

6. Social media and facilitating contributions from students

Instructors are increasingly complementing their teaching resources with student input and collaboration using social media including virtual learning environments.[1] The advantage is that students can collaborate informally using their own portable devices. The advantage of social media inside and outside the classroom has been highlighted and described in Junco et al. (2011) and (2013).[2] Specifically, these contributions (using a control group) show that students exposed to social media became more engaged and performed better. The authors observed a positive effect of social media on the degree of collaboration among students. Figure 17 shows examples of tweets posted on a UG Macroeconomic Tweeter page as described in Middleditch and Moindrot (2015b).

Figure 17: the use of Twitter in a intermediate macroeconomics module as described in Middleditch and Moindrot (2015b).

Enhanced collaboration among students is especially advantageous in a large module. Students may answer some of the questions posted by other students and contribute to the discussion. This should reduce the volume of queries to the teaching staff.

In this respect, social media can build a role for students as creators of resources. This role offers positive effects on their understanding of the subject and their communication and transferable skills.[3] Bahrani et al. (2016), for example, describe their experience introducing "Econ-selfies", photos where students are asked to highlight the intuition behind an economic concept. The interesting part of the practice is to motivate students to think in economics terms using a medium—the *selfie*—that they are very well-versed to produce and share. In the same spirit, Spielmann and Chaudhury (2016) describe the possibility of asking students to make an "economics movie".[4] When students are assessed on the production

of a media file describing an example or an application of an economics concept, they are induced to think of the concept in very real terms.

An important message here is that it does not necessarily have to be the instructor who is the producer and distributor of media content. Students can be producers as well as consumers of these media.[5] In this sense, there are various benefits available. Instructors can obtain inspiration and ideas from students' work; students can access media made by other students, who presumably may have a closer sensitivity and connection to the topic and, commenting or sharing the material can make the process of learning more collaborative.

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[1] See the student guide to social media for learning, created by the university libraries of Leeds, York and Manchester available at https://www.escholar.manchester.ac.uk/learning-objects/social-media-guide/.

[2] Some contributions in the literature are, however, more cautious in attributing advantages to social media. In particular, these contributions stress Kassens-Noor (2012) and Graham (2014), the importance of carefully implementing the use of social media (including considering the use of incentives to guide students' behaviour) in a module and the possibility that social media may be a distracting force especially in those modules where student self-refection may be particularly important.

[3] See https://www.jisc.ac.uk/guides/enhancing-the-digital-student-experience/empower-students-to-develop-their-digital-environment.

[4] See the recent RES video competition.

[5] The same idea is behind the use of wikis, i.e. collaborative texts on economics topics created by students under the guidance and supervision of the instructor. See Stephenson and Cortinhas (2013).

7. Conclusions

The aim of this chapter has been to provide a guide to some of the most popular forms of technological innovation in higher education teaching, with a particular focus on economics teaching. We have stressed that students tend to have preferences over the use of technology in education and it is important that instructors take these preferences into consideration when innovating in their teaching. Indeed, if technological innovation is carefully planned and implemented, it can help educators meet students' needs and improve their learning experience.

What students really want

In the introduction we described the insights regarding what students really want when concerned with the use of technology in higher education provided by the submissions to a Jisc competition. How do the innovation practices described in this chapter match students' needs?

Personalised learning.

Students expressed a desire for more personalised teaching. Identifying and producing digital resources (for example audio and video files) and releasing them for students to access when required can improve the learning experience. Adopting video capture, students can access the information provided during lecture at their own pace and when most convenient. In addition, the use of online assignment (possibly enhanced with adaptive features) and personal response systems allows instructors to tailor assessment and practice and revision to the particular needs of each student.

Networking

Students expressed a need to access platforms to communicate and share information with other students. We explained that personal response systems and social media allow students to interact with the instructors and with the rest of the class. Similarly, when students are asked to access online video posted by instructors, they may be allowed to post comments and initiate a debate. We also stressed that students should be invited, when possible, to contribute to discussions and production of digital resources.

We have critically discussed some of the most common forms of technological applications in higher education. In particular we have identified the advantages and disadvantages of various practices and highlighted the importance of assessing the pedagogical benefits and costs.

An important message that this chapter has put forward is that students should be at the centre of the teaching innovation process. They are the end users of the outputs of technological innovation in learning. It is essential that instructors acquire a good understanding of students' needs and, at the same time, consider ways to allow students to contribute to the development of teaching practices and digital resources that could benefit peers and future cohorts.

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Assessment and Feedback

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Contents

1. Introduction

1.1 Background

It is difficult to overestimate the impact assessment has on learning. For the majority of students it determines (a) the topics on the syllabus they choose to study (b) how much time they spend studying them and (c) how they go about studying them. For example, do they simply try to memorise the course content or do they attempt to understand the material? Unfortunately, tutors tend to spend most of their time thinking about module content and delivery i.e. how to run large and small group teaching. Assessment considerations tend to be something of an afterthought. One possible cause of this bias is that academics are not representative of their classes: they are much more intrinsically motivated in the subject than the majority of people they teach.

Given its importance, it is worrying that evidence from the National Student Survey suggests that students are less satisfied with assessment and feedback than any other aspect of their educational experience in higher education. For example, in 2018, 86 per cent of economics students agreed that 'staff are good at explaining things'. This figure falls to 66 per cent for those who agreed that 'I have received helpful comments on my work'.

One reason for this poor experience is clearly increasing student numbers. Many institutions have been able to exploit economies of scale in delivery by simply increasing class sizes i.e. by spreading fixed and 'lumpy' costs. Evidence from the NSS suggests that most universities have done this whilst maintaining student satisfaction with the quality of teaching. Assessment and feedback, however, has a higher proportion of variable costs. The resources required to grade and provide traditional written feedback tend to increase proportionally with the number of students on the module.

There is also less innovation in assessment than teaching. This is probably because of the greater perceived risk. Tutors are more likely to trial different methods of delivery as, if they are unproductive, it only affects one or a small number of classes. However, if new and different types of assessment prove ineffective or detrimental to student performance, the potential impact is much greater and longer lasting.

1.2 The objectives and purpose of assessment

Assessment is complex and has a number of competing objectives. These include:

a. *Promoting/supporting learning*: Assessment design should support and encourage effective and deep learning. This is often referred to as 'assessment **for** learning'

b. *Measurement*: Another purpose of assessment is to measure (a) what students have learnt on the module/course and (b) the level/depth of this understanding. It judges the extent to which students have achieved the learning outcomes for the module and programme. This is often referred to as 'assessment **of** learning'.
c. *Providing feedback for tutors*: Assessment performance helps tutors to evaluate the effectiveness of their own teaching. A relatively low distribution of final grades and/or poor feedback comments on student questionnaires should trigger some reflection by the module leader.
d. *Identifying students*: Assessment performance can help to identify those students who are struggling to meet learning outcomes and may need extra support and guidance.

Module leaders need to keep these objectives in mind when thinking about assessment. They also need to take into account the manageability of the process. The two most important costs for a tutor are the time it takes to (a) write assessment questions, and (b) grade and provide feedback.

Section 2 of this handbook chapter focuses on assessment for learning in more detail while section 3 examines some implications of assessment design within a module i.e. the number/ structure of coursework and type of examination. Section 4 considers the implications of using different types of assessment question and, given their popularity, discusses the use of multiple-choice questions in some detail. It also includes cases studies that outline some alternative types of assessment. Section 5 concentrates on methods of feedback – the area of assessment where students express the least satisfaction with their experience in higher education.

Section 6 of the handbook focuses on two important issues when considering the measurement function of assessment – validity and reliability. The validity of an assessment is the extent to which it measures what it purports to measure, i.e. students' understanding of module content. For example, the extent to which guesswork as opposed to knowledge can influence grades. The reliability of an assessment is the extent to which grading is consistent both between different assessors (inter-marker reliability) and by the same assessor (intra-marker reliability). The chapter provides some tips on how to improve both reliability and validity, but recognises the trade-offs that exist.

2. Assessment for learning

One of the key functions of assessment is to facilitate, motivate and support learning – assessment for learning. Assessment can support learning in two important ways.

Firstly, there is the process of completing the work i.e. the research, reading, writing and revision. Therefore, both the design within a module (the number of coursework vs exam) and the type of question (fixed vs open response) play a key role in promoting and determining the level/depth of learning.

Secondly, there is the communication between marker and student about the quality of work both during and after its completion. This includes (a) information on strengths and weaknesses and (b) advice on how to improve performance in the future. For feedback to be effective, students must act upon it.

Section three of this chapter discusses some of the implications of assessment design within a module while section four discusses different styles of question and types of assessment. Section five discusses feedback in more detail.

2.1 The importance of assessment

It is difficult to overestimate how important coursework, tests and exams are in the learning process. Some widely cited studies from the 1970s concluded that assessment was by far the most important factor that determined students' study time. Snyder (1971) found that students differentiated between the actual curriculum and the hidden curriculum i.e. what they needed to know to perform well in graded work. Miller and Parlett (1974) coined the term 'cue seekers' to describe those students who go to great lengths to find out the best way to answer a question or what topics they need to learn for the examination. More recently, Thomas, Hockings, Ottaway and Jones (2015) found that the number of non-contact study hours depends on the perceived assessment demand of the modules. Chevalier, Dolton and Lurrman (2017) carried out an interesting study on a large first year Principles of Economics module that uses on-line quizzes to promote continuous learning. The authors found that making the quizzes count towards the final grade increases the participation rate by 42 – 62 percentage points.

Evidence and experience indicates that the majority of students concentrate on tasks where they see the most direct and obvious impact of their actions on their marks/grades i.e. a clear line of sight. The tendency to ignore non-graded tasks may also increase with experience e.g. final year undergraduates focus more on graded work than students in the first year of the course.

Therefore, assessment is very important as it potentially has a bigger impact on learning than the actual teaching on a module. Gibbs and Simpson (2004) argue that assessments should encourage:

- *An appropriate amount of study time*. The perceived demands of the assessment should incentivise students to exert enough effort so they can develop a deep understanding of the material.
- *A relatively even distribution of study time throughout the duration of the module*. Students will develop a deeper understanding of the material if they work consistently as opposed to a few hours or days of intensive study just before a coursework deadline or examination. Unfortunately, a combination of much larger student numbers and resource constraints make it very difficult for tutors to mark regular problem sheets, essays or other types of homework.
- *Study time on high-quality learning activities*. It is important that students do not perceive memorising and rote learning as effective ways to achieve high grades.

3. Assessment design to promote learning

How can different assessment design within a module help to address the conditions identified by Gibbs and Simpson (2004)? What are the advantages and limitations of the traditional closed book examination and what alternatives are available? How many pieces of coursework in a module are both desirable and feasible? This section of the handbook discusses these issues in more detail.

3.1 Traditional closed-book examinations

Traditional closed book examinations are by far the most widely used and heavily weighted assessment component on the majority of economics modules. It is difficult to set a time-constrained exam where students have to answer questions that test their understanding of the entire module content. Typically, questions only cover a subset of the curriculum so both the level and specificity of any guidance is an important factor.

If the lecturer provides very little advice about the topics the exam paper will cover, then ignoring any of the course content is a risky strategy for students. The fear of not learning an examined topic could incentivise risk averse students to work harder and more consistently throughout the module.

However, students' perceptions of the demands of the exam might not align with that of the tutor. They may believe it is possible to predict exam questions and so spend large amounts of time acting strategically[1] rather than focussing their efforts on mastery of the module content. This approach may also reduce the validity of assessment, as grades partly depend on luck.

If tutors provide more guidance, students may learn some topics in greater depth and gain a deeper understanding. However, there is a danger it reduces the perceived demands of the assessment, leads to lower effort levels and results in more inconsistent patterns of studying with students completely ignoring some topics. Some educational researchers also argue that traditional exams promote low quality learning activities such as attempts to memorise material and are a poor predictor of long-term learning and understanding of course content.

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[1] This includes continual visits by some students in staff office hours with questions designed to reveal information about what is on the exam rather than about the understanding of module content.

3.2 Some alternative types of examinations

There are a number of innovative alternatives to the standard closed book examination.

Open Book Examinations

Open book examinations vary by the amount of material the assessor permits students to take into the exam room. In some cases, there are no limits. The students are free to take whatever materials they wish into the room. In other open book exams, the assessor places certain restrictions. Some examples include specified papers, books and limits on the quantity of notes i.e. one A4 sheet of notes.

One advantage with using this type of format is that it gives students more time to demonstrate higher order thinking skills as opposed to simple recall of basic information. It may also effectively signal that deeper learning is required to achieve high grades.

One potential disadvantage is the possibility it leads to less revision and exam preparation as some students overestimate how much they can effectively utilise books and notes in the exam.

Open Examinations

There are two broad categories of open examination.

a. The assessor gives students a task to complete in a much shorter time-period than coursework i.e. overnight or within a couple of days.
b. The assessor gives the student the assessment topic/questions and/or specific material (i.e. a case study/journal articles) to read and research before the exam. After a period for research/revision, students have to answer questions under normal exam conditions. If tutors provide detailed guidance for a closed book examination, there is a danger it effectively becomes this type of open examination but with lower expectations.

Open examinations can be useful if it is difficult to assess the module's learning outcomes in time-constrained conditions. For example, the ability to synthesise information from a wide range of academic sources. It is very important to communicate the length of time you expect students to spend on the preparation activities.

Case study 3.2.1: An example of an open examination

The tutor gave the following assessment instructions to students on an MSc Microeconomics module.

Select any firm of your choice. Discuss the microeconomic factors that you think impact on the firm's decision-making. Highlight any challenges the firm currently faces and how microeconomics helps us understand these challenges and possible strategies the firm could adopt to overcome them.

You must include relevant diagrams and/or mathematics in your answer. You cannot bring any notes or texts to the exam. However, if you have collected firm and industry relevant data in the form of tables or plots, these can be brought to the exam, discussed and submitted along with your test answer.

This format aimed to achieve a number of objectives. First, students needed to demonstrate a good understanding of the technical content of the module. Second, they had to ask themselves, on a weekly basis, how the material they were learning could provide insights into real firms and consumers' decision-making. Finally, they had the challenge of drawing together information on factors such as market share, pricing strategies and profitability whilst using microeconomic theory to provide insights.

Students were encouraged to show the tutor some of the materials they were planning to use to check they were suitable/appropriate. They were also advised to select a firm not being analysed by fellow students. This meant they could work collaboratively with their peers while confident that their exam answers would be very different from one another.

A number of exam scripts contained very high quality work i.e. demonstrating technical knowledge while producing detailed background research into a selected firm.

3.3 Coursework

Modules typically have one or two pieces of graded coursework to keep marking loads at a manageable level. One limitation with this approach is that students only study content they perceive as relevant for the assessments. It can also result in very inconsistent patterns of learning as studying in non-contact time takes place in short intensive bursts i.e. in the weeks/day prior to the submission deadlines.

To incentivise students to work more consistently, some type of continuous assessment is usually required. How is this possible on modules with large student numbers without creating an unmanageable marking load? There are a number of possibilities.

The module requires the submission of numerous assessments that are marked/graded by software rather than the tutors.

This approach is increasingly popular, with lecturers creating a series of multiple-choice tests/quizzes using on-line products such as MyLab Economics or Aplia. The students typically complete the tests outside the classroom and the software automatically grades the assessment and provides feedback. The use of on-line products creates two key issues. Firstly, who pays the cost of the license? The tutor will typically have to convince their department/school or faculty to finance the cost of any licenses as it is difficult to insist that students pay. Secondly, how do you limit the potential for cheating? Many on-line products have features to deter copying. These include:

- The use of pooling. With pooling, the tutor creates different versions (i.e. a pool) of each multiple-choice question i.e. typically five to ten alternatives. It is easy to find a number of similar questions in the various banks of questions. The software randomly selects each question from the pool so it is highly unlikely that any two students will get the same questions on the test. Some care needs to be taken to make sure the difficulty of each question in a given pool is similar.
- Randomising the order in which the questions appear on the test.
- Randomising the order of the answer options to any given multiple choice question
- Setting time limits for completion of the test. Once the student begins the on-line test, they have certain amount of time to complete the questions i.e. 30 minutes.
- The release of grades/feedback after the deadline.

Some recent research indicates that this type of approach can have a positive impact on learning. Chevalier, Dolton and Luhrmann (2017) find that graded quizzes increases the examination performance of economics students by 0.27 of a standard deviation. There is also no evidence of any displacement effects i.e. grades and pass rates in other modules are not negatively affected. However, a potential drawback is that it may encourage low quality activities i.e. those that generate surface learning. There is evidence that students believe that rote learning and memorising course content are effective strategies to perform well in multiple-choice tests (Scouler, 1998). This focus on rote learning might also crowd out other higher quality learning activities that lead to a deeper understanding of the material.

Some tutors also question the extent to which automated on-line tests can measure high order skills of analysis, synthesis and evaluation. Section 4.1 of the handbook discusses the use of multiple-choice tests in more detail.

The module requires the submission of a number of assessments that tutors grade in a relatively low cost manner

The following case briefly outlines an example

Case study 3.3.1: A log - book exercise

Some economics departments use this type of assessment in both Intermediate Microeconomics and Intermediate Macroeconomics modules. Students have to write and submit four problem sheets that contribute ten per cent of the module mark i.e. 2.5 per cent for each individual problem sheet. The tutor releases the exercise a week in advance and the students write their answers during four specified seminars. The questions on the problem sheets typically involve the completion of a set of short numerical problems and/or the representation of solutions using diagrams. Each exercise is marked on a pass/fail basis to keep the grading process as simple as possible. The tutor posts model solutions on the virtual learning environment. The marking criteria are as follows.

Pass

Students receive a pass grade for work of a good standard in terms of both quantity and quality. While there may be some errors or omissions, the answers demonstrate evidence of a good understanding of the core aspects of the material. There is also evidence of good preparation.

Fail

Students receive a fail grade for one or more of the following reasons.

- The work reflects a deep and fundamental misunderstanding of core aspects of the material.
- There is an unacceptably high frequency of mistakes and errors in the work that indicate undue carelessness and/or a complete lack of preparation.
- The amount of work completed during the session is unacceptably low, such that significant elements of the problem sheet are missing or incomplete.
- Absence from the class.

An alternative approach is to require students to complete a number of ten-minute mini-assessments at the end of seminars. The questions on each mini-assessment are very short and similar in nature to the problems on the seminar sheets. Once again, this makes them easy to mark. The highest five marks from the six mini-assessments count towards the final grade.

The module requires the submission of a number of assessments but the tutor does not grade them

Students have to complete all or the majority of the problem sheets in order to be eligible to complete other assessments i.e. the final exam. The tutor does not mark or grade the work and simply provides model answers. One obvious issue with this design is the quality of the work. How much effort will students exert on the tasks if it is not marked and graded? Checking to see if the students have submitted all

the problem sheets also involves some administrative costs. One final issue is the credibility of the threat to exclude students from other assessments i.e. is it consistent with university assessment regulations?

The module requires the submission of a number of assessments but the tutor only marks and grades a fraction of the work

In this assessment design, students have to submit a minimum number of assessments during the module i.e. the answers to 4/5 problem sheets. The tutor posts guideline solutions for each exercise on the VLE. After the deadline for the last problem sheet, the tutor randomly chooses and grades just one. This mark counts towards the final grade.

The tutor needs to take care that each of the problem sheets is of approximately the same level of difficulty. This approach may seem very unusual but in many ways mirrors that of an examination where tutors provide very limited guidance about the topics, i.e. students' understanding of some of the module content they have learnt is never measured/graded. It also encourages consistent study habits, i.e. taking each problem sheet seriously because of the random selection of the one that is graded. It may induce more consistent effort than marking all the problem sheets: students may exert less effort on a problem sheet if it is only carries a few marks.

The module requires the submission of a number of assessments that the students grade

With some practice, students may be able to mark the work of their peers effectively. It is possible for tutors to organise peer marking in seminars by providing answer guidelines and moderating a sample to check for consistency. Some research has found that peer marking by students to be as reliable as that of lecturers. Mostert and Snowball (2013) discuss the use of on-line peer assessment in a first-year macroeconomics module with over 800 students.

4. Different types question and some alternative assessments

Questions in either coursework or examination fall into two broad categories – fixed response and open/constructed response. With fixed response assessments, students choose between the possible answers provided by the tutor. Popular examples include true or false and multiple-choice questions. With open response questions, students have to construct an answer either verbally or in written form. Examples include short answer questions, essays, reports and presentations. Both fixed and open response questions are widely used on most economics programmes. Each has relative strengths and weaknesses in the way they measure and support learning and the costs they impose on tutors.

4.1 Multiple choice

4.1.1 Standard multiple-choice assessments

Standard multiple-choice questions are one of the most widely used types of assessment on economic programmes both in the UK and in other countries. They are particularly prevalent in Principles of Economics modules and are utilised in both coursework and exam. Referred to in the assessment literature as SA (single answer), NR (number of right answers) or NC (number of correct answers), the assessor has to construct a question, called a stem, and a number of alternative answers – typically four or five. One of the alternative answers is correct, while the others are distractors i.e. incorrect answers.

Correct answers receive a positive score while incorrect and unanswered questions receive a mark of zero. To calculate the total mark for the test, the tutor simply multiplies the number of correct answers by the mark per correct answer – usually a constant number.

Why are they so popular? What are the advantages?

- They enable the assessor to test for knowledge and understanding across a broad range of economic/quantitative topics.
- As a measurement tool, there are no issues with reliability/consistency. This saves on the time and effort required to ensure consistency when using other types of assessment (e.g. moderation activities).
- It reduces the costs of marking especially for tutors on modules with big student numbers.
- It is feasible to mark a large number of answer papers very quickly by tutors with no expertise in the topic area. Many universities have also invested in technology and machines to automate the marking process. This enables students to receive their grades promptly after submission of the work.

- Automated analysis of the results (i.e. scores by question) is also possible.

There are also a number of disadvantages

- Although they reduce the marking costs, effective multiple-choice questions are difficult to write and take longer to construct than many other types of assessment. Writing a stem typically involves constructing a question, a statement or incomplete statement with blanks. The tutor then has to compose the correct answer and a number of distractors. Writing effective distractors is often the most difficult and time-consuming part of the process. Haladyna and Downing (1989) provide the following guidelines:
    - When using a completion stem, avoid placing the blank at the beginning or middle of the statement.
    - Use the phrase 'all of the above' as one of the answers as sparingly as possible.
    - Use the phrase 'none of the above' as one of the answers as sparingly as possible.
    - Take care to make sure all distractors are plausible and impossible to rule out without some knowledge/understanding of the module content.
    - Use familiar yet incorrect phrases as distractors.
    - Use true statements that do not answer the question.

  It is possible to reduce the costs of setting this type of assessment by using banks of prewritten multiple-choice questions. However, tutors still need to take some time checking the quality of any imported questions as they can vary considerably. MyLab Economics and Aplia are two of the most commonly used resources in the UK and these on-line products support some of the best-selling textbooks. Another alternative is to encourage students to generate their own multiple-choice questions using PeerWise. This online repository enables students to create, answer, rate and discuss questions. To incentivise participation, tutors can use some of the best questions in the graded assessment. It is important to communicate this intention to the class.

- Students with no understanding or knowledge of the material can score marks by guessing the correct answer. With the grading system in standard NC multiple-choice assessments, students have an incentive to attempt questions, even when they have no understanding of the material. This reduces the validity of the assessment.
- Standard NC questions treat learning as if it was a dichotomous variable i.e. the student receives a mark for complete understanding (i.e. choosing the correct answer) or zero for absence of knowledge. In reality, learning and understanding is a continuous variable with students having varying degrees of knowledge and understanding and the measurement instrument should

reflect this. For example, open response assessments enable students to score some marks on a given question for demonstrating partial understanding of relevant content.

- Buckles and Siefried (2006) argue that they are not an effective way of testing for the highest levels of understanding, synthesis and evaluation. However, the authors of the Test for Understanding College Economics (TUCE) claim that multiple-choice questions can be used to measure the higher levels of Bloom's taxonomy of educational achievement.
- As discussed below, the use of multiple-choice questions may encourage students to engage in less productive learning activities i.e. surface learning and memorisation.

4.1.2 Some different types of multiple-choice assessment

The structure and grading of multiple-choice assessments can be adapted in a surprising number of ways. Some of these have been carefully trialled and tested to see if they address the limitations of using standard NC tests. The following section will discuss some of these alternatives.

Negative marking

The most widely used alternative to standard multiple-choice assessments is negative marking for incorrect answers. The main rationale for this approach is to deter guessing. One of the key issues with negative marking is the optimal size of the penalty. How large does it need to be to deter guessing?

Many assessors set the size of the penalty so that the expected score from guessing, for a candidate with no understanding of the material, is equal to the certain score of failing to answer the question. This is possible by setting the penalty equal to S/(C-1), where S is the score for a correct answer while C is the number of alternative answers in the multiple-choice questions. Therefore, where S =1 and each multiple choice test question has five possible answers, the penalty is set to 1/(5-1) = 0.25. The expected score from guessing is 0.8(-0.25) + 0.2(1) = 0 i.e. the same from missing out a question. If students are risk averse and have no understanding of the material, they should always leave the question blank, as the certain score from omitting an answer is the same as the expected score from taking a risky guess.

Negative marking does not effectively address the issue of guessing where students have partial knowledge. If they are able to identify some of the distractors, the expected score from guessing is positive[1] and the student's decision to guess now depends on their risk preferences. This same issue could also arise if some of the distractors are poorly written i.e. obviously incorrect/completely implausible. This introduces variations in test scores that are unrelated to the depth of learning i.e. it reduces validity. Students with similar understanding of the material may

differ in their willingness to answer questions as they have different attitudes towards risk.

Survey evidence also suggests that negative marking is unpopular with students. A common complaint is that it makes the assessments more stressful. This may reflect an element of loss aversion. One way to address this issue is to reward students for failing to answer questions rather than penalising incorrect answers i.e. rewarding desirable behaviour as opposed to penalising undesirable behaviour. For example, tutors could use the following grading design. Students receive one mark for a correct answer, 1/C for an unanswered question and no marks for an incorrect answer. The expected score for guessing when students have no knowledge is 0.2(1) + 0.8(0) = 0.2, the same as the certain score from failing to answer the question. This removes the loss framing, but introduces an element of grade inflation. It also fails to address the issue of partial knowledge.

Another concern with both of these approaches is that students will spend far too much time strategically thinking whether to attempt a question rather than simply focussing on the economic content of the assessment.

Elimination Testing

Elimination testing (ET) is a way of rewarding partial knowledge and so uses a more continuous measure of learning. Rather than trying to identify the correct answer, students have to indicate which of the answers they believe are incorrect. In other words, they have to identify the distractors. They can choose to eliminate up to a maximum of C-1 of the suggested answers. The following scoring system is the most widely used with ET:

- For each distractor a student correctly eliminates, they receive a mark of S/(C-1) where S is the number of marks awarded for a correct answer in a SA test.
- If they incorrectly eliminate the correct answer, they receive a penalty of –S.

Therefore where S = 4 and C=5, the student receives one mark for each distractor they correctly eliminate. Identifying all four distractors on a question scores a mark of four. However, if they eliminate two distractors and the correct answer they receive a score of -2 (+1, +1, -4).

Bradbard, Parker and Stone (2004) discuss the implementation of ET in an undergraduate macroeconomics module. Some tutors worry that negative marking will reduce the distribution of scores for the assessment, so the authors grade the work by adjusting the raw ET score to take account of the range of negative marks. For example, where S = 4 and C =5, a student's mark on a single question can range from -4 to +4. Therefore, on an assessment with 25 questions it can range from -100 to + 100. To calculate the percentage score, the authors add hundred

marks to a student's raw score and then divide by 200. For example, a student with a raw score of 60, is awarded a percentage mark of 80 [= (60 + 100)/200]. They conclude that this approach reduces the incidence of guessing and measures partial understanding in a more effective manner.

Subset selection testing

Subset selection testing (SST) is very similar to ET. However, instead of trying to identify the distractors, the students need to identify the correct answer. The approach is different from standard NC assessments as the students can choose more than one potentially correct answer i.e. they can choose a subset of answers. However, the more answers they choose, the lower the mark. If a student successfully chooses one correct answer, the result is equivalent to NC or identifying all of the distractors in ET. For each distractor included in the subset, the mark falls by S/(C-1). Therefore if S = 4 and C=5, a score of 3 is awarded if the students chooses two options that include the correct answer and a distractor (+4, -1). If the two options chosen are both distractors, the score is -2 (-1, -1). Otoyo and Bush (2018), outline a subset selection design without any negative marking.

Confidence based marking

Confidence based marking (CBM) is another alternative design that aims to deter guessing and reward partial knowledge. As with standard multiple-choice tests, students select a single option from the choice of answers or decide to omit the question. If they select an option, they have to choose a level of confidence for that answer. Most CBM schemes use a three-point scale i.e. students have to choose C = 1 (low), C = 2 (high) or C = 3(high). The confidence level chosen determines the size of the positive score if the answer is correct and the size of the negative score if it is incorrect. See an illustrative scheme in table one below.

Table one

Stated confidence level	C=1 (low)	C=2 (mid)	C=3 (high)
Mark if answer is correct	1	2	3
Mark if answer is incorrect	0	-2	-4

Gardner-Medwin and Gahan (2003) argue that tutors need to take care with the design of the scores so that they motivate the desired behaviour. For example, if the penalties for incorrect answers are -1, -2 and -3 in table 1, then it is never in the students interests to choose C=2 no matter what their level of confidence.

As with negative marking, some argue that attitudes towards risk will influence marks in a CBM scheme. For example, it may disadvantage female students who

tend to be more risk averse. However, Gardner-Medwin and Gahan (2003) find no evidence of any gender differences in the data.

Top Tip:

When introducing any alternative to traditional multiple-choice assessments it is important to provide clear instructions and plenty of practise opportunities before the students take the test that is graded.

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[1] If a student can correctly identify three distractors and believes that both remaining answers are equally likely to be correct then the expected score from guessing is 0.5(1) + 0.5(-0.25) = 0.5 – 0.125 = 0.375.

4.2 Short answer assessments

Short answers questions are a type of open response assessment. The following are some examples:

Write short briefing notes on the following, explaining each concept and its significance for macroeconomic policy:

1. Inflation bias
2. The dynamic aggregate demand curve
3. Credit-constrained households
4. The political business cycle
5. Public-sector primary surplus

Write short briefing notes on the following threshold concepts explaining each concept and its real-world significance.

1. Markets may fail to meet social objectives
2. Rational decision making involves choice at the margin
3. People's actions depend on their expectations
4. Elasticity of a variable to a change in a determinant
5. The distinction between nominal and real values

The use of these types of question enables tutors to measure students' understanding of a broader area of the curriculum. It is also possible to measure and reward partial knowledge. Short answer questions are one of the easier types of assessment to construct and are a useful way to develop generic skills such as writing concisely, identifying key issues and communicating to different audiences. For example, they might mirror the short briefing style used by professional economists or an abstract/executive summary written by academics.

One potential drawback they have in common with multiple-choice assessments is erroneously signalling that only superficial learning of module content is required. They may be an effective way to develop and test a student's ability to apply economic theory but some tutors question their suitability for measuring higher order skills such as synthesis and evaluation. If the question is broken down into small parts, there may be a tendency to award all the marks (3/3) or none at all (0/3) and the assessment faces the same measurement issues as standard multiple-choice questions. Ensuring consistency also requires some moderation activities.

Top Tip:

It is important to make sure students and tutors have shared expectations about the appropriate length/depth of short answer questions. Sometimes, students falsely believe an appropriate 'short answer' is one or two sentences when the tutor anticipates half to a full page of writing to address the question in enough depth.

4.3 Extended open response assessments

Much longer open-response assessments, such as essays, are popular as many tutors view them as a more effective way of developing and measuring higher order skills. For example, to construct and sustain an academic argument in longer written answers, students have to internalise and develop a deeper understanding of economic theories and concepts. Walstad (2006) argues that:

"An essay question challenges students to select, organise, and integrate economics material to construct a response – all features of synthesis. An essay question is also better for testing complex achievement related to the application of concepts, analysis of problems, or evaluation of decisions. This demonstration of complex achievement and synthesis is said to be of such importance as a learning objective that it is used to justify the extra time and energy required by the instructor for grading the essays."

Assessors can write essay questions in a number of different ways. The following are some of the more common styles with examples shown in italics.

- Reproduce and explain relevant economic theory.

Explain the theory of perfect competition.

- Compare and contrast two or more different economic theories.

  With reference to the lottery choice experiments that you played 'in class', assess the major differences between expected utility theory and prospect theory.

- Apply economic theory to a real-world issue and or policy.

  Using the concept of externalities, discuss the economic rationale for imposing a per unit tax (i.e. an excise duty) on alcoholic drinks.

  Using the AD/AS framework, discuss the possible shot-term and longer-term adjustment of an economy to a negative demand-side shock.

- Summarise relevant empirical evidence and judge the extent to which it supports the predictions of economic theory.

  Evaluate the argument that as alternative methods of raising the welfare of a target group of consumers, unconditional cash transfers are more effective than in-kind transfers. To what extent does the evidence suggest that the labelling of these transfers influences the way they are spent?

  To what extent does the evidence suggest that Giffen goods exist in reality?

- Use economic theory/evidence to appraise a point of view, opinion or assertion.

  "The predicted outcomes of a monopolistically competitive market are more efficient than those of a perfectly competitive market." Discuss this assertion.

  Evaluate the argument that in highly financialised economies like the UK, the balance sheets of economic agents are an important source of economic volatility.

  Discuss the argument that supply-side factors are the sole determinant of the economy's potential output.

Some issues with extended writing

Tutors face a number of issues when using extended writing assessments.

- Should the essay/report be broken down into sections with marks clearly allocated to each section? For example:

  Compare and contrast the economic model of perfect competition with that of monopolistic competition paying particular attention to:

a. *their characteristic features and assumptions (20 marks)*
b. *the nature of the long-run market adjustment (40 marks)*
c. *their implications for economic efficiency (40 marks)*

This may help to provide effective guidance on how to structure the work and develop a shared understanding of what is important. However, breaking down questions in this way can also send a very prescriptive message to students about what to write and so deter deeper learning. It also constrains the ability of markers to reward high quality answers to particular sections of a question.

- Rather than trying to develop an internalised and deeper understanding of economic theory, students simple cut and paste material from various sources on the internet. This may lead to the inclusion of maths/diagrams, which are either irrelevant or not adapted to the issue referred to in a particular essay question.
- It increases the time it takes to mark work and provide feedback. This may become unmanageable for modules with over a hundred students.
- Grading the quality of essays involves the tutor making subjective judgements. Factors such as the halo effect are more likely to influence the marking. Therefore, more effort is required to ensure both intra and inter-marker consistency.
- Tutors need to consider the levels of support they are willing and able to offer students during the writing process. One particular issue is feedback on draft copies of work. Many students expect this level of support as it is common in pre-university education. Therefore, tutors need to communicate the support they offer before releasing the work to manage expectations. If assessors provide feedback on drafts, it should focus broadly on what the student needs to do to improve the work rather than specifically correcting the work. There is often a fine line between these two types of comment. It is also not advisable to provide any indication of the grade as this leads to more complaints. For example, a number of students will claim they have carried out all of the suggested improvements but not received a significantly higher grade.

Tip: To keep marking at a manageable level the essay can have two-stages. The first stage is the submission of the draft copy that receives feedback but no indication of the grade. The final copy only receives a grade and no feedback. Another alternative is to get the students to provide feedback on each others work in a peer feedback activity. Mostert and Snowball (2013) discuss the use of this type of activity in a first year macroeconomics module with over 800 students.

Case study 4.31: Economics in the news[1]

This case discusses an alternative way of designing a written assessment. This particular example is from a course on Industrial Organisation but it could easily be adapted to other topic areas in economics.

The assignment has a number of elements. Firstly, students have to select and write a 500-word academic literature review on any topic covered in the module i.e.

innovation, competition policy. The relatively low word limit helps to develop concise writing skills. For the second part of the assignment, they have to find three articles in The Economist or a broadsheet newspaper relating to their chosen topic area. Importantly, the publication date for the articles must be in the same term/semester as the teaching of module. Students have to write 500-words on each article and discuss the extent to which they either support or contradict the academic literature on the topic. For the final part of the assignment, they have to write an appendix that lists ten further articles that relate to any topic on the module. Once again, the publication date for the chosen articles must be in the same semester as the module.

Some advantages with this assessment design.

- It motivates students to keep-up to date with economics news and see the real world relevance of the technical material covered in the module. This can be very useful interview preparation for a graduate job.
- It encourages more consistent studying during the module as opposed to very intensive bursts of effort just prior to a deadline. At a minimum, students need to be reading and selecting relevant articles throughout the term. To reinforce the consistency of study effort, tutors could spend a few minutes at the beginning of each seminar asking the class for examples of articles they have found in the preceding week.

Some students can be unsure and nervous about this type of coursework as it is different to what they have encountered previously in their studies. For this reason, it is advisable to use some contact time to discuss anonymised examples of work from previous years. Some tutors are nervous about discussing exemplars as they fear students will simply copy them in their own work. However, the requirement for articles from the current academic year reduces the likelihood of this occurring.

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[1] For more detail see Elliott and Balasubramanyam (2016)

4.4 Some innovative types of coursework

The following cases outline some alternatives to the standard methods of written assessment.

Case study 4.4.1: Using class debates[1]

The use of debates is a suitable assessment design for a wide range of topics such as (a) the Bank of England's decisions on interest rates (b) the UK's decision to leave the European Union (c) A World Economic Forum on policies to combat

climate change and (d) a firm's decision to enter an overseas market. This particular case is from a course on competition policy.

Students self-select into groups of 4-5 and choose a competition case they want to investigate from a list prepared by the tutor. Two groups choose each case. One represents the competition authority (i.e. the European Commission, Competition and Market Authority) while the other represents the business under investigation (i.e. Microsoft; Google; Intel; Qualcomm).

Before the debate, it is important to hold an initial meeting with both groups to set the scene and highlight some of the key features of the chosen case. Then, about a week before the debate is scheduled, the tutor meets with each group separately to check their arguments and answer any queries. These meetings play a key role in ensuring the quality of the presentations.

The actual debate is organised in the following manner:

- For the first 15 minutes, the group representing the competition authority make their arguments. The group representing the firm has the next 15 minutes to respond.
- For the next 10 minutes, they have the opportunity to cross-examine each other. The tutor also asks some of their own questions as well as any from the other students in the audience.
- Each group is given a final minute to summarise their key arguments
- Finally, based on the debate, the audience vote on what they believe should be the outcome of the case. This helps to maintain engagement during the session.

The tutor makes it clear that in some cases one group has a much harder position to defend and argue. Therefore, the grade does not depend on the final audience vote. Instead, the assessment criteria includes factors such as the presentation of the arguments, links to economic theory, cross-examination and response to questions and summary of arguments.

When the debate format replaced a more traditional group presentation, student engagement improved both during the preparation and delivery stages. The design seems to tap into the competitive desire of students to outperform their peers and the feedback has always been positive. From the tutors viewpoint, assessing and grading is far more enjoyable than sitting through numerous standard presentations.

Case study 4.4.2: Using videos

The increasing number of students, who have high quality video cameras on their mobile phones and tablets, makes this type of assessment far easier to implement

than in the past. The following example is from a final year option module on behavioural economics.

The assessment asks the students to apply Behavioural Economics to any real world issue or problem. The module leader supplies some possible topics but students are free to choose as long as the tutor agrees that it is a suitable area. The assessment brief clearly states that all students must contribute. If a member of the group does not appear in the video, he/she has to provide a short-note outlining their contribution to the work. The guidelines also stress that the tutor will grade the video on its economic content rather than the quality of the recording or editing. The students can also use any type of video recording equipment.

Each group has to produce a 3-minute video. The tutor chose this duration, as it is the same as the requirement for the Royal Economic Society Undergraduate Video Competition. The submission is via the virtual learning environment or YouTube.

Some advantages over traditional in-class group presentations.

- It frees up class contact time to do other activities.
- Students no longer have to sit through numerous presentations of variable quality. They can watch the videos submitted by the other groups, if they are interested in the topic.
- It gives tutors greater flexibility over when they watch and grade the presentations. This could help to reduce problems of marker fatigue.
- The quality of the presentations tends to be much higher than those completed in-class. One potential reason for this is that the format helps to remove some of the anxiety of presenting directly in front of people. This allows students to focus on the economics content.

Top Tip:

The Royal Economic Society (RES) often runs an undergraduate video competition. Try to follow the guidelines in the module assessment so that students can easily submit their videos to this competition.

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[1] For more detail see Olczak (2019)

5. Improving the impact of feedback

As previously discussed, one important way assessment can support learning is through effective communication between the tutor and student about the quality of work. Numerous studies have found that feedback has a significant impact on learning (Black and William, 1998; Hattie and Timperley, 2007; Kluger and DeNisi, 1996). However, there is considerable variability in the results. Given its potential importance, why might students fail to respond to feedback? How can we increase the likelihood that they will engage with and act upon the guidance tutors provide? The following section discusses a number of these issues.

It arrives too late

Students are more likely to engage with feedback if they receive it while the process of researching and writing the assessment is still fresh in their minds. Unfortunately writing detailed comments on hundreds of assignments can take weeks. By the time marking is complete and the feedback returned, many students have started studying for subsequent assignments. The comments may no longer seem relevant as they focus on their next assessment. There are two different ways of providing feedback quickly – even on very large modules.

- Provide feedback after reading a sample of assignments.

Instead of marking all the students' work before providing feedback, read a sample of the assignments in the first couple of days after the deadline. Identify any common weaknesses and either discuss these in the next class or post announcements/handouts on the virtual learning environment.

- Provide feedback before reading any assignments!

Tutors can often predict/anticipate common mistakes or weaknesses in students' work before they have marked a single assignment. Rather than keeping this information private, produce a handout and discuss these anticipated weaknesses with the students in the first class following the deadline date. It is also useful to spend some of this contact time describing some of the key features of a good answer.

Although imperfect and rather generic, feedback provided in the first few days following a deadline, may have a stronger impact on some students than more personalised and detailed feedback provided at a later date.

It discourages and demotivates

One purpose of feedback is to motivate students to take appropriate actions to deepen their learning. If the comments only discuss weaknesses and the language

is harsh/judgemental, it can have the opposite result. When marking, it is easy to forget the emotional responses people feel when reading comments on work in which they have invested a large amount of their own time and effort. As well as having a negative impact on self-confidence and motivation, students are likely to ignore feedback if it is overly negative. Always try to find something positive to say otherwise there is a danger the students will take no notice of any of the comments.

The impact of releasing marks/grades

There is evidence that once students see their marks/grades they are more likely to ignore potentially useful feedback. There are a number of possible explanations. For example, those students who receive high grades may believe they have mastered the topic and so do not need to read any of the comments. Those who receive low grades may feel they never want to look at or engage with the assignment ever again. One way to address this issue is to release feedback before the marks. Students then have to provide an estimate of the grade based on the comments. They are encouraged to compare the feedback with their peers and a small grade incentive for accuracy is a useful way to encourage them to take it seriously.

Top Tip:

A useful incentive scheme operates in the following way. If the estimated mark from the feedback is within five percentage points either above or below the final mark awarded by the tutor, the student receives a bonus of five percentage points. To avoid any incentives to game the system, add the five percentage points to the mark awarded by the tutor – not the estimated mark provided by the students.

It seems irrelevant for future assessments

In the research literature there is evidence that some students ignore feedback because they believe it is specific to that particular assignment and provides no guidance on how to improve their future work. Many lecturers write feedback comments as if the students have submitted a draft copy of the work for a later resubmission. How can we avoid doing this? Some comments relate to the academic content of the assignment such as the choice/explanation of economic theory and its application to any issues raised in the question. When writing these types of comments, it is important to highlight cases where a good understanding of this same academic content is required for students to perform well in subsequent assessments. For example

> *"You need to gain a deeper and more thorough understanding of expected utility theory if you wish to improve your performance in the final examination"*

Other comments relate to more generic skills development such as the structure of the answer, the balance of material, the quality of written communication and the ability to develop arguments in a logical manner. It is easier for students to see the relevance of improving these skills for future assignments but always signpost and make it as clear as possible.

Perceptions about the usefulness of all types of feedback are greatest when provided on draft versions of work. Some issues with marking drafts are considered in section 4.3.

It does not clarify the size of any weaknesses or gaps in understanding

Traditional written feedback can be effective at identifying gaps. For example, commonly used comments include

“The assignment lacks clarity and logical coherence.”

“There is not enough critical analysis.”

“Some concepts are not explained in enough detail”

“The answer did not focus on the question.”

It is far more difficult to explain the size of any gaps. For example, the second comment above identifies that there is not enough critical analysis but says nothing about the level required to achieve a particular grade. One way to address this issue is to show students concrete examples of work that demonstrate the standard or the skill at an appropriate level. These are post-submission as opposed to pre-submission exemplars. For example, when marking assessments, copy samples of answers that illustrate good performance on some aspect or aspects of the assessment criteria. Distribute these answers in class or post on the VLE. Referring to these exemplars in the written feedback can also save time by reducing the quantity of comments.

The use of post submission exemplars can also play a very useful role when staff face students who appear disinterested in constructive feedback and just want to know why they received a mark below the one they believe they deserve. Spending a few minutes getting these students to compare their own work with examples of high quality exemplars is an effective and efficient way of dealing with these difficult situations.

Top Tip:

Rather than providing complete versions of the post submission exemplars, copy a particular page or highlight a paragraph that is a good example of some element of

the assessment criteria. In the feedback, include a sentence along the following lines – "For an example of a piece of work that demonstrates excellent critical analysis see the highlighted section on exemplar A"

It does not explain how to improve

This is the trickiest part of the feedback process. It is difficult to specify/outline exactly what the student needs to do or what future actions they can take to improve. Comments such as 'you need to work harder' are unlikely to have an impact. Some alternatives include:

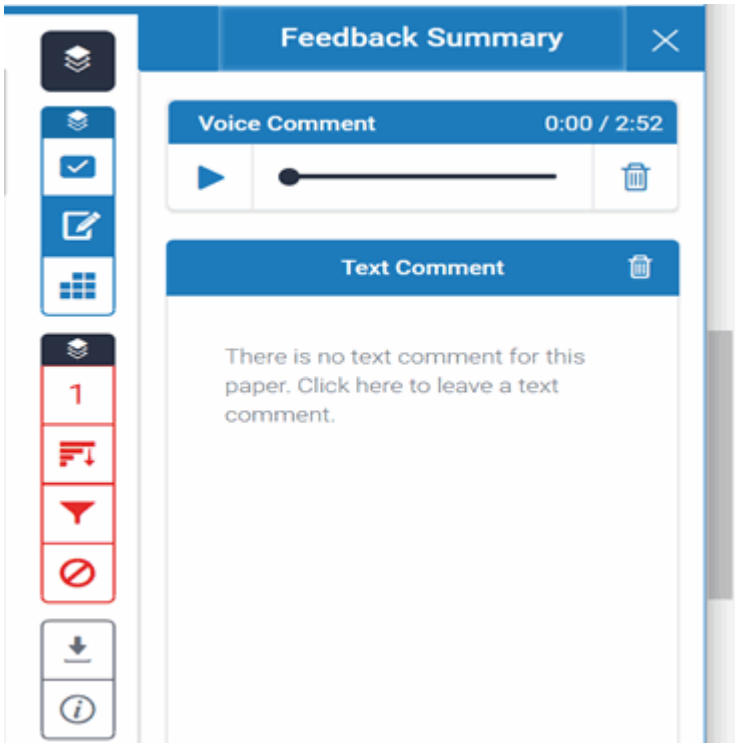
"Read lots of different examples of other assignments that received a high grade. Compare them against your own and try to identify their particular strengths and areas you need to work on to obtain higher marks in future assessments."

> *"In the future, try to read through your work more carefully and amend any errors before handing it in."*
>
> *"Book an appointment with the support centre x at the university to receive extra support."*
>
> *"Try to attempt more practice questions."*

"Go back and read chapter x again in the textbook and try to gain a better understanding of theory y."

Case study 5.1: Using audio feedback

GradeMark in Turnitin is perhaps the most common way for tutors to provide written feedback comments on coursework – see the screen shot. Just above the box for typing in text comments is a general feedback recorder i.e. see the 'Voice Comment'.



It is very straightforward to record comments using this function using headphones or the built in microphone on a PC/tablet computer. The recording can be paused at any time while the tutor reads the next section of the coursework. Although it is very easy to use, one major limitation is a three-minute limit on the duration of the audio comments. It is also impossible to edit files. If the tutor is unhappy with any of the feedback, they have to re-record all three minutes. Other software such as Audacity provide greater flexibility but involve more time costs i.e. creating the files and posting the results.

Research suggests that audio feedback is both more efficient and effective than written feedback. For example, in a simple experiment Lunt and Curran (2010) compared the effort levels of producing the same feedback comments in three different ways. On average, it took tutors three minutes to type, four minutes to hand write and forty seconds to record the comments in an audio file.

When used on a large course in intermediate microeconomics, students thought that vocal explanations conveyed meaning more effectively than written explanations. In particular, they found the comments more detailed, supportive and personalised. Some research suggests that intonation, inflection and tone in the audio comments increases the likelihood that students will respond to critical/developmental feedback. Another potential advantage is the impact on marker fatigue. A number of tutors find recording audio feedback comments over an extended period of marking less tiring than writing feedback comments.

6. Assessment of learning – Measurement Issues

One of the key functions of assessment is the measurement of learning. When marking coursework and exams, tutors make judgements about the extent to which students demonstrate (a) an in-depth understanding of the module content and (b) achievement of the learning outcomes. This typically involves the awarding of marks, grades and certification of achievements. Employers and other educational institutions frequently use this information as part of the selection process for jobs and places on postgraduate courses. This makes students acutely aware of its importance. There is a tendency for many tutors, as well as students, to focus solely on the measurement function at the expense of all the other objectives.

6.1 Validity

The measurement function raises two important issues – validity and reliability. In order to understand validity it is useful to consider the following questions. Are the current methods of assessment for the module appropriate and effective measurement tools? Do they indicate the extent to which students have met the modules learning outcomes? Put simply, do they measure what they purport to measure? Validity of assessment focuses on this issue. Why might assessment lack validity? There are two key reasons.

a. The methods of assessment fail to capture one or more of the learning outcomes. This is most likely to occur where learning outcomes refer to specific theories from the module's indicative content. For example:

'By the end of this module, successful students will be able to explain how to apply elementary game theory to economic models of firm behaviour'

The problem with writing learning outcomes in this way is that assessment does not typically test students' understanding of the entire content of the module. Coursework elements often focus on detailed investigations of a single topic while examinations include questions that cover part, but not all, of the syllabus. If an exam does include questions on the entire module content, they can typically only test a relatively superficial knowledge of each topic. In exams where students need to demonstrate a greater depth of understanding, the design includes some choice over the questions they answer. Therefore, it is usually possible for students to achieve a pass grade without demonstrating any knowledge of some areas of the syllabus i.e. 'explain how to apply elementary game theory'. For this reason, it is advisable to write learning outcomes that refer to economic theory more broadly. For example:

'By the end of this module, successful students will be able to discuss and apply a range of economic theories at an intermediate level'.

Some learning outcomes refer to generic skills. For example,

> *'By the end of this module, successful students will be able to communicate economic principles in a clear and precise manner through written work'*

If the assessment for the module is only by examination then perhaps the words '*in time-constrained conditions'* needs to be added to the end of the previous learning outcome.

Top Tips:

When you first take over a new or existing module, carefully read the existing learning outcomes. Ask yourself if they clearly articulate the learning you have in mind for the module. If you do not think this is the case, then change them.

Always keep the module learning outcomes in front of you when writing assessments. If you want to change the assessment for a module, make sure the new design is still an appropriate way to measure the learning outcomes. If this is not the case, you will need to change the learning outcomes.

b. Assessment may also lack validity where factors other than those referred to in the learning outcomes influence the grade – i.e. factors other than the students' understanding of relevant economic theory and/or demonstration of generic skills. For example, scores on some methods of assessment, such as multiple-choice tests, may vary because of luck and risk preferences (i.e. lucky guesses) rather than the underlying knowledge of the module content. (There is more discussion on this topic in section 4 of the handbook). The wording of questions can also create problems. Even very experienced tutors, find it difficult to write assessments where there is no ambiguity over precise meaning. This lack of clarity leads to some students achieving higher marks because they are lucky enough to infer the same meaning as the tutor rather than any deeper understanding of the course material.

Top Tips:

Always remember that from your students' perspective, the most important words you write in any module are the assessment questions. Make sure you give them enough time, care and attention.

It is very difficult to write assessment questions and then instantly recognise any ambiguity in their meaning. Always re-read assessment questions a number of days after writing them. Also, try to encourage as many of your colleagues as possible to read and comment on the clarity of your questions.

6.2 Reliability and Consistency

For the measurement function of assessment to work effectively, grading must be consistent both between different assessors (inter-marker reliability) and by the same assessor (intra-marker reliability). To achieve intra-marker reliability, the same assessor must award the same grade to different pieces of work of very similar quality. To achieve inter-marker reliability, different assessors must award the same grade to different piece of work of similar quality.

6.2.1 Intra-marker reliability

Sadler (1989) argues that tutors'

“Conceptions of quality are typically held, largely in unarticulated form, inside their heads as tacit knowledge”. (Sadler, 1989, p.54)

One important issue is whether the application of these ‘inner standards’ remains constant during the marking process or whether they are subject to a number of biases. For example, are judgements influenced by (a) comparisons with the quality of previously graded work (b) marker fatigue (c) changes in mood?

Contrast or sequential effects

This is where the grade awarded to any given assignment/exam script is a function of the quality of the previous assignments/exam scripts. For example, a tutor may grade an average piece of work far more harshly if they have just read a block of excellent answers as opposed to a block of weak answers. Higher quality work may also receive a higher grade when it follows a block of lower quality work as opposed to a number of outstanding pieces of work. A number of research papers (Hughes, Keeling, and Tuck, 1980; Daly and Dickson-Markman, 1982; Yeates, Moreau and Evra, 2015) report evidence of these effects. Hughes, Keeling, and Tuck (1980) found (a) the impact was stronger for average quality assessments and (b) the effect declined with the number marked. Perhaps more worryingly, Yeates, O’Neil, Mann and Evra (2013) found that assessors lacked awareness of their susceptibility to this bias.

Assessor fatigue

After a prolonged period of marking, tutors may start to read answers less carefully and fail to notice important strengths and weaknesses with the work. This leads to a smaller spread of grades as higher quality assessments receive lower marks than those of a similar quality read earlier in the day. The reverse is true for lower quality work i.e. the tutor awards higher marks. There is a danger that different pieces of work of varying quality all start receiving a mark somewhere between 58% and 63%.

Mood effects

This is where the application of the inner standard varies from one day to another based on the general mood of the marker. If the marker feels happy, they may award higher grades to similar pieces of work than when they are feeling down.

Top Tips:

Briefly read a number of the assignments to get an initial sense of the types of answers before grading and providing feedback.

When the marking is completed, sort the assignments/exam scripts in rank order. If the assignments have been submitted electronically using Turnitin, this can easily be done by clicking on the grade column. Once sorted, read through some assignments/exam answers you have awarded the same grade and check for consistency.

Marking exam paper by question, as opposed to the whole script, may help to improve consistency.

6.2.2 Inter-marker reliability

This is a major issue especially on large modules where a number of different tutors mark and grade coursework and exam scripts. Do they have similar or different perceptions of the standard required to achieve particular grades? Are some markers systematically more lenient than others? There could also be a 'halo effect' where the quality of one aspect of the assessment overly influences the tutor's judgements on other aspects of the assessment. Examples could include the impact of (a) high standards of presentation and (b) the quality of the opening paragraph. The strength of these biases is likely to vary between different markers.

In an ideal world, whoever marks the work should have no impact on the grade awarded. Unfortunately, research evidence suggests that there are wide variations in the grades awarded by different tutors for work of similar quality (Baume, Yorke and Coffey, 2004; O'Hagan and Wigglesworth, 2014). In an attempt to deal with this issue, many universities expect module leaders to provide written guidance that clearly outlines the criteria used to grade coursework. For example:

- A detailed assessment criteria for each piece of work with grade descriptors for each criteria
- Marking schemes
- Model answers

Although the research evidence suggests that guidance helps to reduce levels of inconsistency, it remains a significant issue. For example, Bloxham, den-Outer, Hudson and Price (2016) studied the consistency of grading in four disciplines -

psychology, nursing, chemistry and history. Six highly experienced markers, in each discipline, graded five different answers to the same question with the same detailed assessment criteria. In nine cases, different tutors ranked the same assignment as either the best or the worst answer! Only one assignment received the same ranking. Why is the provision of detailed assessment criteria not enough to ensure consistency between different markers? There are a number of reasons:

- Some tutors may have very established ideas about the appropriate standards and criteria i.e. what they are looking for from a good piece of work. If these differ from the published guidance then they may:
    - Simply ignore the whole criteria and judge the work against their own unarticulated 'inner standards'
    - Ignore some of the published criteria and judge against some additional criteria from their 'inner standards'
- Some published criterion are often extremely broad and effectively require the application of sub criteria that are unpublished. Once again, the application of these unpublished sub-criteria may vary between different tutors depending on their inner standards.
- The precise understanding and application of a particular criterion may vary between different tutors. For example, does 'critical analysis' mean the same thing to all markers?
- Tutors may agree on the meaning of specific criterion but not the standard that students need to demonstrate for a particular grade.
- The weighting of each of the criteria may vary between different tutors.
- Assessors may judge the overall quality of the assessment before working backwards and applying arbitrarily generated marks for each of the published criteria.

How to improve inter-marker consistency

- The module leader provides other assessors with examples of the work they have already marked across a range of different grades.
- Tutors mark a small sample of the work and get this moderated by the module leader before continuing with the rest of their marking.
- Module leaders and other assessors grade a sample of the work together and discuss the rationale behind their grading.

Although this last approach maybe the most time consuming it is also the most effective. The Quality Assurance Agency (QAA) recommends the use of:

"Practices which promote and support consistency of marking by and between staff, including dialogues which enable a shared understanding of standards" (QAA Quality code, chap 6, p13)

Bloxham, Hughes and Adie (2016) recommend that the discussions of assessment tasks and the appropriate standard should actually take place before the teaching of the module begins.

6.2.3 The trade-off between reliability and validity

Improving the reliability and validity of assessment will often involve trade-offs. For example, increasing the proportion of quantitative/technical questions and reducing the proportion of discursive questions will probably improve both intra and inter-marker consistency. However, it may reduce the validity of the assessment i.e. the development of critical thinking and evaluative skills.

For example, the Quality Assurance Agency Benchmark Statement for economics suggests that the main aims of a degree programme in economics should include the following:

- to stimulate students intellectually through the study of economics and to lead them to appreciate its application to a range of problems and its relevance in a variety of contexts
- to develop in students an ability to interpret real world economic events and critically assess a range of types of evidence
- to foster an understanding of alternative approaches to the analysis of economic phenomena
- to equip students with appropriate tools of analysis to tackle issues and problems of economic policy

It is questionable whether it is possible to test these learning outcomes without a significant discursive element to a number of the assessments on the programme.

7. Summary

Assessment is complex and plays a crucial role in determining how much students learn. Given its importance, it is worrying that surveys report such low levels of satisfaction with this aspect of higher education. One potential explanation for this finding is a tendency for tutors to concentrate on the content and delivery of a module.

This handbook chapter discusses some implications of assessment design within in a module for the quantity, consistency and quality of learning activities undertaken by students. It considers alternative styles of assessment question and outlines some innovative types of assessment i.e. the use of class debates and videos. It also examines some ways of increasing the likelihood of students engaging with and acting upon feedback. The final section of the handbook discusses some measurement issues, and includes some advice on how to improve both the validity and reliability of assessments.

Given the multidimensional nature of assessment, it is impossible for one handbook chapter to discuss all the key issues in detail. In other handbook chapters, Cortinhas (2017) outlines some different ways of deterring plagiarism, Smith (2016) discusses undergraduate dissertations and Watkins (2005) examines the use of group work.

In the wider literature, Cook (2016) examines some innovative ways of assessing students on statistics and econometrics modules. Grogan (2017) and Green, Bean and Peterson (2013) discuss some different ways of using written coursework in economics modules.

Another issue not considered in this chapter is how to develop a shared understanding between tutors and students of what 'good' work looks like before the final submission. Guest and Riegler (2017) examine some evidence on the relative inaccuracy of economics students' self-evaluation estimates. Their findings suggest that for many students, a shared understanding of standards remains elusive. Wilson (2015) outlines some ways of better preparing students for assessment in economics, while Guest (2019) discusses the use of peer review.

Assessment and feedback remains one of the most difficult aspects of teaching. Perhaps we all need to spend a little more time reflecting on our current practice and consider some of the available alternatives.

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Economics in UK Higher Education

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Contents

Introduction

This guide aims to give a brief overview of the UK Higher Education sector with a specific focus on the teaching of economics. It also aims to provide key information about career progression, training and reward.

UK Higher Education

Higher Education (HE) in the UK has a long history with Oxford and Cambridge universities dating from the 12th and 13th centuries and St Andrews, Glasgow and Aberdeen dating from the 15th century. As of 2019, there are 170 higher education institutions across the UK which can award first degrees (GOV.UK, 2019) and 2.3 million students (Universities UK, 2018).

Accreditation, funding and regulation

The UK comprises 4 nations – England, Wales, Scotland and Northern Ireland – each of which fund higher education through their own funding and regulation bodies:

- The Office for Students (replacing The Higher Education Funding Council for England (HEFCE) which was abolished at the end of March 2018)
- The Higher Education Funding Council for Wales (HEFCW)

- The Scottish Funding Council (SFC)
- Department for the Economy in Northern Ireland

Quality Assurance

Quality assurance standards for HE are monitored and advised by the Quality Assurance Agency (QAA) for the whole of the UK. The QAA's services include:

- The Quality Code (revised version 2018), developed with the sector, which provides guidance to those developing programmes of study and policies on academic standards.
- Part of the Quality Code is the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies, which defines the UK qualification system and describes the generic requirements for each level/qualification. This describes the two parallel frameworks for higher education qualifications of UK degree-awarding bodies: the Framework for Qualifications of Higher Education Institutions in Scotland (FQHEIS) and, for the rest of the UK, the Framework for Higher Education Qualifications of Degree-Awarding Bodies in England, Wales and Northern Ireland (FHEQ).
- Further guidance including other education sectors and qualifications in the UK nations and the Republic of Ireland can be found in the QAA's Qualifications Can Cross Boundaries - A Rough Guide to Comparing Qualifications in the UK and Ireland.
- Subject Benchmark Statements which set out the skills and knowledge that graduates are expected to have at the end of their degrees. The Economics Subject Benchmark Statement was last updated in 2015.
- Review of HE providers to assess how and whether they meet the standards of the UK HE sector.

Teaching Excellence Framework (TEF)

The Teaching Excellence Framework was established by government in 2015 to evaluate the quality of the undergraduate student experience in UK HE institutions. It intends to provide comparable information about universities beyond existing quality assurance systems (such as QAA review), ultimately allowing institutions to increase their student tuition fees according to how highly they are rated.

Participation is optional across the UK, though HE institutions in England that have a TEF award in 2017 can increase their student fees in line with inflation (up to £9,250 in 2017). Participation in TEF by institutions in Scotland, Wales and Northern Ireland has no direct impact on their student fees.

Each institution is measured against three categories – Teaching Quality, Learning Environment and Student Outcomes – and is benchmarked against an expectation of their student intake. Data are largely drawn from the *National Student Survey* (NSS – a UK wide survey of the experience of final-year undergraduates) and *Destination of Leavers of Higher Education*. Institutions also provide a statement to support the data. Judgements then result in a 'Gold', 'Silver' or 'Bronze' badge.

There are plans to develop the TEF to evaluate the quality of the student experience at subject level, and to be extended to include taught postgraduate students.

Participating higher education providers and their TEF awards are listed here.

Typical higher education qualifications within each level

Qualification level	Further information	FHEQ	FQHEIS
		FHEQ level	**SCQF level (Scottish Credit and Qualifications Framework)**
Doctoral degrees (e.g., PhD/DPhil, EdD, DBA, DClinPsy)	A *doctorate* is the next (and highest) qualification in the UK, usually taking three to four years to complete.	8	12
Master's degrees (e.g., MPhil, MRes, MA, MSc)	*Master's degrees* are either four year degree courses (often sandwich courses involving one year in industry or abroad) or a one year course after completion of an undergraduate degree.	7	11
Integrated master's degrees (e.g., MEng, MChem)			
Postgraduate diplomas			
Postgraduate Certificate in Education (PGCE) Postgraduate Diploma in Education (PGDE)			
Postgraduate certificates			
Bachelor's degrees with honours (e.g. BA/BSc Hons)	*Bachelor's degrees with honours* are typically four years in Scotland but three years in England, Wales and Northern Ireland. The four year course in Scotland allows students from Scottish schools who usually sit Highers aged 16/17 (as opposed to GCE A-levels aged 17/18 in England, Northern Ireland and Wales) to progress to university	6	10

	receiving a broader based education in the first two years, and then specialising in the final two. A combined or joint honours *bachelor's degree* is a degree where two or more subjects are studied from different areas (e.g. Economics and Business). A combined degree is the same level of qualification as a single honours degree. Bachelor's degrees with honours are typically four years in Scotland but three years in England, Wales and Northern Ireland.		
Bachelor's degrees			9
Professional Graduate Certificate in Education (PGCE) in England, Wales and Northern Ireland			
Graduate diplomas, Graduate certificates			
Foundation degrees (eg, FdA, FdSc)	Usually 2 years to complete.	5	N/A
Diplomas of Higher Education (DipHE)			8
Higher National Diplomas (HND) awarded by degree-awarding bodies in England, Wales and Northern Ireland			N/A
Higher National Certificates (HNC) awarded by degree-awarding bodies in England, Wales and Northern Ireland	Usually one year to complete	4	N/A

Certificates of Higher Education (CertHE)			7

Table adapted from the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (QAA, 2014)

Students

University entry

Some higher education institutions use qualifications and grades as part of their student entry requirements for undergraduate degrees – many use UCAS (Universities and Colleges Admissions Service) tariff points, which are allocated to qualifications generally studied between the ages of 16 to 18 (including A-levels and Scottish Highers).

Some economics undergraduate degree courses require A-level Maths, but most do not. Virtually all require GCSE Maths at grade C or B. **No course requires A-level Economics**. On some economics degree courses students are streamed in the first year according to their background in Maths and/or Economics.

Student fees

Student fees in the UK vary according to each student's home nation/region and where in the UK they are studying:

Tuition fees by region for courses starting in 2020 (UCAS, 2020)

Student's home region	Studying in England	Studying in Scotland	Studying in Wales	Studying in Northern Ireland
England	Up to £9,250	Up to £9,250	Up to £9,000	Up to £9,250
Scotland	Up to £9,250	No fee	Up to £9,000	Up to £9,250
Wales	Up to £9,250	Up to £9,250	Up to £9,000	Up to £9,250
Northern Ireland	Up to £9,250	Up to £9,250	Up to £9,000	Up to £4,395
EU	Up to £9,250	No fee	Up to £9,000	Up to £4,395
Other international	Variable	Variable	Variable	Variable

Generally students take out student loans or grants to pay for university. These are usually from devolved government agencies. EU students are also eligible for UK student loans.

Training, reward and recognition

Each institution will have a policy on career progression – many have generic academic job descriptions along different career pathways – for example teaching only, research only, teaching and research. Progression will depend on your role as well as evidence of your expertise.

In terms of teaching expertise, most HE institutions have central academic/teaching development units which can guide and support staff in their teaching development, reward and recognition.

New lecturer training

Since 2001, all new lecturers to UK higher education are required to undertake institutional training to prepare them for their teaching (Department of Education and Skills, 2003). Many run postgraduate certificate programmes.

129 institutions (Pilkington, 2017) also run Continuing Professional Development (CPD) schemes accredited to the UK Professional Standards Framework – a national teaching standard developed by the sector and currently overseen by the Higher Education Academy (HEA). Staff can be recognised through these CPD schemes (or directly with the HEA where no scheme exists) at various categories of HEA Fellowship: Associate Fellow; Fellow; Senior Fellow and Principal Fellow.

New lecturers are generally expected to gain HEA Fellowship (Fellow category) - normally through the institution's accredited postgraduate certificate programme or CPD scheme. Postgraduates who teach are often expected to gain Associate Fellowship through an accredited CPD scheme or by direct application.

During 2018, the Higher Education Academy merged with two other organisations to form Advance HE which will continue to oversee the UK Professional Standards Framework.

Economics New Lecturer Training

The Economics Network's Early Careers Workshop is a two-day event focused on effective and innovative economics teaching. It has been developed in consultation with a network of experienced economics lecturers from across the UK. The workshop aligns with the UK Professional Standards Framework and has been formally endorsed by the Royal Economic Society and the Scottish Economic Society.

Other events, including training events, are provided by the Network: see the news page or subscribe to the monthly email to be kept informed.

National Teaching Fellowships

Many institutions offer internal Teaching Awards (sometimes student-nominated). In England institutions can put forward up to three members of staff annually forward to compete for a National Teaching Fellowship (55 currently awarded annually).

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Motivating International Students

A practical guide for economists

Margarida Dolan
and **Irene Macias**
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Contents

1. International students learning Economics: the UK context

Many international students come to the UK to study economics attracted both by the history of economics in the UK and the excellent teaching and research reputation of many Economics departments. The following quotes*(note 1) suggest that international students enjoy the intellectual challenge of studying in institutions with a high reputation and believe that Economics will give them the opportunity to pursue a wide range of good careers in either the private or public sector:

'The opportunity to study at a prestigious institution of international repute, and the promise of intellectual stimulation.'

'I wanted to be part of one of the most appreciated educational systems in the developed world.'

When asked about the best aspects of their Economics course in the UK, students include the quality of teaching and the international environment*:

'Excellent teachers: have a deep knowledge of the subject and know how to transmit it to the students.'

'Meet different people from all over the world, being independent.'

'Meeting international students and learning more about other cultures.'

International competition for quality and cost-effective Economics education is rapidly increasing. UK HE strives to remain an attractive destination for international students, and even expand international recruitment, but faces deep challenges (see for example, Sastry and Bekhradnia, 2007). Despite evidence of the UK's competitive advantage in international education at both undergraduate and postgraduate levels (Universities UK, 2015, 2016), politically-driven restrictions are also shaping the sector's international reputation (Pells, 2016; Adams, 2016; Beall, 2017; Conlon, Ladher and Halterbeck, 2017).

International students in UK universities provide many benefits, with EU students alone reportedly generating £3.7bn for the UK economy and supporting in excess of 34,000 jobs (Universities UK, 2014). But there also a number of challenges posed by international students. UK Economics lecturers have varied responses to the number and diversity of international students in classes, some seeing this as beneficial to students' learning and others highlighting the difficulties.(note 2)

The importance of motivation in academic learning is recognised by many authors (for examples see Maclellan, 2005 and Lanzt, 2007). When we ask cohorts of

international and UK lecturers and teachers 'what constitutes a good lecturer or teacher?' the responses show that, irrespective of cultural background, there is an expectation that the lecturer or teacher is fundamental in motivating students to learn. There is a shared understanding of the characteristics of a *motivational* lecturer or teacher that includes being passionate, enthusiastic and inspirational, combined with being knowledgeable, clear, structured, available and approachable.

Even the choice of a particular career direction can be influenced by a motivational lecturer or teacher (apart from status and money!). Equally, a number of postgraduate students choose to do research with the academic they find to be most motivating – including having an appealing website or writing in a manner perceived to be enthusiastic. In our experience, no subject in Economics is inherently impossible to make interesting: any subject can be made clear, interesting and motivating or, conversely, confusing, boring and de-motivating.

As lecturers and teachers we are potential role models to all students, and our behaviour 'can have a significant impact on students' Lantz (2007). We can therefore mediate openness to diverse ways of being, and contribute to developing and sustaining academic environments where international students feel valued, included and motivated. However, we may inadvertently propagate unhelpful stereotypes regarding other cultures.

Prior to their arrival in the UK, international students will have been successful learners; their skills, knowledge and command of English are to the level required by UK admission criteria, and they will have received advice regarding the challenges of living and studying in the UK. But the challenges encountered when they arrive are often manifested in such unexpected ways that students may struggle to settle into their academic lives. The opinions of individual international students are very important since those who are highly motivated by their experience in the UK can become excellent ambassadors, in turn motivating others. This is implicit in the following quotes:

'I have always loved the British culture, history and the English language. So for me it was the only place where I wanted to study.'*

'(…) I already had friends studying in the country.'

Students can now share their thoughts on social media, thus influencing the choices of other students.

Whilst UK universities have for many years organised activities specific to welcoming international students, particularly the induction week, there tends to be a separation of the social from the curricular, in that the presence of international students is visible and explicit in specifically designed social occasions, but

invisible and barely implicit in learning and teaching contexts. Regarding this issue it is interesting to comment on the findings from the 2004 and 2008 Alumni Survey (Economics Graduates): the perceptions of alumni regarding their own awareness of cross-cultural issues has increased markedly from 2004 to 2008, but their perception of the role played by the degree itself for awareness of cross-cultural issues has not changed much. These results strongly suggest that there is a lot that can be done within learning and teaching of Economics to further support cross-cultural awareness and fluency of Economics graduates.

By developing an understanding of international students that acknowledges them as able, experienced learners who have been successful in other learning contexts, we can work from the constructive premise that the challenges faced are a result of conflicts between the expectations of the parties involved and their actual experience. International students can be an invaluable asset if we facilitate and value their participation in the learning community. Staff and students alike can gain wider, richer and internationalised perspectives of Economics, and of personal and social choices linked to culture.

Notes

1 Quotations marked with * are drawn from Economics Network (2008) Economics Network Students Survey 2008, available at http://www.economicsnetwork.ac.uk/projects/stud_survey2008_full.pdf

2 Quotations marked with + are drawn from Economics Network (2007) Economics Network Lecturer Survey 2007, available at http://www.economicsnetwork.ac.uk/projects/lec_survey2007.pdf

2. Cultural diversity and learning and teaching

In this section we share examples of cultural diversity we have experienced that can directly impact on the academic performance, behaviour in lectures and social interactions of international students. These examples support or complement the wealth of published material on this matter (see for example Ramburuth, 2001, who investigated the perceptions and practice regarding cross-cultural learning behaviour with implications for teaching, learning and diversity management in Economics; and Carroll, 2005).

In some cultural traditions, scholars are treated with great respect as societal role models. Students from such cultural traditions may address us with ceremony emphasising or exaggerating our academic title, and combining it with our first name. No matter how many times we invite the student to call us by our first name alone, they may never feel at ease to do so. Also, some students may seek our advice on personal issues of a serious nature, beyond the scope of normal pastoral care. In these situations it is best all round to refer the students to specialised support services within the institution.

Knowledge is, for many, considered as having an intrinsic value for humanity, with no ownership or attribution to its creators. The fundamental value of learning and of researching to become a better human being is in contrast with applied research and learning for a career and material gains:*

'My main objective was to learn economics rather than getting a degree, however, currently I just wish I could finish my degree as soon as possible because I am not learning what I wanted. I have become a degree seeker instead of knowledge seeker.'

Referencing can be meaningless if we believe we should integrate learnt knowledge as our own. This is fundamental to understanding why so many students are considered to be colluding and plagiarising even after being explicitly told that this is unacceptable, and that they can face exclusion.

Top Tip

The purpose of referencing escapes many international students, and is not an immediately easy task as it implies being very attentive to detail. Exemplifying how to reference properly using our own work somehow humanises the experience. Asking the students to practise referencing under our guidance and giving students immediate feedback can be very helpful.

There are also implications for answering exam questions and writing essays. Many students will consider that basic questions that check factual knowledge cannot be *just* that. They take such questions as opportunities to show how much

they know around the subject without ever stating the obvious because that *is* obvious and the lecturer or teacher already knows that. As a result, such students produce long answers that do not address what is asked, and that often have to be marked as wrong. Similarly writing essays can be a problem.* Some students will produce work that is three times as long; that does not address the immediate concerns of the essay but is instead speculative; where no distinction is provided between facts and opinions; that is poorly referenced, or not referenced at all. This tends to be an issue when students first start their degrees but can have a big impact on their motivation:*

'Essay writing during the first year was a little difficult.'

Respect in some cultures also manifests itself by not looking straight at others, so that there is no eye contact. We could interpret the student as lacking in confidence, being extremely shy, not being interested or even being rude. This is relevant when students give presentations as they may receive lower marks.

Top Tip

Students who do not look at us directly when talking or listening, respond constructively when we explain sensitively how such behaviour can be interpreted. Students need to consider *negotiating with themselves* and changing a behaviour that may be core to their culture.

In some countries, arriving late, chatting with peers or answering the mobile phone in lectures or tutorials is not an issue. We have given lectures in some countries where students take notes whilst answering their mobile phones, or leave the lecture halfway through and come back later without any form of justification. When international students chat during lectures or tutorials, particularly in a language other than English, it can be distracting, irritating and interpreted as a lack of respect. However, students may be trying to support each other's learning as expressed in the following quote from an Economics lecturer:

'In the past I have occasionally had overseas students talking in class – but this was usually one of them translating for the others.'

Interrupting or talking at the same time as other people can be considered normal and even desirable in some cultures, as it indicates people are paying attention and are interested. Yet, in the UK it may be interpreted as disruptive, aggressive or rude. We need to address these issues early on, by explaining to students clearly that such behaviour is distracting and considered disrespectful.

Some students will want to give us presents, as an expression of respect. It could be food and drinks, but it could also be expensive goods (or money and vouchers) and even forbidden imports such as stuffed crocodiles. Simply telling such students

that we cannot accept presents does not solve the problem, as in a number of cultures it is polite to accept a present only after having refused to accept it a number of times. So students will insist that we accept, as it is part of a cultural ritual for them to insist and for us to refuse! Such students can seem to be intrusive and as trying to ingratiate themselves with us in some way.

Top Tip

One approach to deter students from giving us presents is to tell them that we cannot personally accept presents as such gifts become university property and have to be formally recorded (check your university policy on gifts).

Shaking hands energetically, patting each other on the back, gesticulating, talking loudly and standing very close to others may be the norm in some cultures but considered as overtly aggressive in the UK. Unless students are told about these interpretations explicitly, they will not necessarily notice that they are behaving differently to others.

Making quick decisions, taking initiative or volunteering information before developing a strong sense of belonging to a group is not expected in some cultures. However, in the UK reluctance to do the above could be interpreted as passive or non-assertive behaviour. This can lead to some students feeling they are not given the time to think and having to accept other people's decisions, particularly in group work. Making these differences explicit to all may ease relationships between students.

Some students will be surprised that there may be fewer senior female academics in the UK than in their country of origin; others will consistently not acknowledge the presence and professional competence of female academics and will only accept male academics.

Top Tip

Some students feel uncomfortable in one-to-one or small group meetings where they are the only person of that gender. Leaving the door open of the office or room where the meeting is taking place, and offering the student a seat by the door can reassure them.

Some international students will think that English, Irish, Scottish and Welsh are the same; and many non-European international students may even assume that all European students (including UK students) are the same. Likewise some UK students may believe that all Africans, for example, are the same. This form of stereotyping can create irritation for students and staff alike.

3. Being aware of language and cultural references

3.1. Language issues for students

English language is an important factor when international students choose to study in the UK. A good command of English is a highly valued skill for many professionals across the world, and achieving language fluency is a goal for international students. Although institutions set certain language standards as entry requirement, the monitoring of these standards tends to be subcontracted to language units within the institutions.

One issue faced by many international students is the sudden realisation when they arrive in the UK that despite their language qualifications they still find it difficult to understand what others say and others find it difficult to understand them. This is usually often unexpected and can be very disheartening. As a result many international students become very self-conscious which can lead them to avoid speaking with others and to isolation.

Often international students, particularly those new to the UK, are more fluent in written than in spoken English. They may not be prepared for specialised jargon, and initially being taught and tested in English can be unexpectedly difficult. A further issue is that students may feel inhibited to ask for clarification which can affect their performance.

Schmitt (2005) reports that the vocabulary considered sufficiently large for native English speakers is 40,000 words whilst for non-native English speakers entering university it is 10,000 words. Schmitt *et al.* (2001) found the average vocabulary of university-aged English language students in several countries to be just under 4600 words. As would be expected with such a limited vocabulary, students' understanding and progress are likely to be affected. A study by Shanahan and Meyer (2003) found that first-year students of Economics for whom English was a second language, did significantly worse in end-of-semester examination results than students for whom English was a first language.

The following quotes reflect some difficulties initially faced by some international students studying Economics in the UK:*

‘At the beginning of the course it was difficult to grasp more technical and academic terms, but I would not see that as a long-term problem.’

‘I had hardly any experience with essay writing, which resulted in several bad marks at the beginning of my course.’

A high proportion of international students of Economics in the UK report that their learning had been affected in some way due to language:*

‘To some extent, yes. It doesn't affect my understanding, but when it comes to asking questions and writing essays, I do have some problems.’

International students who are native or near-native English speakers, and to some extent UK students whose first language is not English or who come from areas with strong regional accents, can also struggle. The practical suggestions on learning and teaching we share in this chapter may be useful for them as well.

Many international students initially rely on varied verbal and non-verbal cues to understand what is being said, including pace and emphasis, lip reading, facial expressions, hand movements, multisensory signals and contextual prompts. Strong regional accents, colloquialism, the use of unusual phrasal verbs, jargon, abbreviations, acronyms and references to culturally specific information can all obscure the message. Being aware of language and cultural references is very important, as commented by a UK Economics lecturer:

‘My most serious issue is providing material in language that is understandable by ESL students. I am searching for ideas all the time – [the Economics Network site] helps me in this regard.’

3.2. Strong regional accents

It is inevitable to encounter strong accents in an international environment whether individuals are native speakers or not. Both international and UK students consider language issues as barriers to learning:*

‘The seminar tutor should speak better English, as a strong Chinese accent makes it sometimes very hard to follow, even for my native English speaking friends.’

‘Use of more understandable English by the tutors would make seminars far more useful. They can be a little useless when the group cannot understand the tutor and the tutor cannot understand the students when questions are raised.’

Whilst it may be expected that in international environments people may not immediately understand each other, and that this should not necessarily be a barrier to communication, a strong accent can make the a lecture or tutorial incomprehensible. From the students’ perspective, struggling to follow what we are saying because of our accent can be very frustrating and from their perspective,

unacceptable. It is therefore crucial that the delivery of content does not rely exclusively on the spoken word.

Another problem is when students ask a question or offer an opinion but we cannot understand them due to their accent. Asking the students to repeat or rephrase may be embarrassing and counterproductive. Sometimes, it is tempting to pretend we have understood the contribution and try to move on. On a practical note, from our experience, the more we engage with different accents the more we are likely to come to understand them.

Top Tip

A constructive approach when we cannot understand students' contributions due to strong accents is to ask the student to write the question/comment on a piece of paper for us to read, and then for us to write the question on the board for the benefit of all.

3.3. Particular uses of English

Colloquialism, idiomatic and unusual expressions, phrasal verbs, jargon, abbreviations and acronyms

Calling a spade a spade. We should avoid using colloquialisms, idiomatic or unusual expressions that take a long time to understand and learn. One of us recently heard a specialist referring to 'looking at the accounts with *a beady eye*' thought it was an acronym '*a BDI ',* and asked what it was. So if we do use such expressions, we should explain what they mean and why we are using them.

Most international students will know common phrasal verbs including *to stand up*. Less common phrasal verbs can be very difficult to decode and even puzzling. For example, what does to *stand down* mean? Is it the opposite of *to stand up*? If so, how can we physically do it? To develop awareness of such unusual uses can take a long time! Can we use alternatives maybe closer to the Latin or Greek root? For example, instead of *to stand down* we might use *resign*. Linguistically related to phrasal verbs are also expressions that use the same particles as phrasal verbs but in a different order and which have very different meanings – these can be very confusing. Examples of this include *to set off* and *offset*; and *set up* and *upset*.

We should write down all specialised jargon, abbreviations (e.g.; i.e.) or acronyms (BDI!), and what they mean in legible print so that we can refer to this when we use them. It is most helpful if we can refer to a glossary that we have previously made available to students (as discussed in section 6). Also, if year after year, international students make a spelling mistake writing specialised jargon or expressions, we should refer to this, and maybe suggest a way of memorising the word/expression properly.

3.4. Culturally specific references

Examples are important to illustrate information and to help students pay attention to the lecture or tutorial. However, if examples are specific to cultural references they are meaningful only to some students and many international students may effectively be excluded. An illustration of this is when we asked non-European international students and staff about 'Asterix and Obelix' and very few recognise these characters.[(note 1)] Further examples include cultural, social, political, religious or historical references based on the UK, USA and Europe; and TV and radio programmes, films, magazines, newspapers, cartoons and books. Many international students frequently prefer to watch and listen to programmes and to read sources from their countries of origin. So if we want to use local examples, we need to explain the context and why we are using them, and if applicable we could bring a copy to the lecture or tutorial to show.

In cases where our lectures focus on UK specific systems—say, the UK tax system—some international students may feel that this is not relevant to them. We can explain that the underlying thinking and practicalities about systems in the UK are transferable to other systems, and that it is of value to analyse different models of organisation and to learn how to access the relevant information.

Top Tip

The motivation of international students can increase if we ask them to contribute with information relevant to their country. For example, we can ask students to verify the specific impact that a global trend has on a particular economic aspect of their country.

Note

The Adventures of Asterix is a series of hardback French comic strips, first published in 1959, very popular with children and adults alike, in many European countries (http://www.asterix.com/)

4. Promoting interaction for integration

In Economics in particular, poor integration is a missed opportunity for very interesting discussions as international students represent a variety of economic regimes from all over the world. Students from diverse academic traditions also have complementary skills that can be used as a resource for learning. An example is that some international students have higher levels of mathematical ability but struggle with economic intuition and interpretation of results compared with UK students. Interaction that specifically acknowledges these complementary skills can be valuable as international students can check the mathematics of UK students and UK students can check the intuition and explanations of the international students (Long and Barnett, 2008).

Even though many international and UK students would like to interact more, they often misinterpret each others' intentions. For example, a study found that Australian students often think that international students prefer not to mix with them, and vice versa (Volet and Ang, 1998).

Below we discuss how to achieve integration through interaction. We analyse the space provided by the lecture theatre to interact; we give step-by step guidance on how to promote and monitor interaction in the lecture or tutorial; we discuss issues relevant to games and case studies; we discuss group work outside the lecture or tutorial; and we share views on e-interaction.

There may be students who do not like to engage in activities. As long as we provide alternatives for these students to learn (e.g. watching the behaviour of others; trying to look into emerging patterns on their own) we are not excluding them from learning.

4.1. Interaction in the lecture and tutorial, step-by step

In our experience, the lecture space is fundamental to initiating interaction between all students under our guidance. Sharda (1995) highlights the importance of the cultural awareness and sensitivity of staff in supporting the workings of culturally diverse groups, and that group work in class provides opportunities for staff to monitor groups' social dynamics.

The size and seating arrangements in lecture theatres often make them appear unwelcoming spaces, and students tend to sit next to their friends. So a common

justification against embedding interaction in lectures is that it can only be done in small groups, and in rooms where students can walk around.

Activities for interaction include those proposed by Sloman and Mitchell (2002) such as anticipating outcomes to scenarios presented; comparing notes; sharing doubts; filling in gaps in handouts; answering questions; sharing thoughts relating to a quote; anticipating trends in curves; and predicting behaviours.

In our experience, groups of three make good groups as everyone has a chance to contribute fairly, in a short time. Bigger groups may defeat the purpose.

When planning these activities for the lecture, we allocate 1 minute per student per group, plus 1 minute to write down keywords, plus 1 minute per group to share in plenary. In a variation of this format, we give 1 minute for students to reflect on the question on their own and to write down keywords, and then another 2 minutes for students to share in small groups. Instead of asking groups to share in plenary, we can show the students the answers to the activities proposed and give them another 3 minutes to compare in their groups with what they had achieved.

We specifically ask students to form groups of three with others they have not worked with before. We say and write something along the lines of 'Please find two people sitting within your reach that you have not worked with before.' In the following schematics we suggest ways to form groups of three. Students sitting in adjacent rows across a corridor can easily stand up and change places. This gives enough variety to group membership.

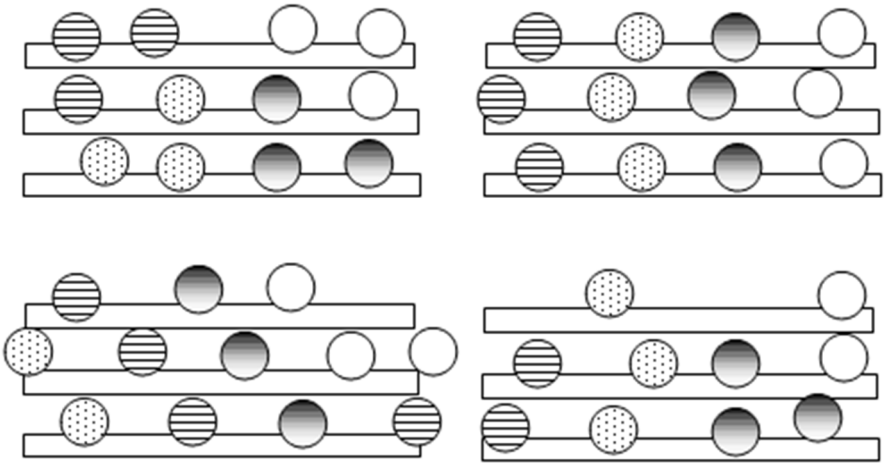

Figure 1 Schematic of sitting arrangements in an amphitheatre type room where the rectangles represent rows, and same-fill adjacent circles represent students working in the same group.

Top Tip

If students are reluctant to interact they may need some encouragement or clarification. Having written instructions and aims, and reaffirming the benefits of interaction, is usually sufficient for students to engage. We should give the choice to students who prefer to work on their own to do so.

International and UK students generally enjoy working this way and are constructive about overcoming difficulties in communication to complete the activities successfully.

Frequently, students start by introducing themselves and where they come from, which is a great step for integration.

Our observations over the years lead us to conclude that there are a number of valuable outcomes of proposing such activities, for motivating integration of international students:

1. Students work together who might not otherwise interact.
2. Engaging in such activities on a regular basis prepares students to listen to different ways of expression including different accents, and different culturally informed views.
3. Students tend to leave the lectures in mixed, rather than in the initial same-cultural background, groups.
4. This is a constructive foundation for more demanding group work outside the lecture.

Top Tip

As students come to expect working in mixed groups in lectures they no longer sit next to their friends and clusters of same-cultural background students tend to disperse. Apart from integration in the lecture, interaction may also nurture informal peer support networks.

Interaction in the lecture motivates international students and further energises the class. We find that it no longer takes most of the semester or academic year for international students to develop enough trust in us and in the rest of the group to be willing to contribute.

4.2. Games and case studies

Using games and case studies in lectures or seminars can help make Economics lectures and tutorials more meaningful and help to motivate students (see for example Sloman and Mitchell, 2002; and Volpe, 2002). When asked about aspects of their Economics degree that could be improved* students refer to more interactive elements, such as games, experiments and role-play.

There are three issues we feel important to address when considering such approaches in an international environment.

1. We need to be realistic in our planning of how long the activities take, so that the conclusions at the end are not rushed, which can lead to international students being unable to follow.
2. International students may need longer to understand why games and case studies are relevant for their learning.
3. Following instructions with jargon that international students cannot recognise can be de-motivating. Even if we reassure the students that they will understand once they engage with the activity, it is still very frustrating to try to do something they have not understood.

Top Tip

Enriching the instructions of games and case studies with multisensory resources can help international students better understand and recall information.

For example, a game with very simple instructions such as 'Setting up a pit market', used to introduce the supply and demand model, can be initially very confusing for international students. So how can multisensory resources be of help? Do all international students know what a *pit market* is? Why not show a photograph? When the roles of buyers and sellers are allocated, can we enrich the verbal instructions with visual or auditory cues? Small changes can make it easier to memorise the roles so we could allocate the **b**uyers (and highlight the **b** for buyers) with the **b**lack cards (and highlight the **b** in black) to make it easier to remember. Also can we complement this with showing and keeping visible the colour of the cards? Can we use a simple cartoon to explain the instructions?

4.3. Group work outside the lecture or tutorial

Group work can be invaluable for students to acquire and develop values and skills. Equally, it can be very frustrating and discourage students from interacting. If this is the case when all group members have attended the same or comparable educational system, having a mixed international and UK membership can bring far more complexity to group work. Different (and divergent) unspoken culturally-influenced values, expectations and prior skills become more salient when trying to comply with deadlines. Our observations indicate that students who experience culturally mixed groups regard anticipated difficulties as manageable supporting the findings of Volet and Ang (1998) and those of De Vita (2005: 77). We too find it important to share these affirmative outcomes of culturally diverse group work with all students to remove unhelpful preconceptions. Carroll (2005) also addresses some interesting issues related to group work.

Before suggesting international students work in groups, it is important to consider the following issues carefully.

1. Suggesting group work at the beginning of the course is not wise as some international students will still be struggling with language, learning how systems work, and trying to access information including the library, internet and intranet, and VLEs. They may therefore be unable fully and equally to participate in group work.

2. International and UK students interact better in groups if they have already had plenty of opportunities to work together during lectures and tutorials as suggested before. Still we have to be aware that unless we do the group allocation, UK and international students might not mix.

Top Tip

In group allocation we need to be sensitive as international conflicts can make some students reluctant to work with others. We must make it clear to all students that if there is a reason why they would like a different group allocation, they can contact us in confidence.

3. Whilst in some countries, students have more exposure to assessed group work than in the UK, in other countries group work may be considered as not real learning. So whilst some international students will have very professional, proactive and constructive approaches to group work others will be uninterested and disengaged.

4. To assess the process we can ask all students to submit reflective journals. Self-regulation and keeping records of emails exchanged, when meetings took place, what was discussed and decided and who attended can be very useful for us to balance who did what and when. Our experience is that many international students do not understand the relevance of reflective journals. Can we provide them with examples and can we make it explicit that these are part of the assessment?

5. We need to clarify what we expect to get from group work; what the roles are within the group; how we expect the group to self-regulate and that all contribute fairly; the typical barriers to group work and how they might be overcome; and what students can gain and what the challenges might be.

For example, in many cases, working in groups with international and UK membership can be slow, with the potential for misunderstandings. Some international students feel that they are not given the opportunities to express themselves, are being misunderstood intentionally, and are being rushed to make decisions. Some UK students may feel that the progress is insufficient and they are

effectively wasting time, not learning as much, and that they will be marked down. Some other international students with more experience of group work may feel that UK students do not make enough effort.

Top Tip

Make explicit to all students the values and skills they can gain from group work and the added value of an international membership. Also be clear about the difficulties that groups with a culturally-diverse membership can pose and how the difficulties may be manifested in practice.

Shanahan and Meyer (2003) observed that awarding bonus points for completion of a non-traditional curricular task related to learning issues resulted in increased student responses, and supported students' perceptions of the legitimacy of the task as integral, rather than external, to the course. An equivalent approach can be incorporated regarding knowledge and understanding of different cultures as an item that contributes to the final assessment of group work. We first need to ensure how specific we expect students to be in return about what they have learnt from each culture presented in the group.

4.4. International students giving presentations

Some international students may not have encountered this type of academic situation, and some may be too uncomfortable with their way of expression in English, as expressed by an Economics student:*

'(…) in terms of presentations it was quite problematic for me to speak in front of people.'

Asking international students to give presentations can result in unnecessary tension. Adjustments may help the student feel more comfortable with the situation. For example, would the student prefer giving the presentation in a smaller room, to a smaller audience? Or maybe to read from a script while sitting down?

Consider whether allowances should be made for oral fluency of international students when giving presentations. McMahon (2007) argues that since students will be assumed to have a very good command of English on finishing their degree in the UK, they should be judged in the same way as UK students. However, international students may sometimes feel it unfair to be penalised due to their use of language. We suggest that if such a criterion is to be adopted, international students should be given plenty of support on their presentation skills, and staff assessing the presentation should give specific feedback on what and how exactly the use of language can be improved, so that international students can work towards specific goals.

All students preparing to give presentations have to be aware of the diversity of audience needs including those of (other) international students. We can specify what we do in our practice to support the learning of international students, including making available materials beforehand; writing down questions; making references available; and responding to questions and comments in an affirmative manner. We can formalise criteria relating to clarity of the presentation to international audiences in the evaluation sheet.

Top Tip

Avoid asking international students to read aloud in lectures or tutorials as this can cause embarrassment for those who are self-conscious about their pronunciation, particularly at the beginning of their course.

4.5. Online interaction

With Virtual Learning Environments (VLEs) and social networking platforms we can communicate with students in a way that makes effective use of our time. In addition, outside the academic context, and irrespective of language and cultural differences, many students are increasingly using social networking sites. If we use these means to enrich our teaching we may facilitate students' engaging with the subject.

Social networking can be used to great effect to promote learning of academic content and interaction of international and UK students in and outside the class. Communicating academic content using spaces students use to socialise seems to make the students perceive the subject and the lecturer or teacher as familiar and motivating. However, we would like to caution that some colleagues feel that they effectively spend more time moderating students' contributions. Good training on advantages and disadvantages, as well as on the time management skills required is recommended before we consider proposing their use as learning tools.

5. Being sensitive with questions, answers and comments

5.1. Offering questions and inviting comments

One of the recurrent comments about international students is that they do not contribute in lectures or tutorials. The classic 'Are there any questions?' followed by an uncomfortable silence, is often used to justify moving on quickly. But do we find it easy to interrupt the Dean or Vice Chancellor with a question or comment without feeling that it may seem obvious or irrelevant to the rest of the audience? International students have the added tension of simultaneously internally debating how to articulate the question or comment in 'good English'. In our view, questions should be used as offering opportunities to learn. However, they can sometimes be felt as threats.

Top Tip

If we want international students to contribute to a discussion we have to anticipate that initially they may struggle to find the right words or expressions, and may need more time than UK students. In addition, international students are more likely to contribute with questions and opinions when they feel safe that they will not be ridiculed for their English.

An approach we have adopted in our practice that motivates international students to answer questions is as follows:

1. We avoid asking questions directly of individual students, whether international or UK.

2. We are also particularly aware of the difficulties in presenting international students with a text that they have not had an opportunity to prepare, and asking them to respond to questions. If we want to consider written material not made available beforehand, we must give enough time for international students to read it. A good approach is that we read the material twice over in silence, and that usually corresponds to the time many international students take to read once.

3. We always write the question down with clearly legible handwriting (or have it already written in slide shows, OHTs, etc.) and keep it visible so that international students can refer back to it without having to ask us to repeat. This has two practical advantages as we avoid the following:

a. when we repeat the question, we are likely to rephrase it and generate added questions or slight variations from the original one, which can confuse international students;
b. international students may not realise at first that we are asking a question (particularly if we do not use emphasis), and may worry that we think they are not paying attention.

4. We give students 3 minutes to discuss in groups of three what the answer/answers might be.

5. We reassure the students that:

a. We can all learn from doubts, so doubts are learning resources.
b. All interpretations are initially valid, and initially we are more interested in diversity rather than focus on the quality of the contributions.
c. We are more interested in giving students opportunities to test their own understanding than in assessing their individual knowledge at that point in time. This way we get to know and can then clarify, for example, plausible or intuitive but wrong views, that several students may have.
d. The more difficulties and misconceptions raised and elucidated before the exams, the better for all!
e. Abstract, complex concepts need time to mature and become clear.
f. Inevitably, some students will be focusing more at some times than others, and together in groups they may have got all or most of the message.

6. We suggest that one of the students writes down the answers produced by the group on a separate A4 piece of paper, clarifying that we are interested in the combined contribution and not on who contributed what.

7. Once the groups have been talking for 3 minutes we remind them that they should start writing notes on what they want to share, and we give them an extra minute to do so. In our experience this refocuses the students on the task and supports them in being succinct.

8. To get the attention of very animated students we clap three or four times.

9. Because of time constraints, we do not ask all the groups to share their contributions in the lecture. We randomly select two or three groups to read out their findings with one of the group members reading the group notes.

10. We ask all groups to share their contributions on a VLE or by email.

11. We remind them that whilst the posting will be done by one of the group members, it is important that the comments are anonymous, i.e. we do not identify which group member contributed what.

12. Being realistic: even if only two groups share their contributions in the lecture, we need to allocate 4 minutes for group work and 3 minutes for sharing.

In our experience if a group interpreted the question differently from what we had originally expected, they typically apologise for interpreting the 'wrong way'. We reassure them that their contribution is still welcome. This is a good opportunity to clarify how to interpret types of question and is valuable preparation for exams and essays. We should take note in the session plan of the different interpretations of a question as this can inform us when writing exam questions, and reflect on how to make the question clearer. If several groups interpret our question in ways we had not expected, it is a strong indication that the question needs to be rephrased.

Top Tip

International students are more likely to contribute and to take risks if there is a shared responsibility for the contributions and they are not the sole focus of attention. Even students with strong accents do not generally have problems in contributing when they are talking with their neighbours.

This approach has enabled us to probe and learn misconceptions students have regarding the topics taught; to reflect on the areas of our lecturing we need to clarify further; and to help international students feel that they can contribute to everyone's learning regardless of their perceived communication difficulties.

In seminars and tutorials, where more time can be allocated for each question and student cohorts are smaller, we can invite all groups to share the answers obtained.

Top Tip

In tutorials, groups can show their responses using a visualiser or putting up their contributions on the wall so that all students can go round the room and read them. We need to allocate 10 minutes for this, but we can be sure that all feel focused and energised.

Advantages of this approach include that:

a. we save time, as we avoid groups repeating or rephrasing the same items;
b. we avoid the potential distractions that result from listening to the contents of all posters
c. to tick or add an item to a poster implies that at least one member of each group is paying enough attention;
d. all groups feel they have contributed, even if to inform us that all items have been covered by previous groups.

5.2. Responding to questions/comments

When it comes to responding to questions or comments from international students we have adopted the following approach.

If we understood the question being asked, we start by repeating the question or comment (or rephrasing it, particularly if it needs to be simplified) to check that our understanding represents the student's meanings. We write down the question/comment or its keywords on the board. Very importantly, this gives the opportunity for all students to read the contribution, and be prepared to engage with the answer.

We thank the student for their contribution. We may say 'thank you', 'that is a relevant point' or 'that's an interesting question'. What we are signalling to all the students is that we welcome their willingness to contribute, and that the whole group can benefit. Even if it is a request to repeat what we have just said, we thank the student as we can anticipate that several international students may also have missed that particular point.

Top Tip

Aim to keep answers short and simple, and avoid lengthy answers or too much detail as international students may be unable to follow. Writing keywords and drawing visual elements such as a diagram or flow chart on the board can help.

When we finish, we can check that our response has addressed the question and open the possibility for the students to contact us if issues remain. For example, we may say 'Does this answer your question?', 'I hope this answers your question', 'Any issues remaining please come and see me afterwards', 'We can discuss this further at the tutorial/seminar'. We can invite the students to post queries on the VLE or by email, e.g. 'Please email me to remind me of this conversation'.

What if we perceive a question or a comment as provocative? This is where we need to be very aware of the cultural differences that we have mentioned in section 2. Cultural differences influence the responses we expect from International students, and our interpretations of unexpected responses. Students may sound inappropriately aggressive, apologetic or disengaged/uninterested and be genuinely unaware of being perceived that way.

When there are misunderstandings or misperceptions that are uncomfortable or potentially threatening for those involved, it is best to try to safeguard everyone's values and worth. For example, if we feel that an international student is undermining what we are saying, we can anticipate that there might be a misunderstanding and we can ask the student to specify what the misunderstanding is. If the student is not co-operative, we can diffuse the situation by suggesting that the discussion is continued at a later date, e.g. on the VLE.

Unless there is a way of communicating sensitively to the student how that behaviour may be interpreted, the student will not know, and may never develop the appropriate behaviour. In our experience, we have never had to take more severe action such as asking the student to leave the room or having to call the security, and hope that we will never be faced with such uncomfortable situations!

5.3. Supporting international students in sharing doubts and comments

International students may be particularly concerned about forgetting what they want to say or about expressing themselves unclearly. In our experience, giving opportunities for them to work in small groups in the lecture or tutorial results in more questions from them.

Top Tip

International students should write down their contributions (questions, comments) and can read from the script. Students tend to be more focused and clear using this method than when trying to contribute from memory alone. This also makes it possible for us to see the script if we cannot understand the student's accent.

Once the question or comment is clear to us, we can summarise it for the benefit of all present and, if relevant, can write it down on the board.

The focus is always on enabling communication and not making the students feel inadequate for their accent or their different sentence constructions

6. Making written information accessible

Unless international students can prepare for lectures and tutorials in good time, they may struggle and be unable to contribute. In this section we explain particular issues faced by international students, the types of materials we can make available and access to such materials.

For international students, reading and processing information can initially take a long time. Becoming acquainted with the language and ways of representing data, checking unclear cultural references, and translating words and expressions may all be part of the process. We should therefore make the resources available to the students in good time, so they can prepare at their own pace and with access to dictionaries or online resources.

If we make any changes to any information international students have received or have already available, including criteria of assessment, submission deadlines, meetings, teaching times and venues, we need to inform the students orally and in writing so that they have more chances of getting the information. Waiting until the end of a lecture or tutorial to make these announcements is not a good approach. Many students will already be getting ready to go, which increases the background noise, and international students in particular are more likely to be tired and to misunderstand or not hear.

Materials we can make available include lecture and tutorial notes and handouts; slideshows; glossaries and vocabulary lists; list of abbreviations, acronyms, jargon and new words; reading lists; previous exam papers; copies of marked essays; and reflective journals. Such materials can be made available on the intranet and library, as e-booklets or paper copies, and should be available well in advance of being needed (at beginning of the year or start of each term or semester). We can also ask students to research and/or read new material, revise previously covered material, or answer questions that we may post in advance of lectures or tutorials.

Petropoulou (2001) shares the issues faced by international exchange students that join courses at third year level, and who do not share the background knowledge needed to solve some problems. She has supported such students by meeting them outside class and by assigning extra reading in advance to prepare them for material to come.

When designing written materials we should reflect on the following:

1. Is there too much information in the slides and handouts making them difficult and unattractive to read?
2. Is there space for students to write notes?
3. Do materials include visually interesting elements?
4. Are equations, graphs, tables legible when printed?

5. Are the font type and size used legible?

To save paper, we may be tempted to fit two pages in an A4 copy but the material becomes very hard and unattractive to read. If we provide photocopies in the library, we should choose copies that are not twisted, blurred, illegible or dirty, as all these aspects greatly affect legibility and are unappealing.

Some international students will have excellent IT skills, but others may be unable to access written materials that are exclusively reliant on IT literacy, particularly at the beginning of their course. For example, do all students understand the library systems? Do they know how to access virtual libraries and data catalogues? Can they access the VLE? Are they happy with email? If not, can we guide the international students to courses available at the university? Otherwise, can we make paper copies available at the library? Can we suggest those students who have the skills teach those who have not?

Top Tip

Whilst access to written materials may be difficult for some new international students, they should not be excluded from learning that depends on having read materials beforehand. We can give them the chance to learn from other students in the lecture or tutorial.

Here is how we give students the chance to learn from others any relevant information they could not access:

1. We need to plan 5 minutes in our session plan
2. It is most important that we do not make students feel guilty for not having prepared.
3. We ask students to form groups where at least one member has engaged with the reading to share what they remember.
4. We ask them to write keywords on an A4 sheet of paper.
5. We ask two or three groups to share in plenary what they remember.

This allows all students to have a general understanding of the issues we wanted addressed before the lecture or tutorial. It creates good opportunities for international and UK students to interact constructively, and to engage with each other's interpretations. Rather than doing progressively less preparation for the lectures or tutorials, relying on someone else to have done it, our observations are that more students come prepared as they enjoy the social interaction and sharing of their learning.

7. Assessment and feedback

In relation to assessment we would like to focus on multiple choice questions. Other aspects of assessment of international students have be explored in a number of recent publications (e.g. Ryan, 2005; and Brown and Joughin 2007).

Multiple choice questions

Multiple choice questions present particular barriers to international students: the right answer should be unambiguously right; all the other answers should be plausible but wrong. The issue for international students is that because of language, the level of certainty can become lower or, equally, the level of ambiguity can become higher.

It is also difficult for new international students to interpret questions and to relate the theory with the questions asked, and to relate doubts and questions to those already addressed in frequently asked questions. So they need to be given opportunities to learn and practise the language in this particular context. Can we provide lists of typical language used in questions? Can past exam papers be provided at the beginning of the year and be worked on in tutorials?

Feedback

The aim of feedback is to support learning in relation to stated outcomes. In other words, it should provide a link between the student's present performance and future targets:

'Personally feedback is one of the most important elements to improving.' (Student, Economics Network survey)

Feedback (or lack of it) affects all students of Economics. In the case of international students, there are particular barriers as they may not be familiar with classifications, assessment rubrics or indeed the difference between writing conventions for essays, reports, or reflective journals. This is expressed by an Economics student:*

'Learning experiences have not prepared me for the teaching and assessment style used in the UK as it differs very much from the system I am used to.'

It is worth remembering the need to be explicit: the 'what' the 'how' and the 'why'. We should be explicit well in time before any students engage with work that will be assessed so that they have the chance to understand how learning outcomes relate to assessment. No feedback or poor feedback results in depriving students of information they need to develop.

Some Economics students feel they are left ignorant of their progress due to lack of continuous assessment and that there is too much dependence on the final exam. Comments include:*

‘We rarely get any feedback on our submitted work.’

‘Very little feedback received through all courses.’

Realistically, assessing students’ work is very time-consuming and possibly one of the most unrewarding tasks we have to engage with. Assessing the work of international students can be more complex and more time-consuming as we need to be sensitive to their use of the language. The cumulative spelling difficulties, unusual use of words, and uncommon sentence structure can make it very hard for us to feel constructive and to interpret appreciatively the meanings behind what is stated, and to mark the work fairly.

To return assessed work in a timely manner puts a lot of pressure on us. But unless we do so, the assessment is unlikely to be of much use as it can require a lot of effort to refocus on the work many weeks after it was submitted. Hence the large piles of uncollected essays when students have already moved onto something else! To empathise with this, think of the effort it may require for us to try to engage constructively with reviewers’ comments regarding a paper we have submitted for publication three months earlier! The same happens to students:*

‘[Feedback is] normally received too late to be of any help’; ‘Highly poor at my university, you have to chase lecturers for feedback.’

To give one-to-one feedback to all international students is unrealistic as there is not enough time when student cohorts are large. But we can understand students’ frustrations expressed below.* Let us just imagine that instead of detailed feedback from reviewers on a paper we submitted for publication, we have general areas of improvement for the errors we have made!

‘I would have loved a lot more feedback and criticism specifically about my own assignments rather than discussing them in groups.’

‘If the lecture give feedback one-to-one, it is very useful; just give classification is useless.’

Hyatt (2005) discusses types of feedback, and the importance of giving encouragement and appreciation to students with the purpose of establishing and maintaining good academic and social relationships.

One way to humanise formative comments is with the following structure:

1. We start with a brief sentence of appreciation for the effort/time/interest the student has invested.
2. We describe what has been done well.
3. We highlight three points that need further development.
4. We finish by expressing hope that the student's future work may gain from our feedback.

In our experience, following such a structure makes the task of marking large numbers of essays and exams more personable and focused, coherent and fair for everyone involved, as all students get the same amount and type of comments, and we work more efficiently.

The following suggestions are designed to make students gain an appreciation of the challenges of assessing work, including the time taken to assess and to articulate feedback.

1. Give students as much preparation as you can prior to the actual evaluation. Explain how they will be tested and what is expected of them. Providing students with examples of model answers to past papers, for example, gives them a clear idea of the standards they should be aiming for. The Economics Network has excellent resources on this.

2. Before students have to submit an assessed piece of work, post a piece of work with errors and suggest that they:

a. comment and mark it following specific criteria;
b. write suggestions for improving the work;
c. bring their conclusions to the lecture or tutorial to share with colleagues;
d. in the lecture or tutorial, give 5 minutes for international and UK students to share their conclusions in mixed groups.

When students hand in their work for assessment, a way of addressing the multiple tensions referred to above is as follows:

1. We post a numbered list of formative comments on particular difficulties, frequent misinterpretations and errors on VLE or by email.
2. We suggest that the students reflect on the completed task, and conduct self-evaluation in their own time with reference to the numbered list we provided.
3. We ask the students to bring a copy of their self-evaluated work to the following lecture or tutorial.
4. We address the points on the numbered list in plenary.

This gives international students a chance of understand better the type of feedback they are likely to receive, and to have an idea of what to expect.

Top Tip

We can provide students with a list of common issues that they can use for self-assessment, and use the same list when we assess the work, as a way to provide consistency of terms of reference. If new patterns of errors emerge, we can distribute them to complement the previous list.

Fullekrug *et al.* (2007) engaged in an assessment protocol that included students sharing their lecture notes online with other students and with the lecturers. This became an interesting strategy to share understanding of the topic and to complement, clarify and/or correct the notes. The co-created lecture notes were compiled as a comprehensive booklet which led to a sense of group ownership. This type of assessment increased focus and purpose. The staff involved learnt the common difficulties presented by the subject and the time spent assessing the work was effectively reduced.

A word about language. Even though some international students will come to the UK to '*master* the language to perfection', once they stop attending English language courses their level of written English can deteriorate rapidly. Therefore, whilst as lecturers or teachers we do not have the time or training to provide written commentaries on language use, it is advisable to make a sensitive remark about general language use (e.g. relating to word structure, making plurals and using articles).

8. Where next?

All links were last checked on 19 December 2016.

Further reading:

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Web resources

Assessing group work
http://melbourne-cshe.unimelb.edu.au/__data/assets/pdf_file/0003/1770717/Group.pdf

Advice for students unfamiliar with assessment practices in Australian higher education
http://melbourne-cshe.unimelb.edu.au/__data/assets/pdf_file/0004/1770709/IntStaff.pdf

A 14-minute video useful for reflecting about learning and teaching in large classes in general. It is not aimed at learning and teaching international diverse student cohorts so we believe activities need to be introduced more frequently considering a 7–10 minute attention span rather than the 20 minute proposed as we discuss in section *8*.

Teaching Large Classes. A video featuring Graham Gibbs
http://learningandteaching.dal.ca/vhtest/largeclasses.html (broken link)

A useful reference for students is the OU's online resource on mathematics and statistics, Chapter 3 'The language of proof'. This can be accessed by guests at

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Dealing with students' diverse skills in maths and stats

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1. Introduction

The starting point for this chapter is the 'maths problem' in United Kingdom Higher Education (UK HE). This provides a challenging environment for the delivery of both maths and stats teaching in many subjects, particularly economics that is the focus here. Many assume that the 'problem' is only in teaching students who illustrate very limited maths ability or confidence. In fact, the diversity of maths ability is a major issue. This is increasingly the case as UK HE attracts a high number of students from the European Union (EU) as well as outside the EU, and thus an increasing number of students from diverse educational backgrounds. This general upward trend in students coming from outside the UK is reflected in the background of students choosing to study economics.

This chapter will draw a distinction between maths and stats modules, compared to other economics modules that rely on understanding of maths and stats. Its aim is to provide guidance together with a selection of 'hints and tips' to assist practitioners, rather than outlining a review of the education literature. The sections have been kept moderate in length, and an effort has been made to allow the reader to be able meaningfully read discrete sections so that someone can dip in-and-out of the chapter.

Towards the end of the chapter there is a question and answer section that aims to provide step-by-step advice to overcome key problems when teaching maths and stats.

2. Delivering maths and stats modules

2.1 Lecture series

The traditional approach to teaching maths and stats modules is to deliver a lecture or more per week. Despite emerging discussions of a problem-based learning approach few lecturers have fundamentally changed their teaching style. Nevertheless, maths and stats modules are ideal for trialling such an approach. Typically maths and stats students in schools and colleges learn by a relatively light touch lecture style teaching, involving short demonstrations and a high proportion of practical work undertaken by the students. However there is reluctance to move to this format in Higher Education. Partly this seems to be due to a difficulty in identifying how this approach could be formulated in a university context. It is also undoubtedly more difficult to plan for such an approach given the resource constraints that ever larger cohorts entail.

Despite these challenges, it is worth considering the problem-based approach. A basic overview of the structure of the approach is:

1. Problem
2. First meeting
3. Research
4. Feedback meeting
5. Response

The problem-based style of learning can be used in a variety of different formats. One set-up would be for all the teaching sessions to be designed around setting groups of students the task of working through problem sets. The role of the teaching staff in the classroom is then to offer advice as needed. This could be followed by the presentation of the group findings. In this set-up there would be no lectures, essentially meaning the sessions are workshops/clinics. A drawback of this approach is that students may not recognise the sessions as part of a 'proper' module and therefore be less willing to fully engage. If this approach were used successfully there would be a need for very clear guidelines on expectations and learning outcomes.

Another issue that is arises with respect to the problem-based learning approach is that students may become reliant on the group, meaning that they may struggle to carry out problem solving in an independent context. Therefore if you undertake the problem-based learning approach it may be sensible to also consider incorporating individual assessment into your maths/stats module, both formative and summative.

Lectures can provide a useful function, even in a practical subject that lends itself to learning-by-doing. Lectures can act as signposts so that students become aware of what should be their current level of learning and the expectations for future learning. Lectures also provide an effective mechanism for delivering material to a large number of students, avoiding the repetition that can prove very draining for staff teaching on a one-to-one basis. However, the effectiveness of a large group lecture depends on a number of factors. Teaching staff often find lecturing maths and stats in modules to be problematic due to the diverse ability of the students. It takes a very well planned and skilled member of teaching staff of deliver a lecture that students, across the ability spectrum, successfully learn from. Alternatively you may find that you have a group of students with very weak skills and in this context lecturing may not be a useful teaching medium. In contrast to the lecture, one-to-one sessions allow teaching staff to build up an understanding of the range of experience, ability and confidence of different learners and the unique barriers they may face.

Supplementing student-focused workshops with occasional lectures (not on a weekly basis) may be an appealing alternative. The lecture allows for sign-posting key techniques whilst seminars/tutorials with one-to-one support can be used to focus on the range of challenges arising from a diverse student body. The merits of

these different approaches, broadly outlined in this section, centrally depends on the composition of your group of learners.[1]

The diversity of maths ability of a cohort will vary depending on entry requirements. For example, it is likely to be much larger in those programmes that require only a minimum of GCSE-level maths compared with those that require A-level maths and, hence where students have more recent and similar experience. The level of overseas student recruitment adds another dimension to this. Where diversity is an issue, you may also wish to consider offering a preliminary module in order to narrow the gap between your diverse range of learners, with attendance dependent on a screening test on entry. If a preliminary module is in place, this may allow a more 'traditional' approach to be used in subsequent modules, including a weekly lecture series.

Whatever the degree of variation in entry qualifications, in order to effectively teach a range of learners you must be able to identify the skills of different students. Therefore in the next section we will consider the merits of screening and streaming students.

[1] The decision can be influenced by financial and physical constraints. A weekly lecture series will tend to be cheaper, in terms of staff costs, than a set of smaller problem based classes. Teaching space is often organised to facilitate a large group lecture, tiered rows in a large room, and this is not the kind of facility conductive to problem-based learning.

2.2 Assigning students to seminar/tutorial groups, and organising groups in seminars/tutorials

There are wide-ranging views on whether students should be streamed according to their maths/stats ability when allocating students to teaching groups. Fundamentally the decision depends on the student body you are teaching. Your entry requirements and past experience may suggest that the students taking your maths/stats module are of a roughly similar ability. In this case it may be more appropriate to consider allocating students on the basis of other concerns around integration and team-building. In this case weaker students can be offered access to additional support outside of seminars and workshop activities.

However, typically, a key issue regarding teaching maths/stats modules is how to deal with a diverse student body in terms of maths/stats ability. In such circumstances, if groups are allocated on a basis other than ability some students may be reluctant to ask 'simple' questions in front of peers who they perceive to be more able. This can lead to the less confident students not making sufficient progress through the syllabus. Conversely, in such mixed sessions other more

confident and able students may find the sessions ‘boring’ and therefore disengage, with similarly depressing effects on performance.

When streaming is considered there are always concerns among staff that some students will perceive that they have been labelled as weak because they are in the ‘bottom’ group. There is no denying that this may be a real issue. However, there are ways to mitigate the potential downsides, as discussed below. Essentially the problem can be met head-on by explaining the allocation of students to seminars in an open and frank discussion with the students themselves and by building an understanding of the fact that we are all good at different things. In addition it is important to remind students that the streaming may be incorrect and that they should request to change groups if they find their allocated group moving too ‘fast’ or ‘slowly’. By following these steps you can create an environment in which students themselves participate in deciding the best learning environment and as a result will not feel ‘stuck’ in a particular group.

There will also need to be an emphasis that all groups will cover the core material. Together, the emphasis that students are not ‘stuck’ in a group and that all groups will be taught the same core material should counter any negative connotations that students may have of streaming from school where these features are absent and different classes may indeed cover a varying syllabus. This approach finds support in the educational literature. Dancer and Fiebig (2004) note the usefulness of streaming to allow different styles of teaching to cater for varying maths ability, with streaming allowing staff to target at risk (of failure) groups. Similarly Alauddin and Butler (2004) note the benefit from streaming students and providing differentiated offerings, although the authors recognise that teaching to the median student in a lecture room is cheaper and that there are resource-induced tensions in the modern university.

If you decide to stream your students into groups based on a screening test you may also wish to consider sessions of different lengths. This is because although you may target a group who require additional foundational support using the test, there is still likely to be considerable diversity within this group (the greater the higher is the threshold pass mark in the screening test used for allocations). For example, you may want to allocate the more maths/stats able students to one-hour sessions and weaker students to two-hour sessions. This can help reinforce the fact that the same core material will be discussed in all sessions, albeit at different speeds across the groups. An alternative is to provide additional support sessions for students who wish to access this support. However those students who need this support - and recognise the fact - will often have other competing pressures on their time and therefore be less likely to make the time unless it is part of their scheduled activities. Accordingly, by formalising the additional support in different length sessions you can have more confidence that you will reach the students who may benefit most from it.

If streaming your students seems appropriate then the first practical consideration is what results to base this on. Assuming that the data is available then maths entry grades could be used for this purpose. However for some students these grades will have been obtained two or more years before starting university or be based on various overseas qualifications. Therefore it may be sensible to consider screening test prior to the start of the module to establish a current baseline of knowledge.

The next consideration is designing your test. A multiple choice test will allow for quick marking, as turn-around time is likely to be an issue, and you may consider on-line testing to avoiding marking altogether. It is perfectly acceptable to use a multiple-choice test in this setting as long as it is well designed. There is a range of guidance available to assist you, including that available via the Economics Network website. The main considerations are that enough answers are available as options and that these options are sensible in terms of the rational routes that students may have taken to solve the question.

It is worth bearing in mind that while on-line testing has obvious appeal there are a number of issues to be borne in mind. You will need to ensure that you can find a large enough computer room to carry out the testing. The other issue is that it takes time to become familiar with the on-line testing software available at your institution and you will need to make sure technical support is available on the day of the test. The reality is that you will also have some students arriving late and therefore a mixed economy of on-line and paper-based testing will nearly always be required. You will also want to make sure you have a paper-based back-up in case the system ‘crashes’ or some other unforeseen event occurs.

It is important to review your processes and to continue to tailor your approach to the needs of your students in the light of experience. In particular, the screening test threshold mark for allocating students to a preliminary support module or to longer workshop sessions will require review and reflection. As part of this process it is helpful to check that the test has appropriately streamed the students at the end of the maths/stats module. Checking the correlation between the screening results and final grades in the module concerned can be useful guide. Ideally streaming will have delivered added value bringing all students up to a similar level. However, in reality maths/stats learning takes more time a typical module allows to bring students to a similar level and so it is to be expected that there will remain some degree of positive correlation between screening results and end of module results.

If you decide to carry out streaming you may still involve students in group work within the streamed seminar classes. There needs to be thought given to determining the make-up of these within-class groups. Learners have different styles: activist, reflector, theorist and pragmatist. There is some evidence to suggest that it is useful to try and select students with similar learning styles into a group (Dunn et. al. 1995). Table 1 explains these types of learners. You may wish

to set an exercise, or a learning style questionnaire (see, for example, Entwistle, 1981; Honey and Mumford, 1995), and then ask the students themselves to identify their learning style in order to help group formation.

Table 1 Seminar activities appropriate to each type of learner (according to 'experiential learning')

Activist style	
Learns best from activities where: • there are new experiences/problems, etc.; • they can become engrossed in short tasks, games, competitive teamwork tasks, etc.; • there is excitement/drama/crisis and things chop and change with a range of diverse activities to tackle; • there is chance of limelight, e.g. leading discussions, giving presentations; • they are involved with other people, e.g. bouncing ideas off them, solving problems as part of a team.	*Learns least from activities where:* • learning involves a passive role, e.g. listening to lectures, reading, explanations; • they are not directly involved; • they are required to assimilate, analyse and interpret lots of data; • they are required to engage in solitary work, i.e. reading, writing, thinking on their own; • they are asked to repeat the same activity over and over again.
Reflector style	
Learns best from activities where: • they are encouraged to watch/think/chew over activities; • they are able to listen/observe a group; • they can reach a decision in their own time without pressure and tight deadlines.	*Learns least from activities where:* • they are forced into the limelight; • they are worried by time pressures or rushed from one activity to another; • they are pitched into doing something without warning.

Theorist style	
Learns best from activities where: • they are in structured situations with a clear purpose; • they are required to understand and participate in complex situations; • they have time to explore the associations and interrelationships between ideas, events and situations.	*Learns least from activities where:* • they have to participate in situations that are unstructured, where ambiguity and uncertainty are high, e.g. open-ended problems; • they are faced with a hotchpotch of alternative/contradictory techniques without exploring any in depth; • they find the subject matter platitudinous, shallow or gimmicky.
Pragmatist style	
Learns best from activities where: • there is an obvious link between the subject matter and a problem set; • they are practising techniques with coaching/feedback; • they are given techniques that are applicable to the real world.	*Learns least from activities where:* • the learning is not related to an immediate need or relevance; • there is no practice or clear guidelines on how to do it; • they cannot see sufficient reward from the learning activity.

Source: Honey and Mumford (1995).

2.3 Making maths and stats engaging and interesting

Once the format of the teaching sessions and method of assigning students to various sessions has been decided the key issue of making maths interesting for students with diverse skills must be given some thought. One of the most obvious initial steps is to illustrate key maths and stats techniques using economic examples. This approach can help weaker students understand the concepts better as they are then able to identify the relevance of the maths techniques in terms of economic applications. In addition, stronger students may be stretched by

attempting more advanced economics applications using their maths skills. However, this alone is often not sufficient unless the examples are familiar from the core economics modules students are studying concurrently. This can be more difficult than it appears in year one since students may have limited exposure to maths and stats within the core economics modules, making the linking more difficult, or there may be issues relating to the sequencing of the economic concepts and the relevant mathematical or statistical technique. Further, this may be further compounded by the need to cover maths and stats techniques in the first year that will be used in economics modules later in the degree programme.

Ideally module leaders from a range of maths, stats and core economics modules need to sit down together and agree on the linkages, common examples and sequencing where possible. Staff teaching core economics modules at stage one may be reluctant as they can take the view that they are being asked to spend time teaching maths and stats within their modules and that this should be placed elsewhere. To overcome this, the discussion should focus on how a linked up coherent approach can make the job of a core economics module leader easier.

Maths and stats teaching and learning usually requires a cycle of demonstrating and practicing a technique. The extent to which this cycle needs to be pre-empted or followed by an economics application requires thought. Some learners prefer to become very confident with a technique before considering applying it to an economics context. Other students need to understand why they are learning a technique before they can engage with the learning process. Evidence suggests that the more effective approach will depend on the educational/cultural background of your particular group of learners. Leung (2001) provides a discussion of the differences between East Asian and Western maths education. The author draws a distinction between the East Asian approach to content (i.e. basic knowledge and basic skills) and the Western focus on process (i.e. understanding how knowledge is arrived at). Therefore you should consider the diversity of skills and educational background amongst your students and adapt your approach accordingly.

In terms of delivery, the current dominant approach to lecturing in UK HE is to use Powerpoint slides. In the context of maths and stats teaching the use of Powerpoint can be useful in that it provides to students with an outline of the structure of the lecture and key points. Nevertheless, an over-reliance on Powerpoint is often unhelpful as weaker students need practice following detailed examples, which is difficult to illustrate on slides without making them very cluttered. Moreover, good students tend to lose interest unless they are stretched to solve difficult problems.

‘Chalk and talk’ is often criticised in the current education literature as a sign of the outdated teaching styles employed in economics. However this technique should not be completely disposed of as there is merit to it. Seeing a tutor solve a problem in real time is often re-assuring for students. Therefore a balance between

demonstrating a technique with ‘chalk and talk’ while summarising the key points on a Powerpoint slide may be a sensible.

Even when the student body allows for a passive lecture experience it is unlikely to prove enjoyable for either lecturer or student. There are a number of possibilities as to how lectures can be made a more active learning experience for a range of learners. Below is a list of suggestions:

1. Go through a demonstrate-and-practice cycle in the lecture slot by asking students to solve another similar example to the one demonstrated. You can encourage stronger students to work with and encourage weaker students.

2. Ask students to complete a paper-based multiple-choice quiz at the end of the lecture. The key to ensuring engagement with this activity is to walk round the lecture room and provide feedback on interim answers. If you simply stand at the front of the lecture you may find a large number of students do not even attempt the questions. The simple act of walking up the aisle of a lecture can maintain concentration on the exercise for most students. You could ask students to mark their neighbour’s answers and ask for a show of hands regarding number of correct answers on the paper marked by each student. This should provide information as to how well you are delivering to your range of learners.

3. You can use online software such as Quizdom to run quizzes during and at the end of the lectures. If suitable software can be downloaded onto student mobile phones this may ease the organisation of this kind of testing. Alternatively students could be provided with a personal handset at the start of the year by the department for a paid deposit. If this system can be made operational it provides a very effective mechanism to ensure active learning. The advantage of on-line testing in real time during the lecture is that students can actually see whether most students have obtained the correct answer. This provides a good opportunity for students to benchmark their understanding against other students. The lecturer can also recognise where there is a broad lack of understanding and attempt to address this in future sessions. In addition, a lecturer should be able to identify any gap in learning between students with different abilities as results are easily stored.

4. At the start of the lecture series create teams of students, with the number in each team determined by the size of the class. You need to give some thought to the rules for defining how these teams can be set-up. In other words, you do not want teams organised by maths ability so you may suggest that each team should be comprised of students from a particular number of countries of birth. Alternatively, if most of your students are born in the UK you may suggest a composition according to GCSE or A-level results. You could agree on a prize for the winning team, or it may be best to keep it a surprise. Each week you could set a maths problem and note the team with the first right answer. To encourage attendance you could set a minimum number of students per team that must be

present in each lecture otherwise the team will be disqualified. The difficulty of the questions set each week should depend on the length of time required for the lecture. This type of activity should develop mentoring within teams of students with diverse abilities.

5. You may consider showing short videos illustrating the economic application of a particular technique. A number of videos are available from the METAL project. This may provide weaker students with an understanding of the usefulness of maths techniques as well as stretching stronger students.

Turning to consider seminars and workshops the following possibilities are available:

1. The traditional approaches to seminars are either to ask students to present their answers on the board or to ask students to work through the questions individually with one-to-one support on hand. If the majority of students have attempted the questions in advance then going through the answers on the board may be a sensible approach. However weaker students may not know how to start the questions. To overcome this problem provide a quick example then ask them to try the problems individually with support. Weaker students often favour the individual work with support option. Whichever broad approach is used, and this may vary from session to session, adding in another dimension (ideas below) to part of the session may keep things interesting (ideas below).

2. It may be worth considering setting up groups and suggest that these are study groups that can meet outside the teaching sessions. You may wish to offer these groups access to a room to meet at another time in the week following the session. The composition of these groups is important and you need to have a classroom set-up to facilitate this type of session.This approach may work best with weaker ability students.

3. It may be appropriate to ask students at a later stage in their studies to come along to teaching or study sessions and act as mentors. This may be helpful with groups of weaker students who may struggle to attempt the questions without support. Mentors may be encouraged to engage with this activity as it positively reflects on their CV. Alternatively you may wish to consider awarding credits as part of a mentoring module for this activity or provide some remuneration. However, if willing volunteers can be found without the promise of credits or remuneration they may be the most valuable assistants.

4. Another option worth exploring within a workshop setting is to encourage students who have finished the problems to ‘teach’ other students. You would need to explain that teaching ensures deeper learning.

5. Question Time! At the end of a session you could split students into groups. Ask each group come up with a question and have a worked solution. This activity ensures that students are aware of the broad set of questions within a 'type' and thus the common approach to their solution. Ask the groups to solve each other's questions and then have an answer session to establish whether the correct answer has been arrived at. Alternatively have each group ask the next to solve a question until no group can answer a particular question and the winning group is the only one left. The tutor can get involved in this type of activity by being a group in their own right or helping a weaker group. This can work well as a wrap-up session as the stronger students are encouraged to stay until the end.

6. Provide students with some questions to practice a particular mathematical or statistical technique. Split the students into groups and ask the students to come up with a question applied to economics and present the solution. This could be presented on an overhead transparency or you may wish to encourage students to bring along a laptop to type up their answer before showing this via an overhead projector. This approach may allow a tutor to engage stronger students.

7. You can use online software such as Qwizdom to run quizzes at the middle or end of sessions. (See previous section regarding further considerations for using this type of system).

8. The reality of the focus on assessment is that students may engage with sessions only if they can clearly identify a link with the seminar/workshop material and the assessment for the module. Therefore you may wish to include past exam paper questions as part of the classroom work. Alternatively, encourage students to attend sessions by explaining the questions will be of a similar 'type' to that included in the module assessment. It is important to stress that the full range of learners will be formally assessed in the same way. This should encourage weaker students to put in more time to 'catch-up'.

9. Computer-based learning can complement traditional delivery and help embed concepts. See section 2.4 for a further discussion.

2.4 Engaging students with strong maths and stats skills

A key issue when delivering a maths and stats module of learners with diverse ability is how to keep those with a strong ability engaged, as there is a tendency to deliver to the lowest ability in the student body. A few practical examples of how to maintain the engagement of stronger students are outlined below:

1. There is a vast array of software that can be used to complement key delivery of maths and stats modules. This software ranges from maths and stats packages such

as Matlab, Derive, Maple, SPSS, Eviews, Microfit, STATA. There is also a range of open source software and you could consider using Excel. You may also consider using e-learning support software that complements various textbooks. While this type of software may help to embed key concepts it can also prove a useful tool in setting extension work for stronger students. One method may be to use a computer lab with the added facility of a central area of tables and chairs. This set-up would allow students to carry out paper-based exercises and then start on the computer-based activities depending on the speed of progress. The advantage of this approach is that one-to-one help can be offered to those attempting paper-based exercises while stronger students work through computer-based activities independently.

2. The traditional approach to deal with more advanced students is to set an additional number of 'challenging' problems. However students may not engage with the more advanced question just because they have been asked to do so. As a result you may wish to consider a competitive element to solving the more advanced questions. You may consider offering a prize for the student who is the first to answer the most of these questions correctly over the teaching sessions.

3. You may consider designing your assessment so that the students that have engaged with more advanced problem solving in classes are able to have more confidence in attempting more difficult assessment questions.

4. You may find that a substantial number of students with strong maths and stats ability actually find it more difficult to apply the techniques to economic problems. Therefore, rather than asking the more able maths and stats students to attempt more advanced problems practicing the same generic maths and stats techniques you can set problems that involve students tackling problems using the techniques in the context of the material covered in the core economics modules.

5. If you have decided to stream your seminars/workshops for maths or stats you may have scope to arrange some presentations during the sessions for more advanced students. This may take the form of asking a group to produce a short (perhaps 5/10 minute) presentation summarising the key learning outcomes and for these to be delivered at the end of the session each week.

2.5 Support staff and sessions to complement core delivery

The support staff available depends on the structure of each institution. If you have a central support unit that includes maths advisors this is an ideal resource. However, central support can often remain de-linked from module delivery and as a result students may not recognise the role of these central staff in supporting their learning. If possible, within the organisational structures, you may wish to ask

central support staff to attend maths and stats seminars/workshops. This will provide the session leader with extra resource as well as providing central support staff an understanding of the needs of your learners. It also helps students to identify these staff as central to their learning and teaching experience. If students feel that central support staff understand the material covered in a particular module they are more likely to feel confident to access the centrally offered services outside of the formal teaching sessions.

If maths or stats clinics are not already offered centrally it may be useful to have discussions with staff in the central service. The key is not that these additional clinics are held only for one subject group but that students feel that those staffing the clinic understand the requirements of their module. A further advantage of having an interdisciplinary clinic is that the high and low demand of any particular group of students is spread across students where this is related to varying assessment deadlines. This helps to provide sufficient demand for the service throughout the teaching session.

It is important to discuss and recognise the terms of reference for support staff. If support staff feel pushed to engage in activities that they do not see as part of their role they may disengage. You also need to ensure that support staff receive a full set of materials for your module if they are to effectively support your students.

There may be the option of students arranging one-to-one appointments with a central advisor. Again, it is important to clarify the terms of reference and explain to your students what they can expect.

Another possibility, noted earlier, is to also engage higher year students as mentors. This provides an additional layer of support to students and the relative informality may encourage those students reluctant to use a central service to at least receive support from a peer. If the mentor themselves has experience of the central service, this may also help break down any barriers amongst more reluctant students.

2.6 Assessment

The forms of assessment in maths and stats need careful thought in order to maintain engagement throughout the teaching sessions. A number of options are outlined below. In many cases these may be combined:

1. **Exam:** The design of an exam can be used to test all the key maths or stats techniques. At the first year level it may be worth being transparent about the technique tested in each exam question. The reason for this is that students often do not appreciate that they need to have an understanding of the whole syllabus. In other words they can often enter the exam hoping that a particular technique will not be tested. Typically weaker students that only attempt a sub-set of exam

questions struggle to reach a pass grade. However there must be consideration of assessing students to ensure that you do not find that a large number of able students all achieve close to 100%. One approach may be to have the final part of each question more challenging. You may wish to be transparent about this so that weaker students are aware that they should move on rather than dwell on more difficult parts of questions.

Another consideration is whether you wish to have an open-book exam. This may be useful so that students are discouraged from memorising particular formulas or every step in a process and focus more on understanding the techniques relevant to particular problem and how the analysis should be interpreted. You should reflect on the learning outcomes for the module when weighing whether an open/closed book exam is more appropriate.

2. **Phase-tests:** The use of a number of small tests can be useful formative and summative assessment methods and, given their regular sequencing through the term, they can help to keep students focused on learning. There may be rules around the conduct of such tests at your particular institution; for example there may be a maximum student/staff ratio per room. Alternatively there may be a need to establish subject level principles if university rules do not exist. The number of phase tests may be determined by the number of weeks for which the module runs as well as whether you take a paper based or electronic testing approach. There can also be use of electronic testing outside the classroom where students have a designated time slot to take the tests. If tests are taken outside the classroom there are normally a greater number.

There may be reluctance to phase-tests due to the marking burden if these are paper-based. Therefore there needs to be some thought as to what is reasonable. For example, marking homework every week for a cohort beyond even 30 or so students may be difficult in terms of workload. There is a balance between ensuring continuous student engagement, particularly important for weaker students, and feedback as well as the marking workload of staff. As noted above, online resources may provide a more efficient means of providing regular feedback to students in addition to class exercises, rather than using assessed homework.

3. **Group work:** You may want to consider group assessment where students are asked to prepare a video explaining a key concept or why a concept is important when studying economics. Alternatively, you could ask students to produce a Powerpoint presentation and record an accompanying commentary (using the facility within Powerpoint). Once you check submissions for inaccuracies you could post selected submissions on your Virtual Learning Environment (VLE). The posted submissions may help other students with revision for a final exam as well as adding a competition element to the assessment task.

There needs to be considerable thought as to how the groups for this task are constructed. For example, the groups could comprise of a range of students with different abilities to ensure a degree of mentoring. However there would need to be a degree of peer assessment to encourage a fair workload across group members. It is worth noting that an exercise of this type will need a reasonable level of IT and presentation skills, and this may be are area where students less able in maths are able to offer a greater contribution.

3. Delivering economics modules relying on maths and stats skills

3.1 The balance of maths and stats content in economics lectures

A successful strategy for engaging students in maths and stats for the study of economics requires a programme of well-considered modules with clear linkages between modules. Nevertheless it is often harder than it may seem. In part this is due to staff taking ownership of their module with less of a focus on the programme and students' learning as a whole. A second issue is that staff have different teaching styles and approaches. Therefore it needs a strong programme team and regular forums, such as team meetings and away-days, to resolve these potential issues.

3.2 Planning seminar/workshop sessions

Seminar/workshop sessions for core economics modules may be organised with a balance of questions around applied maths and stats alongside discussion questions or short presentations. This allows students to be reminded of maths and stats techniques, covered in the stand-alone maths and stats modules, whilst seeing their application. The key principle is that a solid understanding of economic principles is achieved when students can explain a concept using mathematical representation, graphical representation; where they can interpret relevant statistics alongside the ability to explain the concept in words, orally or in writing. Core economic module seminars/tutorials should bring together all of these approaches when asking students to explain key concepts. Discussing how errors in understanding can be realised and resolved through examining key concepts in different ways should encourage students of the appeal of this approach.

3.3 Assessment

The assessment of core economics modules should aim to test a student's ability to explain a concept using mathematical representation, graphical representation; the interpretation of relevant statistics as well as in explaining a concept in words. Core economics modules often include an exam as either part or the whole assessment of the module. There could be thought given to a compulsory question

requiring students to present an answer that illustrates their ability to apply their maths and stats skills. This could be followed by a selection of essay style questions.

Another option could involve setting a report type of assessment allows a range of skills to be tested. It is important to give learners with different strengths an opportunity to illustrate their knowledge and understanding. In order to achieve this the teaching sessions leading up to the report submission should be tailored to develop the skills of a diverse cohort step-by-step. Group work can be helpful when carrying out the class tasks as different group members will have varying abilities to complete different tasks. There may be some thought as to the merits of a group report depending on the learning outcomes and range of student ability.

4. Questions and Answers

4.1 What can I do if I am teaching a first year maths module with a high failure rate?

Step 1: Maths admissions criteria

Obtain data on the performance and maths qualifications on admission of previous students taking the module. Assess these data to identify if there are any grounds for uplifting the maths entry requirement – are you setting students up to fail? The entry requirement will differ by institution depending on the varying demands of economics programmes.

Step 2: Test/screen students during introductory/first week

Design a test with the help of various internal and external support bodies. An example test is provided at the end of this chapter (section 7.1). The turn-around time will be tight so ensure that the test is reasonably quick to mark and that staff are on hand to undertake the marking.

Step 3: Preliminary maths module

Based on the test results decide on which students should be exempted from a preliminary maths module. An example preliminary maths module syllabus is provided at the end of this chapter (section 7.2). A second module attended by all students should follow this preliminary module.

Step 4: Maths module organisation

The seminars/workshops for the maths module that all students attend (following the preliminary maths module) should be organised according to the maths screening results in step 2.

Step 5: Checking the effectiveness of your strategy

Assess the results of the students and amend your strategy and screening tests as appropriate.

4.2 Students are passing the 1st year maths module but the staff teaching 2nd year microeconomics and macroeconomics are concerned that students are not familiar with key maths/stats concepts. What should I do?

Step 1: Check your syllabus

Check whether your syllabus provides suitable coverage of key techniques that are used in the microeconomics and macroeconomics modules. This will probably mean that you need to sit down with the leaders of the microeconomics and macroeconomics modules.

Step 2: Are you connecting the concepts in the maths/stats module with their economics application?

Once you have checked your syllabus you need to ensure that you are using economics examples that allow students to relate the maths/stats techniques to the content of the microeconomics and macroeconomics modules.

Step 3: Is your teaching and assessment strategy designed to ensure that the key concepts are embedded?

It may be that you need to consider more innovative ways to deliver the material depending on your group of learners. Your assessment strategy is also important as one final exam may lead to students disengaging and ‘cramming’ for the exam, rather than having a deeper learning and thus embedding concepts.

4.3 I am teaching a maths/stats module and running lectures and seminars/workshops but attendance is very low. What should I do?

Step 1: Reconsider your syllabus

It may be that students do not see the importance of the material covered in the module and are therefore disengaging. Reflect on how the material covered can be altered and linked to other modules in their programme of study.

Step 2: Are you teaching sessions that provide an active learning experience?

Students often disengage from a module if they do not feel that they are learning anything important. Therefore in addition to reviewing your syllabus you could look at whether the delivery of the module needs re-thinking. Perhaps you need to link the sessions more clearly to your assessment strategy for the module.

Step 3: Have you designed your assessment to encourage continuous participation in the module?

If you have a one form of assessment it may be worth revising your assessment strategy to encourage continuous engagement throughout the teaching weeks. Consider using phase tests (see 2.6.2 above).

Step 4: Are you following up non-attendance?

It is worth checking what attendance monitoring takes place in your subject group. If non-attendance is not followed up frequently or at all it may be worth discussing if you can do so at the module level.

4.4 I am teaching a maths/stats module and the weak students are no longer attending the sessions. What should I do?

Step 1: Have you streamed students according to ability?

If you have not tested and streamed your students according to ability it is worth trialling this approach. It could be that the weaker students are reluctant to attend and attempt the tasks or ask questions for fear of looking 'stupid' and so they disengage.

Step 2: Are you providing learning material that is accessible to your weaker students?

It may be useful to reflect on whether the material provides a sensible starting point for weaker students. If you are concerned that you are going to end up teaching to the lowest ability students then why not think about longer sessions just for the weaker students? (see section 2.2 above)

Step 3: Are you providing support outside the scheduled sessions for weaker students?

You may wish to investigate some of the following: putting students into study groups; running maths clinics; a student-mentoring scheme.

5. Top Tips

1. Think carefully about the role of lectures in your modules delivery. Is a weekly lecture series really needed, or could you offer occasional lectures as signposting for learners with more workshop activity? Alternatively, are lectures required at all?
2. Consider streaming students according to ability, whilst carefully explaining the reasons to your students.

3. Design innovative teaching sessions that maintain student interest, and forms of assessment that requires continuous engagement. Consider the use of in-class online quiz software, video clips and assessment of a video presentation.
4. Avoid focus on delivering to students with the lowest ability. Stretch your higher ability students whilst supporting weaker students. You could provide extra supported learning time for weaker students, whilst tasking stronger students to use software to visualise maths or stats techniques.
5. Engage support staff and student mentors. Find out the help available outside your department to support your maths/stats students. Also consider engaging students in the later stages of their degree to act as student mentors.
6. Ask students for their views of their learning experience formally and informally throughout the teaching weeks. Provide feedback on how you have responded to their comments i.e. 'make it count'.

6. Research

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Internet Resources:

The Economics Network
http://www.economicsnetwork.ac.uk/

Mathematics for Economics: enhancing Teaching and Learning (METAL)
http://www.metalproject.co.uk/

Statistical Resources for Social Sciences (DeSTRESS)
http://www.economicsnetwork.ac.uk/statistics

7. Resources

7.1 Case Study 1: Maths diagnostic test

At several points it has been suggested that an initial screening test can be extremely helpful in identifying students who need more support, either in a dedicated module or in longer workshops. The following maths diagnostic test has been developed at the University of Bradford. This test is included within this chapter as it may provide useful guidance to staff in other institutions considering introducing maths screening. A similar approach could be taken in relation to statistics.

Please note that the University of Bradford has a minimum entry requirement of GCSE grade C in maths. The pass threshold currently used is 70%. All students below this are required to take the first semester preliminary maths module.

A note of caution: this test format may not be appropriate in a different institutional context even if the maths entry requirement is identical. You should reflect on the appropriateness of any test based on the skills required of your students given the demands of your programme.

- Download test in Microsoft Word format

7.2 Case Study 2: Preliminary maths module

Following the maths diagnostic test students may be selected to attend a preliminary maths module. The syllabus and assessment schedule adopted at the University of Bradford is listed below. A few points to note:

1. This material is foundation level so if a similar module were put on at another institution there would need to be a facility for students taking credits out of stage/year.
2. The level of the material of the module indicated below is such that there needs to be serious consideration of appropriate staffing. School/college maths teachers are ideal for delivery at this level.
3. The module below does not have a ‘big’ final exam. Instead, the assessment is reasonably evenly spread over the teaching weeks to ensure continuous engagement. Note that ensuring engagement is very important for weaker ability students who often find material ‘hard’ and ‘boring’. Nevertheless

there is significant staff marking burden as well as the organisation of the test slots.

4. There needs to be clear accompanying material for students, such as practice booklets. It is important that students are encouraged to keep their practice booklets, with their own notes, for future reference.

Weekly Plan		
Week	**Topics**	**Assessment**
2	**Number**: Order of calculation Negative numbers Fractions	
3	Decimals Percentages & interest	
4	Converting between fractions, decimals and percentages Decimal places & sig figs (rounding) Ratio	Test – 30%
	Directed Study Week	
6	**Introduction to Algebra**: Writing expressions Solving linear equations Simplifying expressions Multiply out brackets	
7	Powers & roots Financial maths	
8	**More Algebra**: Linear factorisation Function Notation Formula substitution Re-arranging expressions	
9	Multiply out 2 brackets Quadratic equations: Solve by formula Discuss factorisation (for easier ones) if time.	Test – 30%
10	**Geometry**: Straight line graphs: sketching by finding intercepts	
11	Sketching curves	
12	Revision	Final Test – 40%

The Handbook
for Economics Lecturers

Threshold Concepts in Economics: implications for teaching, learning and assessment

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1 Introduction

This chapter provides an introduction to the work on threshold concepts in economics and the teaching and learning materials developed within the Embedding Threshold Concepts project. This Fund for the Development of Teaching and Learning project was led by Staffordshire University with Coventry, Durham and the West of England Universities as partners.

There is evidence from various sources that many students in economics 'acquire' a set of concepts but this has little impact on the way that they experience economic phenomena. Many struggle to apply concepts to new situations in their work or personal life. The majority of lecturers can identify students who are struggling with underpinning theory and resort to verbatim learning of isolated aspects of the subject. Frank (1998, p.14), for example, writes of a particular manifestation of these problems: '..... most students leave the introductory course never having fully grasped the essence of microeconomics. Thus, the opportunity cost concept, so utterly central to our understanding of what it means to think like an economist, is but one among hundreds of other concepts that go by in a blur.'

There is already a considerable body of work, for example in the other chapters in the Economics Network Handbook series and in the books by Becker and Watts (1998) and Becker et al. (2006), that have suggested ways in which teaching might respond to these problems. These approaches have in the main been based on the view that the common approach to teaching in the discipline (in the UK of fast-paced lectures accompanied by worksheet tutorials) may lead to much transmission of content and not enough opportunity to apply ideas, and that a mixture of activities may prove more fruitful. The threshold concepts approach supports the view that active learning is important, but puts this within an overall framework for learning that has implications for the design of the curriculum, providing, for instance, principles to guide the development of active learning materials as well as exemplars. In a keynote address 'Educating Economists for Government' to the DEE Conference 2007, Andy Ross, Deputy Director and Head of Learning and Development for the Government Economic Service, argued that there needed to be more in the curriculum on 'thinking like an economist' and that threshold concepts might provide the best way to articulate what this means for teaching.

TOP TIPS

"With any concept such as 'market demand' it is not a case of understanding or not understanding. Students may understand any of these ideas in a number of different ways – and the task of teaching is to get students to replace more simple ways of understanding with the more complex."

'Thinking and practising' like an economist requires using the big ideas in the discipline (which we have identified as the threshold discipline concepts) to frame and organise the way we see problems and possible solutions, and the adoption of a modelling approach that operationalises the way we set about analysing the situation. This presupposes that we really want to get to grips with the meaning of a situation (a deep approach to learning) rather than try and match a bit of received knowledge to a situation (a surface approach to learning) (Prosser and Trigwell, 1999). However, a threshold concepts approach to teaching and learning also suggests that the kind of learning that students will engage in will change as they become more tuned in to the way of thinking in a subject.

When a student initially meets ideas in the subject like 'efficiency' and 'market equilibrium' they cannot understand them in the way that an expert would. An expert in the subject sees these ideas in terms of a framework of thought that has generated the ideas. To progress towards an expert understanding a student must initially learn to work with a simplistic version of these concepts whilst being aware of, and comfortable with, being in this position. Students who

think they have understood an expert version of these ideas become confused when lecturers try to introduce them to more sophisticated ways of thinking.

In Section 2 of this chapter the ideas of the approach are introduced in more detail. Section 3 explores the implications for teaching and learning, and discusses the four principles proposed by the approach. In Section 4 we explain the three types of learning activities developed within the project using an example of each, which is reproduced at the end of this chapter. The following section gives a case study involving the use of a particular exercise. The project was directed at first-year undergraduate study and the examples and evidence referred to in this chapter are drawn from that level. However, the general approach applies to all levels of study. The full set of teaching and learning materials, our working papers and other information are available on our website at www.staffs.ac.uk/thresholdconcepts. Section 6 discusses the implications of the approach for assessment. The chapter ends with considering 'where next?'

2 Threshold concepts

Threshold concepts have been proposed as a way of characterising the progression of students at the discipline level. Meyer and Land (2003, 2006) suggest that within each subject there are certain ideas that present themselves to students as portals that can open up a new way of thinking within a particular domain. They propose that threshold concepts integrate, transform and set boundaries to the discipline and probably are irreversible and troublesome for the learner.

The approach is thus concerned with conceptual change and whether students have reached a certain level of understanding that may be interpreted as 'thinking like an economist'. Getting to this position does not simply require a one-off change, but the integration of previously acquired (but maybe not fully understood) concepts and is likely to take time. On the basis of evidence gathered from students and lecturers in economics, the project suggested that a three-way categorisation of conceptual change may be useful in economics. This is summarised in Table 1 and explored in the rest of this section.

Students have to acquire the specialist language which is associated with the discipline mode of thinking. This involves several types of development:

- They importantly have to rework prior (naïve or 'common-sense') understanding that may come from their general life or from their previous studies in economics. Students have to differentiate between price and costs, money and income, real and nominal values, and between savings and investment. They may need to develop their understanding from A level and appreciate how different the concept of aggregate demand is from the concept of demand for a particular good. Prior concepts may also be coalesced into a single concept. For example, the task of explaining a change in wages may come to be seen as similar to the task of explaining a change in prices since wage is the price of labour.
- Also, a concept that is defined in terms of properties may be transformed into a concept defined in terms of relationships. A conception of price as a property of a product may be transformed into a conception of price as the outcome of a relationship between demand and supply.

Type of conceptual change	Type of transformation and integration	Examples in economics
1. Basic	Newly met concepts some of which transform understanding of everyday experience through integration of personal experience with ideas from discipline.	Distinctions between price/cost; income/wealth (stocks/flows); nominal/real values; investment/saving. Real money balances, natural rate of unemployment.
2. Discipline threshold concepts	Understanding of other subject discipline ideas (including other threshold concepts) integrated and transformed through acquisition of theoretical perspective.	Marginality, opportunity cost, incentives (in particular the role and limitations of the price mechanism), cumulative causation (as for instance in the multiplier).
3. Modelling concepts	An understanding of the subject's modelling procedures that enable the construction of discipline specific narratives and arguments (ways of practising).	Comparative statics (equilibrium, ceteris paribus), time (short-term, long-term, expectations), elasticity.

Adapted from Davies and Mangan (2007)

The notion of 'troublesomeness' is involved in such development since students come with pre-conceived ideas on what is meant by, for example, terms such as 'money' (usually considered as income) and 'investment' (not distinguished from saving) which they then need to revise given the more precise use of the concept in the discipline. However, we have labelled all such changes in understanding as 'basic' in Table 1, row 1 as they do not involve substantial integration of thought.

Basic concepts provide ways of categorising phenomena in ways that are necessary for the deployment of threshold concepts. However, students cannot fully appreciate why these categorisations are necessary at this stage and this creates a problem for learners. The lack of a framework for their understanding may initially mean that the learning is 'shallow' with students trying to remember formal definitions and outcomes. Students may appear to understand a basic concept when they use the appropriate terms. But this can be deceptive as they probably do not understand these words in the same way as an expert. But this initial, shallow understanding is a necessary first step on the road towards a richer understanding. It is only once a transforming threshold concept has been subsequently incorporated into a learner's thinking that the full significance of a basic concept can really be grasped; they will have to revisit these concepts as they acquire the integrating framework to achieve a more sophisticated understanding.

TOP TIPS

"Students frequently only half understand concepts that have been covered before. So get them to revisit and develop their understanding of an idea in a new context."

As teachers of economics we typically imagine that learning our subject is relatively 'untroublesome' when students are prepared to work at it. In fact, many students get stuck, even with 'basic' ideas. Whenever research has attempted to uncover what economics students really understand (as opposed to what they can produce in a more or less verbatim fashion) the findings have been frankly shocking. Within the Embedding Threshold Concepts project we recorded students' group discussion on applied topics in class that were related to the more formal teaching over the previous weeks (at Level 1 in three institutions). An example is given in the case study in section 5 of this chapter. These revealed considerable misunderstanding of basic concepts as well as in many cases a basic lack of understanding that economists usually

start the analysis by considering which model to use. Teaching that fails to appreciate the limited nature of students' understanding is bound to fail. Providing detailed guidance and cues in examination questions can disguise the problem but it comes at the cost of undermining public confidence in the value of what we do.

Conceptual change may also operate at a more profound level through the acquisition of organising schemas that can be associated with the development of disciplinary thought. These developments in academic thought have not occurred simply through supplanting naïve, common-sense notions by more powerful explanatory frameworks. New developments within subjects change the way that members of academic communities think about other ideas that have been developed within the discipline. An example in economics could be the marginalist revolution. Initial learning of some 'basic' concepts such as marginal cost and marginal revenue may be as isolated objects in the learner's thinking, but acquiring such frameworks helps the learner to revisit these concepts, employing a deep approach to learning that integrates basic concepts into these organising schema. In these cases the new conception is transformative insofar as it integrates and reworks other disciplinary ideas that the learner has previously acquired and we refer to this as a 'discipline' threshold concept in Table 1. New phenomena that the learner encounters are then interpreted within that framework.

Pursuing the example of marginality, initially most students approach marginal utility, marginal cost, revenue, etc. as separate concepts to define and calculate (remembering them by rote learning). However, being able to carry out these functions is not the same thing as understanding the importance of marginality in economic thinking. This raises the problem that a deep understanding of any of these ideas often requires a student to create links with a broader conceptualisation of the topic, which has to be built from the very ideas that the student has yet to understand. The importance of the concept of marginality comes in recognising its central role in decision making and some students may first come to understand this when using it in the theory of the firm, but revisiting the concept in welfare economics may deepen their understanding and transform their previous understanding of the theory of the firm.

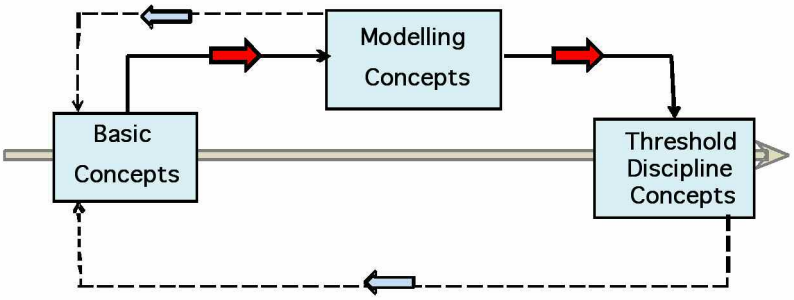
However, there is another important aspect that we need to consider. Discipline thresholds (row 2 of Table 1) are associated with ways of practising the subject: the discipline specific procedures that are used in analysis and the construction of arguments – in economics our use of models. For example, economists make considerable use of 'comparative statics'. This procedure involves the use of comparison of equilibrium positions, using the notion of 'ceteris paribus' in their reasoning. We use this idea in lieu of being able to conduct closed experiments so it is employed as a 'what if' assumption in deductive reasoning. A student who does not understand this device appropriately will have great difficulty in constructing narratives that appear appropriate to an economist and they will be reduced to the 'shallow' learning of specific outcomes. At level 1, which was the primary focus of our project, models are often represented graphically and understanding the modelling procedures is necessary to understanding rather than reproducing the diagrams. Many of our students may come to us having found 'learning the diagrams' an approach that gave them good marks at A level, but with the increasing number and complexity of diagrams they meet in their undergraduate experience this 'surface learning' strategy will fail them. In the threshold concepts approach they need to understand the conceptual basis of the techniques behind the diagrams in order to progress. Learning how to select, amend and test economic models is a central part of undergraduate education in economics and we will refer to this as 'modelling' conceptual change (row 3 of Table 1). The modelling concepts are 'enablers' without which a students cannot achieve a more complete understanding of the discipline concepts and so again are integrative and transformative and may be considered as threshold concepts.

We therefore have a framework in which students will have to revisit concepts in order to develop a deep understanding. The links in this process are illustrated in Figure 1. Although we want students to progress from basic concepts to threshold concepts, this is shown as a long

grey arrow in the diagram as largely this is not achieved directly. Students need the modelling concepts as 'enablers' in the process and so the link is from basic concepts to modelling concepts to threshold discipline concepts. In addition there are feedback loops, shown as dashed lines from the modelling concepts and threshold discipline concepts back to basic concepts, representing the deeper understanding of these concepts as learning progresses.

There is, however, one final complication in learning; in economics the threshold concepts themselves form a web of understanding. Newly acquired threshold concepts may deepen

Figure 1 Learning and integration between concepts

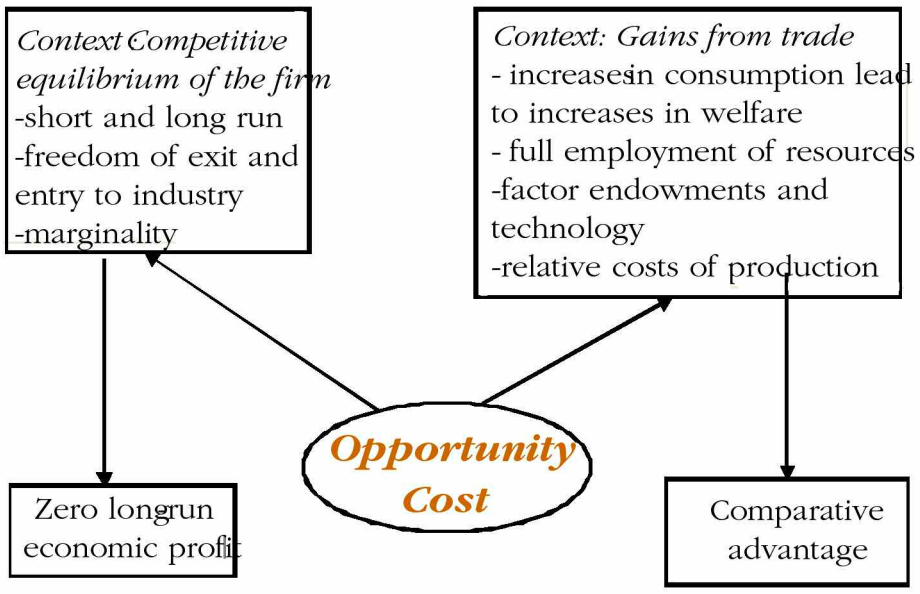


understanding of previously acquired threshold concepts; for instance, understanding marginality (through applications, for instance, in the theory of the firm) may deepen the understanding of opportunity cost – a learning spillover (Guest and Vecchio, 2003). In analysing particular applications, both in their course and outside, students are likely to require a range of discipline, modelling as well as basic concepts. Figure 2 illustrates this using the threshold concept of opportunity cost. Students usually meet opportunity cost in the first few weeks of their undergraduate course and usually have little difficulty in applying this to simple, single country or personal examples. However, they often fail to understand the implications of opportunity cost in more complex situations. The diagram illustrates two ways in which opportunity cost is an important element in theories that are met by first-year students, the competitive equilibrium of the firm and comparative advantage. In these theories opportunity cost is used along with a range of other concepts (that is different in the two cases) in deriving the outcome and the diagram illustrates some of the ideas that are necessary. Most of these are basic concepts, although some may be other threshold concepts – for instance the competitive equilibrium of the firm example includes the threshold concept of marginality.

Considering the comparative advantage example given in Figure 2 in more detail, students need to understand that the analysis proceeds on the basis of full employment of resources and that more consumption is interpreted as a gain in welfare in order to consider the application of opportunity cost in this context. Recordings of student discussion of the gains from trade carried out within the Embedding Threshold Concepts project found that these were dominated by discussion of jobs. Although in mainstream economics we may want students to pursue such aspects in a critical analysis, starting with jobs was preventing student comprehension of the theory. Understanding differences in factor endowments and technology may help students in considering why the differences in opportunity costs arise; while crucially students need to consider the relative costs of production (measured of course in opportunity cost terms).

Students need to recognise the value of other concepts and how they interact with opportunity cost given the particular issue under consideration. Rather than seeing each new context as simply something different to be learnt, students need to be encouraged to reflect on how this new situation can develop their thinking in an integrated fashion, rather than treating each new context as a separate entity.

Figure 2 Opportunity cost and the integration of concepts in two applicationsure 1 Learning and integration between concepts



3. Implications: four principles for teaching and learning

In this section we use some ideas from 'variation theory' (Pang and Marton, 2003, 2005) to develop some implications for teaching. The main pedagogic principle derived from variation theory is that the lecturer should draw the learner's attention to simultaneous variation in the features of a phenomenon that are critical to the desired conception (i.e. the way of understanding something that the lecturer wants the student to achieve). This has led to the proposal of four principles for teaching (Davies and Mangan, 2008), which we reproduce here with discussion and examples:

(i) Highlight variation to ensure there is a sufficient foundation of basic concepts to make it possible to work towards acquisition of the threshold concepts

Students need to acquire certain basic concepts before they can move on to acquire the integration provided by the threshold concepts and although, as we considered above, they are unlikely to achieve a full, deep understanding of these at this stage, progress cannot be made without acquiring some initial knowledge. Highlighting variation in understanding of a conception and giving feedback on what dimensions are useful and what are not may provide a foundation for the deeper study. For example, Pang and Marton (2003) distinguish various conceptions of price held by students in terms of what is related to the inherent value of the commodity concerned, the demand conditions, the supply conditions, and the demand and supply conditions.

(ii) Expose the way in which scholars in the discipline use modelling threshold concepts by highlighting variation in the use of key procedures

This is concerned with developing an understanding of the way models are used in the discipline; why we set up models as we do. Given the complexity of the relationships in the economy, economists use economic models to understand the important interrelationships in the economy. Comparative static analysis is a procedural device developed by the discipline to portray these relationships. Students need to understand why we use such models, the importance of key aspects of such modelling and how this relates to the diagrammatic (or mathematical) representation. An important aspect of this is in understanding the nature of equilibrium in economic reasoning, in terms of it being a final resting point to which markets will move after a shock and also importantly in terms of the forces that resolve the disequilibrium in the model being considered. For instance, without an understanding of this, students may understand the multiplier as simply a never-ending process of interrelationships where an increase in income leads to increased consumption without recognising that in the model there is a limit, with the rise in withdrawals, where the new equilibrium point is reached.

(iii) Help students to integrate their understanding by re-working their understanding of previously acquired concepts in the light of threshold concepts

This helps students to think of their learning in terms of building a coherent structure. For instance, students may initially consider various 'marginal' concepts such as marginal cost, marginal revenue and marginal utility just as isolated ideas, but their understanding of the relevance of these may be enhanced as they acquire an understanding of welfare economics. In macroeconomics, the relevance of the distinction between money and income may only become clear when students start to understand the interaction between the goods and money markets in developing their understanding of the macroeconomy with models such as IS/LM.

We need to design activities that both highlight the role of threshold concepts and procedures and allow the revisiting of previously acquired concepts (both basic and previously 'acquired' threshold concepts, given our arguments about the web of concepts above). It is only when students do this that can they progress in their understanding and we need to encourage them to do this both in formal teaching situations and in their independent learning.

TOP TIPS

"Encourage students to understand that they need to re-work everything they have learnt before – and to see previous learning as necessary, partial and incomplete rather than wrong"

(iv) Help students to regard their understanding as provisional and to tolerate uncertainty

Students have to learn 'incomplete' conceptions in order to make more 'complete' conceptions accessible to them and be happy to move on. Since the acquisition of threshold concepts transforms understanding of previously acquired subject knowledge, students need to be ready to accept that at each stage in their learning their understanding is provisional. This problem becomes most intense when the acquisition of a new threshold concept transforms understanding of a previously acquired threshold concept: an inevitable outcome if threshold concepts work together in a web to define the way of thinking and practising in a subject.

4 The teaching and learning exercises

The Embedding Threshold Concepts project has designed three different types of teaching and learning materials ('reflective exercises', 'problem-focused exercises' and 'threshold network exercises) that apply the principles considered above. The design of these activities can be applied at any level, but our exemplars are all at level 1 as this was the focus of this Fund for the Developing Teaching and Learning project.

In all of the exercises we begin by asking an applied question in economics. The phrasing of this question is intended to make it accessible to students (for example, *'Student's Railcards – Branson's good deed?'* and *'Should home production be protected to keep jobs?'*). If students are to be capable of using their economics, to 'think like an economist' outside of the classroom and formal assessment, it is important that they acquire the skills to recognise and correctly use the 'ways of thinking and practising' within the discipline that enables application to new situations.

Evidence collected by the project, from both recording student group work in tutorials and written work, suggests that it is incorrect to assume that students can readily and appropriately apply their knowledge; they need to have practice and feedback to help them acquire these skills. The current practice of short, technically-based tutorial questions that are used on many undergraduate courses does not provide such opportunities and the threshold concepts approach advocates introducing exercises that require these framing skills. This is likely to mean that we have to reduce the number of technicalities covered in order to give students the time to integrate their ideas and reach a deeper understanding which they can readily apply in previously unmet situations. In the long run this may enable students to be able to absorb the technicalities in a more meaningful way.

TOP TIPS

"Do not assume that students will be able to use models and concepts in applied situations without time and practice. Use at least some tutorials to explore applied problems, without presenting them with step-by-step guidance (for instance, by not telling students initially what model to use). Do not continually use seminar sheets with short detailed questions to work through, but set wider questions that require framing."

Given the 'web' of concepts and the intertwining of discipline and modelling concepts in use, the learning activities do not concentrate solely on one threshold concept. They are designed to draw the students' attention to where these concepts are used as a way of developing their understanding of the conceptual framework within which economists operate. The exercises we propose can be used as part of the introduction to students of a new concept. However, at the same time, they also importantly allow students to revisit other previously introduced concepts within different applications and appreciate the patterns of thought within the discipline.

All three types of exercises ask students to reflect on their understanding at the end of the activity. Given the propensity of many of our students to want to take a 'correct' answer and simply pigeonhole it for future (assessment) use, encouraging students to take this stage seriously is important. They are provided with a short list of questions, focusing on aspects identified as problematic by the trialling in the project, to structure that reflection.

The exercises were tested at the four partner institutions, with the aim of identifying unforeseen issues in their design and the demands on students and lecturers. This included use of some of the exercises with students on non-economics awards, such as Business Studies, given the large numbers of such students taking economics modules at first-year undergraduate level. The

interpretation of these data was informed by the comments of the project's external evaluators and colleagues from each of the partner institutions. Some parts of the activities that students were overwhelmingly answering correctly were removed or reduced to concentrate on more problematic areas. We identified other areas, particularly related to economic modelling, where students needed more help, and amended our questions and feedback to incorporate these. The feedback was recast to be less 'textbook' style and more of a narrative which might express an economist's thoughts as they framed the problem.

(i) Reflective exercises

The 'reflective exercises' pose an applied question in economics that involves the use of discipline threshold concepts and aims to get students to think about why economists set up a problem as we do (and so develop students' understanding of the threshold process of economic modelling). For example the exercise *'Taxing imports – what is the problem?'* (reproduced in Appendix 1) is a scenario students are likely to have heard/read about in the media. The discipline threshold concept pivotal to this learning is opportunity cost.

At the start of the exercise we have a 'framework' section composed of a number of subsections of multiple answer questions that relate to the modelling process and concepts that are prerequisites in answering the question and which have been identified as problematic for students. This addresses principles 1 and 2: *Highlighting variation* to ensure a sufficient foundation of basic concepts and Exposing the way in which scholars use modelling threshold concepts. Students are asked to tick however many of the statements they think appropriate. The example exercise starts by considering the simplifying assumptions of the theory of comparative advantage, including the assumption of 'full employment' of resources, as the media (and students initially coming to the problem) often see the problem as one of employment. Importantly, feedback is available before they progress to the second part of the exercise. The reflective exercises then ask students to use their understanding in answering a second section that relates directly to the initial question posed, or some part of that question. A short written answer is required and may importantly require a diagram or a numerical example if this is how an economist would model such a problem. Students are then given as feedback 'the economics approach to this question' and asked to reflect on their answer, which in the example includes the threshold concept of opportunity cost.

(ii) Problem-focused exercises

The second type of exercise, the 'problem-focused exercise', explicitly starts from stimulus material; such as short extracts from statistical tables, reports and press articles. The example reproduced in Appendix 2, *'Cruise ship pollution – an economic problem'* uses a short extract from a report from the Bluewater Network. The question specifically asks them to consider what the economic view is (the article gives details of the ecological damage and students are often more aware of the environmental arguments rather than the economic ones from the media). The threshold concepts that are fundamental in this learning are welfare economics (in particular the idea of allocative efficiency, although this term is not formally used) and incentives (in particular price/cost incentives and what happens given 'free goods'). Other threshold concepts used are marginality and interaction between markets.

This approach draws on the problem-based learning (PBL) approach. However our exercises require less substantial initial data, less time and provide some structured 'scaffolding' for students (based on principles 1 and 2) to help them identify the phenomena which are appropriate in analysing the question. The 'cruise ship' task, for instance, without using the term 'externalities' asks students to consider whether the cruise ships are bearing the full costs of their operation and the implications of this.

Feedback is again available that stresses the use of economic modelling in answering such questions. A second section of the exercise builds from this feedback, taking the analysis further and thus addresses principle 3 (Helping students to integrate their understanding).

(iii) Threshold network exercises

These exercises give a short applied problem, for example *'Are government budget deficits always bad?'* and a list of concepts that might be used to make sense of the problem. The list of concepts includes some that economists would dismiss as irrelevant in this context as well as concepts that are of greater and less significance in addressing the problem. The example is reproduced in Appendix 3. The aim is to deepen students' understanding of how a web of concepts is used in answering applied questions and the importance of economic modelling in providing a framework for analysis. This type of exercise is mainly targeting principle 3 *(Helping students to integrate their understanding)*. The concepts include discipline threshold ideas – in this example a particular case of cumulative causation, the multiplier. However, the most important aspect of this particular exercise is to get students to realise that they need to identify an appropriate economic model and use this correctly in answering the question. The task explicitly asks students to use an economic model (which is not specified, but should be readily identified). The question requires the students to start on the process of 'framing' a question in the manner of an economist. Students are asked to choose which concepts they will use and provide an account of how using this combination of concepts generates a good analysis of the problem.

In trialling the exercises in the Embedding Threshold Concepts project we found that students do not automatically identify that they need to use a model in such applied questions and they need to develop the economists' way of analysing such questions. The exercise directs students to use a model, but we found an important role for the lecturer was to check on progress and act as a catalyst for groups who had not grasped the importance of this, or were progressing with an inappropriate (often we found unnecessarily complicated) model. We found the list of concepts was good at revealing both student misconceptions (which can help the lecturer provide specific feedback to help progression) and important concepts (such as the multiplier in the example given here) that many students were not integrating into their thought. More details are given in the case study in section 5.

The exercise in the appendix has two versions of feedback available, 'basic' and 'intermediate', the latter applying a more advance economic model. The 'basic' feedback enables the exercise to be used with non-specialist level 1 students or students who are starting with a lower initial background and all three types of exercises provide feedback at different levels where this is considered appropriate.

Use of the materials in a teaching and learning programme

There are alternative ways these exercises can be incorporated into the teaching and learning programmes. For instance, the stages of the reflective exercises do not have to be completed at one session. Each stage can be given as a task, some of which may be carried out in self-managed time, in lectures or seminars. The reflective exercises and the problem-based exercises take some time to complete and organising their use in different stages brings some flexibility in putting them into a programme. However, generally, it is important that all stages of the exercises are completed as the exercises are designed to be completed in their entirety with each stage leading through to the next. Feedback from our use of these exercises has indicated that placing the final section of the reflective exercises (which requires a short written answer) in students' self-managed time is not appropriate unless this is tied into assessment.

Students may find it useful to work in small groups for some of the tasks, although this is not a

necessary requirement. Analysis of our use of some of these exercises during the project indicated that students found group discussion useful in developing their thoughts. The tasks are also available online for students in a separate section of our website for use in independent learning. In these versions, after accessing each part of the activity the student is given the feedback before going on to the next task. Individual exercises can be attached to module websites or the URL given in module handbooks.

TOP TIPS

"Don't crowd the syllabus. Consider what is most important for students to understand and be prepared to develop this in different ways, for instance by taking time in seminars to explore applied questions in depth."

5 Case Study: 'Are government budget deficits always bad?'

Peri Yavash, Coventry University

Introduction

'Are government budget deficits always bad?' is one of the threshold network exercises which was used on the first year Introductory Macroeconomics course at Coventry University, following teaching on the Keynesian model. The exercise was used with three separate seminar groups. At the beginning of each seminar, the students were allocated to groups of 4–6 students. The discussions which took place within each group of students as they completed the exercise were recorded. The discussions for two groups from each seminar, chosen at random, were transcribed and analysed. Although the lecturer was in attendance for the duration of the seminar, help was only offered when students got 'stuck' and only by asking students questions as opposed to giving answers.

The scenario is thus: 'The country is currently in recession and this has led to lower tax revenue and higher expenditure. The result is a large budget deficit. The government decides to raise taxes and lower government expenditure. Is the government's decision a good idea?' (This exercise is given in full in Appendix 3). Students were asked to identify, from a list, which threshold concepts might be useful in answering this question. The list consisted of the following concepts: inflation, interaction between markets, the multiplier (cumulative causation), investment, withdrawals, injections, social costs, scarcity, consumption and oligopoly. The students were also required to 'Draw an appropriate diagram to illustrate the above scenario and comment'.

What the exercise uncovered in terms of understanding

Analysis of the discussions demonstrated that the difficulties students encountered and their progress could be categorised under two headings: (i) misconceptions and (ii) problems with modelling.

(i) The most common misconception or confusion was between the terms 'investment' and 'government spending'. A less surprising confusion was between the concepts of money and income. However, for the purposes of this particular exercise, this was not crucial.

What was more surprising was the desire of many students to include social costs as a relevant concept. They rationalised this desire by discussing social costs in terms of the increased unemployment resulting from the recession. They also discussed social costs in terms of reduced government spending on education. The concept of social cost was not relevant to answering this question – this was an attempt by students to incorrectly try and make the concept relevant to the question, instead of correctly discarding it. Another concept which was not readily rejected was that of scarcity. This concept was incorrectly attributed to the scarcity of jobs in a recession.

There were also confusions with regard to Government Spending (G) and Taxation (T). Some groups assumed G = T, whilst another group initially equated Government Spending with unemployment pay!

(ii) The second major problem area was with regard to modelling the scenario. Most of the groups decided immediately it was either a good idea or a bad idea, without even considering a model. When students did eventually try to use a model, it was by trying to remember where particular lines went on a diagram, rather than by demonstrating any deep understanding of the model. Many groups tried to introduce elements not yet covered in the module (e.g. labour markets). Some groups were confused with regard to the possible impact of reduced injections and increased withdrawals on income.

Diagrams were often poorly drawn. The multiplier was not even mentioned or recognised as an important concept until it was noticed on the list! A great deal of time was 'wasted' trying to justify the use of concepts which were not relevant to the question.

Some groups got bogged down with trying to work out the nature of the tax, i.e. lump-sum or income related. In this particular question, it did not matter, but in all previous questions that the students had attempted it had mattered. This problem did not need the level of detail encountered in previous problems and students found it difficult to work without the framing given to them in the previous exercises which involved numbers and/or algebra. They found it difficult to transfer their skills from a very structured economic question to an economic problem couched in more general terms.

What was achieved

By the end of the seminar, all the groups had reached the correct conclusions, i.e. that it would be a bad idea to increase taxes and reduce government spending in a recession – some with a greater depth of understanding than others. After the students had completed the exercise, there was some class discussion and feedback. All students were also given a feedback sheet which identified the appropriate concepts and included a relevant diagram.

In conclusion, the concepts which students had the most difficulty with were Investment/Government Spending, Social Costs, Scarcity, Injections/Withdrawals and the multiplier. However, although students encountered misconceptions and followed the wrong path at various points, all the groups had some idea of the necessary concepts and the consequences of particular actions by the end of the seminar. The exercise exposed misconceptions that would otherwise have remained hidden and allowed incorrect understanding to be explored and rejected.

With regard to the modelling, there was far too much reliance on memory rather than understanding. However, it was definitely the case that students learnt by getting it wrong initially and then working out why it was wrong. It was good to make mistakes. One of the

strengths was using this exercise as a group exercise. Members of the group often explained to each other why a particular line of thinking was right or wrong. It was very heartening to hear students talking about Economics problems to each other.

This particular exercise helped in understanding where students were having difficulties and what appeared to be the most prevalent misconceptions. It will certainly be used again along with many of the other exercises that have been developed as part of the Embedding Threshold Concepts project.

6. Assessment

The work on threshold concepts has begun to consider the implications for assessment. This section contains the insights that can be drawn from the approach and some initial discussion of question design.

The different types of conceptual change and their interrelationships carry some implications for assessment. First, the acquisition of a basic concept in terms of 'understanding or not understanding' misrepresents the situation. Students may have an understanding of a basic concept, without having the kind of understanding associated with expert knowledge in a discipline. Therefore, it is desirable that assessment should distinguish between limited and more complex understanding of a basic concept. The more complex understanding will be the way of understanding the concept that is aligned with a threshold concept. Thus second, we might therefore interpret a more complex understanding of a basic concept as an indication that a learner is, at least, becoming aware of a threshold concept.

Third, a learner's journey towards incorporating a discipline threshold concept in their thinking requires that they learn to use modelling concepts to generate structures of thought in analysing applied questions. For example, an important stage in introductory macroeconomics is learning to combine a number of basic concepts (such as the distinction between injections and withdrawals, savings and investment, stocks and flows, real and nominal values) in a model of expenditure flows. Without appreciating the importance of the modelling concept of equilibrium the set of basic concepts that are pertinent to understanding the model are not made to act in concert to produce a coherently structured understanding of an economy as a system and this leads to a limited understanding of concepts such as the multiplier. This is not to say that most students, when asked, will not be able to recall the equilibrium condition in such a model. The concern is over their being able to integrate this in their analysis. For instance, a study of the examination answers to applied questions on income/expenditure flows in the Embedding Threshold Concepts project indicated that many students describe the multiplier process as a continuing sequence (a decrease in government expenditure leads to less employment and lowers income which leads to less consumption which leads to less employment and income, etc.) rather than one with a limit with the endogenous variables changing as the system returns to equilibrium.

These implications can be related to assessment criteria. At level 1, for instance, the approach suggests we want to examine:

- the development of understanding of a range of basic concepts
- the ability to use the modelling procedures of economics (particularly comparative statics at level 1)
- the emergence of understanding of threshold concepts.

However, the expected understanding of threshold concepts may be limited and patchy at this level and, as we have argued in section 2, this may affect the understanding of even basic concepts. Students need some understanding of basic concepts to progress to threshold concepts, but also understanding the threshold concepts may deepen the understanding of basic concepts (which does create a problem for the learner in that they need to progress without full understanding and continually reassess their comprehension). This complicates judgements on the progression of students – understanding is not a nice linear sequence and we need to take this into account in our judgements.

Question design and the assessment package

The assessment package, and within that the design of questions, needs to create opportunities for students to demonstrate a range of levels of understanding through their answers. However, given the discussion above on the interrelationships between understandings of concepts, this is not a simple matter. We want the design to uncover students' understanding rather than their rote knowledge. The understanding we want to test is 'how to think like an economist', and not simply an ability to manipulate a given model (even if in a complicated manner). Students need to show the 'framing' skills necessary to analyse the problem and we need to develop these 'framing' skills in the teaching and learning activities we undertake. In order to uncover students' understanding the question should present something unfamiliar to the students which they then have to use their understanding to unravel, rather than be able to reproduce more or less verbatim a rehearsed answer.

However, the 'patchy' understanding we may expect because of the complex nature of concept acquisition means we have to be careful to give

borderline students a good chance of demonstrating their 'just passing' level of understanding. Such students may well be rote learning in some parts of the curriculum because they have not gained the integration that goes with the acquisition of the relevant threshold concepts. There is a problem in assessing such learning as there is no clear continuum from this level to understanding. Such learning may be deemed irrelevant if it never progresses, but if the student revisits the concept it could provide the first stage in the later development of understanding. These problems may encourage the design of questions that give students considerable support (such as through directing them towards a concept/model they should use in their answer). However, the threshold concepts approach argues against this and that it is important that students show development in understanding (although not necessarily showing a deep understanding across the whole of the curriculum).

These arguments suggest that the 'assessment package' needs careful design which allows students to reveal the depth of their understanding. This requires the setting of questions that allows for this and we have proposed certain criteria for questions:

a) Problem-focused rather than straight theory

The ability to answer problem focused exercises is a good indication of student progress with regards to 'thinking like an economist' – it is a good way of finding out the level of understanding of theory and concepts. The focus of the problem needs to be an aspect that has not directly been covered in the module or we may just be picking up rote learning (this does

not preclude a question on a general applied area that has been covered, but it must be sufficiently far from replication). The problem needs to be a question that students can relate to and they will have sufficient information on the background.

b) Does not explicitly direct the use of particular theory/concepts

We need to see that students can start to recognise the importance of certain concepts, rather than being directed all the time. Recognising the web of concepts and being able to pick out the important aspects for a particular question is an indication of the depth of integration achieved.

c) The complexities of the question

There is a need to design questions that allow students to show their understanding of the web of concepts that relate to a particular question and within that show an emerging understanding of threshold concepts. However, this is tricky, in that given the web of concepts some applied questions need a large number of concepts in their analysis. How many can we expect students to integrate? We may want to accept 'good' answers that are limited in scope and we need to be careful that the complexity of the question does not stop students attempting the question.

TOP TIPS

"Test depth of understanding in assessment by asking applied questions without providing clues to the answers expected (by for instance telling the student what model or concepts to use). But only do this having tackled this type of question, with feedback, during the course in seminars/web-based exercises, etc.)."

These criteria suggest that we should reduce the 'scaffolding' (the direction to using certain concepts and models) that is currently present in many economics examination questions. However, basing questions on the criteria above needs to be part of an integrated approach to teaching, learning and assessment. The approach developed in the Embedding Threshold Concepts project suggests that we need to use applied questions in helping students learning during our courses, whilst providing appropriate support, but in testing we can only examine depth of understanding by asking students questions that allow them to 'frame' their answer.

As examples, Table 2 gives some past examination questions on two different areas and a discussion of their merits, given these criteria. The first set of three questions is in microeconomics and relate to the threshold concept of opportunity cost. The second set of three questions is in macroeconomics and are concerned with the effect of a fall in aggregate demand on the economy, related to the threshold concepts of interactions between markets and cumulative causation (in this case the multiplier). Given the criteria set out above, question (a) would not be seen as appropriate in the microeconomics set and neither would question (c) in the macroeconomics set.

Table 2 Examples of examination questions

	Microeconomics questions
a	What is meant by 'opportunity cost'? Illustrate this concept by reference to a production possibility diagram. Why do economists use the concept of opportunity cost when referring to the marginal cost of production? *This question directs the student to the concepts of interest and is not problem focused. It can be answered by rote learning.*
b	Why might an economist expect the price of Christmas trees to fall substantially in the last few days before Christmas? How do sellers try to prevent this? *This is problem focused and does not direct the student to the concepts/theories. It requires students to consider the role of price as an incentive and opportunity cost. They need to recognise that the economist would use the comparative static framework of demand and supply in answering this question.*
c	'Economics is about scarcity, choice, and opportunity cost.' Explain what this means and give examples to illustrate your answer. How can principles of choice based on opportunity cost be related to the decisions of parents with small children about whether or not to seek paid employment. *This question directs the student to the concepts of interest. However, the second part is problem focused and does test the depth of understanding of these concepts if the particular example has not been pursued in class. In the example the students need to consider the modelling framework of supply (and demand) for labour.*
	Macroeconomics questions
a	A recent fall in the stock market has hit consumer confidence and reduced consumption. Explain how the economy is likely to react, both in the short and long run, to this event. *This is problem focused and does not direct the student to the concepts/theories. Students need to decide which model they have covered in their module is appropriate to answer the question. It is testing their ability to recognise the need for and use appropriate economic modelling in answering an applied question. A good answer will consider the threshold concepts of cumulative causation and interaction between markets.*
b	A recent fall in the stock market has hit consumer confidence and reduced consumption. Explain how the economy is likely to react, both in the short and long run to this. Use aggregate demand and supply curves to show the likely effects on prices, output and income in the short and long run. *This question directs the student to the model of interest. However, the setting is problem focused and does test the depth of understanding of these concepts if the particular example has not been pursued in class. A good answer will apply the model to this case and will consider the threshold concepts of cumulative causation and interaction between markets.*
c	Use the aggregate demand and aggregate supply model of the economy to explain how the economy is likely to react, both in the long and short run, to a fall in aggregate demand. *This question directs the student to the concepts of interest and is not problem focused. It can be answered by rote learning. It tells students what model they should use, in a non-applied situation covered in texts, which makes it difficult to distinquish rote learning from deeper understanding .*

7 Where next

The newly developed threshold concepts approach provides a framework for learning that has implications for teaching, learning and assessment. The aim of the approach can be encapsulated as getting students to 'think like economists'. It may help lecturers in Higher Education who are grappling with two widely reported problems:

(i) students who acquire formal knowledge of a discipline but who seem unable to use this knowledge when making sense of experience in work or their everyday lives

(ii) students who struggle with underpinning theory and resort to verbatim learning of isolated aspects of the subject that they seem unable to use effectively in conjunction with each other.

In the approach 'deep' rather than 'surface' learning is not just related to the student's approach to learning. Students who want to 'deep' learn may initially resort to 'surface' learning because deep understanding requires an integration of knowledge they have yet to acquire. The threshold concepts approach is concerned with how students can be helped to acquire integrating ideas. Within the discipline of economics, a three-way classification of concepts has been proposed which link to criteria for teaching, learning and assessment.

More details of our approach are available on our website at www.staffs.ac.uk/thresholdconcepts. The website, as well as providing general information on the Embedding Threshold Concepts' project, includes:

- our newsletters
- working papers from our conference presentations
- discussion notes from the meetings of the project that present how our thinking progressed during the three years of the project.

More detailed reading is also available from the bibliography section below. This gives the seminal readings on threshold concepts as well as the published articles and book chapters from the project. In addition, it gives some wider reading on conceptual change both in general and in economics which have links to our approach.

Exemplars of the three types of activities discussed in this handbook are available from the project website. These have been revised from feedback and new exercises are added in September of each year. There are currently 12 reflective, eight problem focused and six threshold network activities that cover many aspects of the level one curriculum in economics (12 in microeconomics, five in macroeconomics and seven in international economics).

They are available in two forms:

(i) Staff version

This is the full exercise, with feedback and lecturer's notes (including information on timing and prerequisites) and is available in word and PDF format. You are welcome to adjust the materials to the needs of your module.

(ii) Student's version

This version allows students to try the exercises online as part of their independent learning. Each exercise has its own URL which can be given to students as part of the module information (either via hardcopy or through linking from a module website). After each individual part of

the task is completed the student is given feedback before progressing on to attempting the next part of the task.

Lecturers new to threshold concepts may find that some of the activities may provide a useful way into the approach. The materials developed require active learning and can be used independently of the adoption of a full threshold concepts approach.

In addition many ideas for active learning that can be used in a threshold concepts approach are available on the Economics Network website at http://www.economicsnetwork.ac.uk/. This site also gives access to the International Review of Economics Education which promotes research into effective learning and teaching in economics in higher education.

ACKNOWLEDGEMENT

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Appendix 1: Reflective exercise example

Taxing imports – what's the problem?
Should a country that is less efficient at producing all goods use import controls to reduce imports from other countries?

The Setting

This is an important problem as it raises a number of topical questions that are currently subject to economic debate:

Should we protect the manufacturers of certain goods from international competition? Or should we impose tariffs or quotas on imports and/or subsidise exports? Is free trade desirable?

In order to answer this we are going to illustrate the effects of trading by examining an example.

Section 1: Setting the framework for investigating the question

Which of the following alternatives do you think is more appropriate for examining an example illustrating this problem?

A	**Tick the answer you think is the most appropriate**	
a	Two countries and two products	
b	Three countries and three products	
B	**Tick the answer you think is the most appropriate**	
a	If a country produces more of one good it will be able to produce less of other goods	
b	If a country produces more of a product it will be able to produce it more efficiently	
C	**Tick the answer you think is the most appropriate**	
a	We will assume that neither country has an unemployment problem	
b	We will assume that there is unemployment in both countries	
D	**Tick the answer you think is the most appropriate**	
a	A better situation is where more of all goods are produced (and consumed)	
b	A better situation is where less of some goods are produced as this will reduce pollution	
c	A better situation is where either more of good A and less of good B OR more of good B and less of good A are produced	

Now consider an actual example

Two countries are both the same size and all resources are fully employed. Each is producing handbags and iPods and currently allocates half of its country's resources to each commodity. Each is producing the quantities given below. At present each consumes what it produces (i.e. there is no trade). Note that country A is richer – it can produce more of both commodities than country B.

	Country A	**Country B**
Handbags	500	270
iPods	100	90

E	**Write your answer in the boxes**	
a	How much does it cost to produce one iPod (in terms of handbags forgone) in country A?	
b	How much does it cost to produce one iPod (in terms of handbags forgone) in country B?	
F	**Write your answer in the boxes**	
a	Which country has the lowest opportunity cost of producing iPods?	
b	Which country has the lowest opportunity cost of producing handbags?	

Section 2:

It now becomes possible for the two countries to trade. Should the government of country B introduce an import tariff on handbags to prevent future possible imports? You may want to use the numbers in the example above to help develop your answer.

☐ Yes ☐ No

Argument in support of your decision

Feedback Section 1: Setting the framework

Review your answers in the light of the economist's approach below. Were your answers the same? If not, think about why they are different.

A We will start from the simplest framework we can to illustrate the points, which is (a), and then generalise. We will only move to a more complex situation if the effect cannot be illustrated in this simple framework. Here we will find that it can.

B The general assumption is that, although it may take some time to do this, resources can shift and be used in other areas of production, that is (a) is appropriate. We ignore the time dimension in the model as a simplifying assumption. We also do not have to assume (b) here. This may also be true, but introduces a complication that is not necessary for our argument (and if it is true it will give further support to our conclusion).

C We do assume full employment – otherwise the countries could be in a position where they could produce more of everything. Also unemployment is seen as another problem and we want to keep things as simple as possible. Thus (c) is correct.

D We will assume (a); that more consumption is good.
(b) is another issue, which may be important but is not our concern here.
(c) involves the complication of what different consumers want and some may feel themselves worse off, whereas with (a) all consumers can be as well off and at least some consumers can be better off.

There are also other fundamental assumptions in the background to our approach which you will examine (and perhaps reject, or reject in some circumstances) when these are discussed as the topic is further developed in your course.

THE APPROACH IS TO NOT INTRODUCE UNNECESSARY COMPLICATIONS INTO THE EXAMPLE – **START WITH THE SIMPLEST**

E (b) Country B is producing 90 iPods and 270 handbags at present. To produce one extra iPod means 270/90 = 3 less handbags will be made.

F (b) To answer this question we need to do calculations similar to (a), but in terms of what it takes to get one extra handbag. In county A this is 100/500=1/5. In country B it is 90/270=1/3. Thus the opportunity cost of producing handbags is lowest in country A.

Feedback Section 2: The approach of economics

The imposition of an import tariff is a move away from 'free trade'. Economics starts by considering what happens if the countries engage in free trade, as theory suggests that gains can often be made. We do this by looking at the opportunity cost of production in the two countries with the aim of showing that overall more of both goods can be produced (and consumed) by allowing specialisation and trade.

So what are the opportunity costs of production in both countries?
In sections D and E we established that country B has a lower opportunity cost (a comparative advantage) in iPods as it has to give up less resources than country A to make an extra iPod (and vice versa for handbags).

What does this mean in terms of the total production in both countries?
If country B specialises in iPods (and country A in handbags), total production across the two countries can increase in both of the commodities because they can use the resources more effectively.

…continued over

We can show this in a numerical example. If, for instance:

	Country A	Country B	Total production
iPODS	–20	+66*1/3=22	100+90-20+22=192 (up from 190)
handbags	+20*5=100	-66	500+270+100–66=804 (up from 770)

How can trade therefore enable increased consumption of both goods in both countries?

The countries can adjust their consumption patterns by trading and since there are more of both commodities produced than before it is possible, by sharing the increase, for each country to consume more of BOTH commodities (see section 1D).

For instance, if country A exports 80 handbags to B in return for 21 iPods:

- country A now has 1 more iPod and 20 more handbags
- country B now has 1 more iPod and 14 more handbags

They have both gained!
(Note that this argument does not depend on economies of scale.)

What does this do to unemployment in country B?

People transfer from producing handbags to iPods in country B. There is no increase in unemployment. This is because we have assumed resources are mobile (see section 1B).

This then provides an argument against an import tariff by country B on handbags. There are some arguments for tariffs in particular circumstances, but unless these apply, it is not in the best interests of county B's citizens to impose such a policy.

	Reflection In your explanation did you:	Yes	Partly	No
1.	Refer to the opportunity cost of production?			
2.	Show that trade can benefit both countries?			
3.	Recognise that in this model people switch jobs but there is no unemployment?			

Does it affect your explanation if people cannot readily change jobs because different skills are required or the expanding industry is in a different part of the country?

Appendix 2: Problem focused exercise example

Cruise ship pollution – an economic problem?

Scenario

Discharge of waste from the growing number of cruise ships causes problems for the seas, wildlife and people. The environmental problems are commonly recognised. This exercise considers if this is also an economic problem and if so what does economics bring to the analysis?

Task 1

Read the extract below and then discuss the following question:

Why is the pollution an economic problem?

In doing this you should use an appropriate diagram. You may find the following questions helpful in formulating your answer:

- Are cruise liners bearing the full costs of the cruises?
- What other markets are affected by the cruise ships' actions?
- What does this suggest about the number of cruise ships in operation?

feedback

GROWTH OF HOLIDAY CRUISES DAMAGES ENVIRONMENT

Based on the Bluewater report

A report from the Bluewater Network has highlighted the severe environmental problems that arise from the sewage disposal from cruise ships. Sewage from ships is more concentrated than that produced on land as less water is used for sanitary purposes. Two problems are caused to the marine environment by the discharge: disease-causing micro-organisms can be spread and the excessive nutrients produced can promote algal growth.

Releases of sewage close to shellfish beds can endanger public health because shellfish are filter feeders that concentrate pathogens in their tissues. Corals reefs are also harmed by sewage-borne pathogens, causing disease and scarring in many species. The discharge from vessels can also be visually repulsive. This affects other users of the water, decreasing the use for contact sports, such as swimming, water skiing, snorkelling, scuba diving and surfing. The chemicals and deodorisers used in many marine sanitation devices are often harmful to aquatic life as they can contain chlorine, ammonia or formaldehyde.

The over-enrichment of nutrients, or eutrophication, also leads to grave problems. Excessive algal growth, promoted by nutrients such as nitrogen and phosphorous, consumes oxygen in the water and kills fish. It also smothers and kills coral reefs. It causes a loss of diversity among planktonic organisms and in sea floor species such as seaweeds, seagrasses and corals. The former are the basis of the marine food cycle and a change can have a domino effect throughout the food web.

Task 2

Read the short extract and consider the following:

(i) What are the problems identified with the policy being used to control pollution?

(ii) Do the problems stem from generic difficulties with this policy approach that will apply in other situations, or are they specific to this case?

(iii) From an economic viewpoint, should the dumping of greywater be banned everywhere?

∑Feedback

ENVIRONMENTAL LAWS FLOUTED

Based on the Bluewater report

The Bluewater report goes onto consider how fleets of cruise ships have been not only damaging the environment, but also breaking the law. The report gives the disturbing example of Royal Caribbean Cruises Ltd. This company admitted that over a number of years they had routinely dumped noxious pollutants into several US harbours and coastal areas. The substances included waste oil, hazardous chemicals from photo processing labs, dry cleaning operations and print shops. The report explains how this was carried out by secret piping systems in the ships to bypass pollution treatment equipment. Investigators considered the company's dishonest behaviour was so pervasive that the criminal conduct amounted to routine business practice. They regarded the case as a 'fleet-wide conspiracy' by Royal Caribbean to 'use our nation's waterways as its dumping ground'.

In the resulting prosecution the company pleaded guilty to 21 offences in six US jurisdictions. They agreed to pay a record $18 million in fines.

As well as the flouting of the law by companies, there are problems with the law's coverage. Problematically, several types of cruise ship discharges are exempt from key regulations governing other wastewater dischargers. Both the cruise ship industry and the environmental agencies seem unclear on what laws do and do not apply to the management and disposal of these wastes. The report argues that current controls are not strong enough because there are numerous gaps in environmental laws and loopholes in the regulations that should be controlling pollution by cruise ships. For instance, greywater can lawfully be dumped anywhere except the Great Lakes, even though greywater has the potential to cause detrimental environmental effects. (Greywater is non-industrial wastewater generated by processes such as dish washing, laundry and bathing, but not toilets.)

Both the extracts are based on: **CRUISING FOR TROUBLE: STEMMING THE TIDE OF CRUISE SHIP POLLUTION**, report prepared by Kira Schmidt, BLUEWATER NETWORK, March 2000. The full report can be obtained from:

http://bluewaternetwork.org/reports/rep_ss_cruise_trouble.pdf

Feedback Task 1:

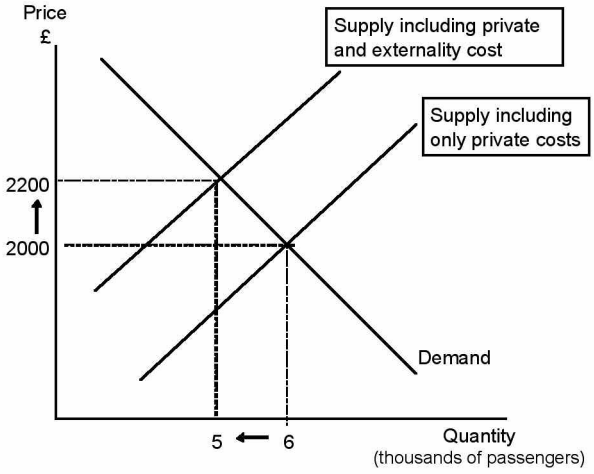
Pollution is not an economic problem simply because it is 'bad' environmentally. People going on cruises presumably enjoy them (and they see them as being worth at least the **price** they have paid for the trip). From an economics viewpoint this is beneficial, even if it does cause pollution. However, there are some other important economic factors to take into consideration that do suggest an economic problem exists.

Are cruise liners bearing the full costs of the cruises?
No. The dumping of the greywater and in some cases more noxious substances is a cheap method of waste disposal for the cruise ships, lowering their costs and prices (and increasing the **quantity**). Importantly, water is being treated as a 'free' good, but in fact clean water is a **scarce commodity** and there is an **opportunity cost** involved.

What other markets are affected by the cruise ships actions?
Fishermen, swimmers, etc. who are not involved in the market transaction (the market for cruises) are being adversely affected. These are 'third party' or **'externality'** effects and these are a problem of **welfare economics.**

What does this suggest about the number of cruise ships in operation?
The **price mechanism** is not sending the correct signals and we have what is known as **market failure** and an over-supply of cruises. We can use Figure 1 to show the effect. We draw the demand and supply curves in the standard way (the numbers are purely illustrative). The cruise ship market only takes into account its private costs, giving a price of £2,000 and 6,000 cruise passengers. However, if we include all costs, including the opportunity cost of the waste disposal, this would shift the supply curve to the left and price would be higher at £2,200 and the number of cruise passengers would be reduced to 5,000. At the moment cruise passengers are 'getting it on the cheap' and not paying the full costs of their cruises and this means fewer resources available to others.

Figure 1: The market for cruise ships



Feedback Task 2:

What is the rationale for government intervention?
In task 1 we considered how the problem was an externality that gave rise to market failure. This welfare economics problem means that the unfettered price mechanism is not sending the correct signals and there is an arguable case for government intervention. If the legislation is successful it will raise the cruise ships' costs in having to deal with the waste water, leading the supply curve to move to the left and prices of cruises to rise (a movement towards the supply curve that includes the externality costs in figure 1).

What are the problems with using legislation as a control?
Simply passing a law will not necessarily stop the market operating as there are incentives for firms to cheat. Without adequate policing the policy becomes optional. The problem (including the cost) of obtaining information on dumping is also an important aspect.

Should all greywater dumping be banned?
From an economics viewpoint, it does not **necessarily** mean that dumping greywater should be banned. This depends on the costs and benefits, including any costs of policing legislation. Reducing, rather than banning, may reduce the negative side-effects dramatically and we should not lose sight of the fact that people do seem to like cruises!

Reflection In your explanation did you:	Yes	Partly	No
1. Can you distinguish the concept of an externality from a pure environmental effect?			
2. Cruise ships do not pay for their use of the sea for waste disposal. Do you understand why this is a problem?			
3. Did your diagram illustrate the market failure?			

If your answer is 'No' or 'Partly' to any of the above, which of the following do you now intend to do to improve your understanding?

1. Ask for guidance from my tutor? ☐
2. Read a relevant section in a textbook? ☐
3. Work though some example questions? ☐

Appendix 3: Threshold network exercise example

Are government budget deficits always bad?

Scenario

The country is currently in recession and this has led to lower tax revenue (because of more unemployment and less business profits) and higher spending (on welfare benefits). The result is a large deficit. The government decides to raise tax rates and lower government expenditure.

Is the government's decision a good idea?

In doing this you should:

(1) Consider an economic framework or model that you think is going to be useful. Draw an appropriate diagram.

(2) Identify three important economic concepts from the list below you would use in answering this question and explain why they are important in this context.

Inflation	Injections
Interaction between markets	Social costs
The multiplier (cumulative causation)	Scarcity
Investment	Consumption
Withdrawals	Oligopoly

(In the list there are concepts that are irrelevant and concepts that are useful. Some are arguably more useful than others. Although there are some 'wrong' answers there is not just one 'correct' one. Our feedback highlights our choice of three concepts but you will find we use others on this list as well. In making your choice try to discard the irrelevant and consider what you think is the most important amongst the others and why.)

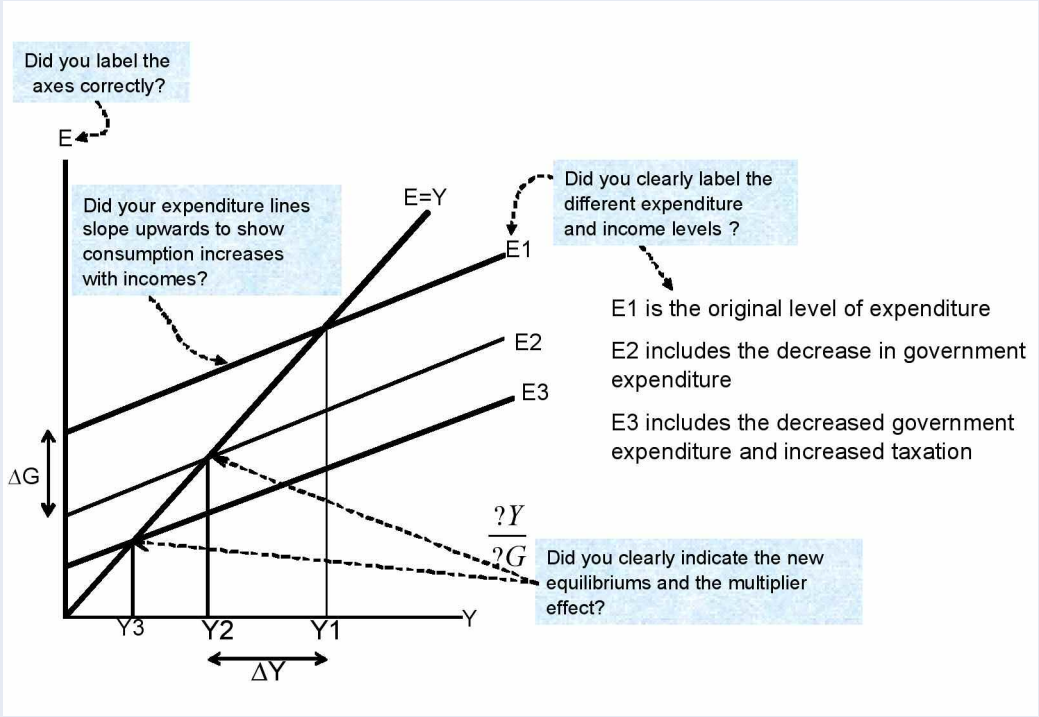
feedback

Feedback (Intermediate)

What concepts from the list are important? Arguably, the most important concepts here to use are the multiplier, withdrawals and injections. You may also use interaction between markets and consumption in an answer. The reasons for their importance relate to the model used and is explained below. Scarcity, social costs and oligopoly are not useful here.

What model you should use depends to some extent what you have covered in your course. The income/expenditure (or injections/withdrawals) model is appropriate if you have covered it; the IS/LM and AD/AS models can also be used, but are more complicated in this context and do not fully illustrate all the relevant points, so are not as appropriate. If you have only covered the circular flow of income model this can also be used and an answer on this basis is provided in the 'basic' version of this exercise.

…continued over



Lowering government expenditure (an **injection**) and raising taxes (a **withdrawal**) will decrease aggregate expenditure (demand) in the economy (shown as movements from E1 to E2 to E3 on the diagram) and hence lower output (and income, shown as Y1 to Y2 to Y3 on the diagram), deepening the recession. The size of the effect depends on the **multiplier**. Considering just the reduction in government expenditure, this will reduce incomes (because for instance jobs in health care and education are cut) and thus reduce consumption: this will lead to a further reduction in jobs as less goods are demanded, which will again reduce consumption, etc.

However, this process is limited as the 'second round' effect on consumption is less then the initial fall in incomes as people also reduce savings, buy less imports and pay less taxes. That is withdrawals go down automatically if incomes decrease. This is part of the process of restoring equilibrium – injections have gone down and the resulting fall in incomes leads withdrawals to fall. The diagram shows the overall position at equilibrium where the decrease in income, ΔY, is limited but is more than the decrease in government expenditure ΔG.

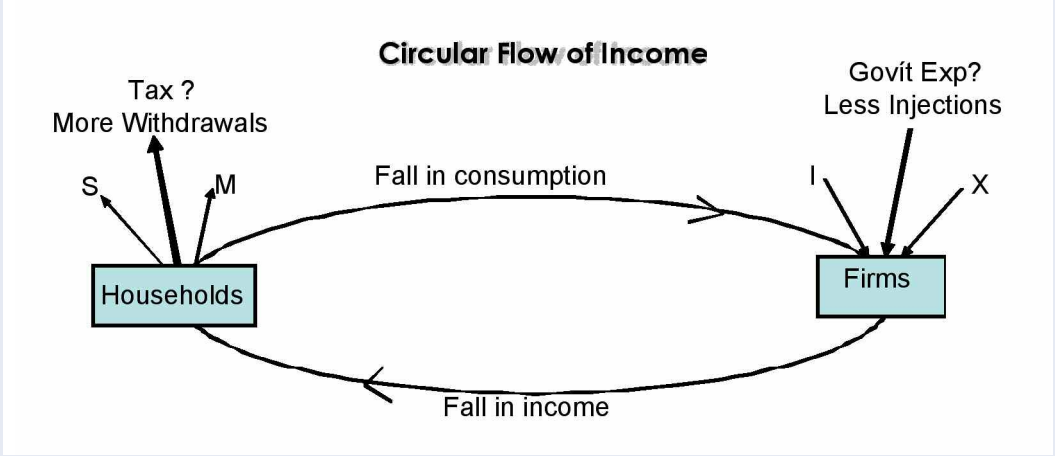
An increase in taxes as a policy change would also reduce incomes and induce a further (but limited) fall in consumption (shown by the further movement to E3). Thus the combined effect of the policies would deepen the recession, which is not a good idea.

Notice that we did not consider explicitly if the tax was lump-sum or depended on income. As drawn in the diagram the tax increase in the diagram is lump sum, as this is the simplest to consider. Both cases give the same direction of changes and so the same answer and so it is appropriate to use the simplest case to illustrate the effects.

Feedback (Basic)

What concepts from the list are important? Arguably, the most important concepts here to use are the multiplier, withdrawals and injections. You may also use interaction between markets and consumption in an answer. The reasons for their importance relate to the model used and is explained below. Inflation, scarcity, social costs and oligopoly are not useful here.

What model you should use depends to some extent what you have covered in your course. If you have covered the circular flow of income model this can be used in an answer. If you have covered the income/expenditure model this can be used in a slightly more advanced answer (this is provided in the 'intermediate' version of this exercise).



Lowering government expenditure, an **injection**, (shown in bold in the diagram), lowers income (as, for instance, cuts are made in employment in health and education services). This reduces consumption (there is less going around the flow) and leads to less overall demand for goods. Firms will have reduced sales and this leads to further decreases in employment and income, which again reduces consumption around the flow (the **multiplier** effect).

However, this process is limited as the 'second round' effect on consumption is less then the initial fall in incomes as people also reduce savings, buy less imports and pay less taxes – withdrawals go down automatically if incomes decrease. This is the process of restoring equilibrium – injections have gone down and so will withdrawals.

Increasing taxes as a policy change, a **withdrawal** (shown as bold in the diagram), leads to less consumption as disposable incomes fall. Again, there is a multiplier effect.

The combined effect is a deepening of the recession, which is not good.

Reflection In your explanation did you:	**Yes**	**Partly**	**No**
1. Did you illustrate the diagram correctly and use it to illustrate your answer?			
2. Do you understand how the initial changes induce more changes as the economy returns to equilibrium?			
3. Do you understand why the concept of the multiplier is important here?			

If your answer is 'No' or 'Partly' to any of the above, which of the following do you now intend to do to improve your understanding?

1. Ask for guidance from my tutor? ☐
2. Read a relevant section in a textbook? ☐
3. Work though some example questions? ☐

Teaching Heterodox Economics and Pluralism

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Published April 2017

Contents

1. Introduction

Remarkably, economics teaching has become newsworthy. In the UK, for example, BBC Radio 4 and *The Guardian* have charted the debate over the design of economics curricula.This wide interest is probably driven by economic events - principally the Global Financial Crisis - but also concerns about *inter alia* austerity policy, the Eurozone, and climate change. Films such as *Inside Job*, *The Big Short* and *Boom Bust Boom* have sparked curiosity about economics.

Employers, too, have complained that economics curricula may not prepare students for careers as economists (or elsewhere). In a survey commissioned by the Economics Network, O'Doherty et al (2007) report, surprisingly, that employers find that graduates could not apply theory to the real world, solve complex problems or be objective. Most strikingly, employers claimed that economics graduates could not engage in abstraction: only 41.7% of graduates were judged as being excellent or strong at this. This concern about employability, among others, led some to ask 'what's the use of economics?' (see Coyle, 2012).

The public and media interest builds on concerns from within the economics community itself. Even from within the 'mainstream' of economics, it was recognised that the remarkable uniformity across undergraduate economics programmes did not reflect the state of contemporary economics. Becker (2004) lamented that the undergraduate curriculum had lagged economic research. The CORE Project is a major response to this failure. CORE includes newer topics, principally game theory and behavioural economics. CORE also responds to calls for greater awareness of the 'real world' by presenting students with data. Its proponents believe that in doing this, CORE also helps students develop critical thinking, by teaching them to demand evidence to settle questions. This approach also introduces greater uncertainty, which may also serve to answer critics who allege that economics is guilty of hubris (Fourcade, et al, 2015).

Within economics there has also been an appeal for greater *pluralism* in economics teaching. This call has sometimes come from heretical mainstreamers or experts in economic methodology: for example Hodgson, et al (1992) did so in the *American Economic Review*. Further there is a constituency of economists who may regard themselves as 'heterodox', who campaign for pluralism; but moreover argue that space in the curriculum must be allowed for alternative economics traditions *inter alia* Marxism, Institutionalism (associated with the work of Veblen), Post Keynesianism, and Feminist economics. These economists complain that mainstream economics has become intolerant of difference and focused on key economic concepts (such as methodological individualism and equilibrium) or

methods (mathematical modelling and econometrics) to the *exclusion* of others (Lawson 2013).

These economists' calls for pluralism have been more pronounced recently, and embodied in a number of initiatives; *inter alia*, a special issue on pluralism in the IREE (2009) and the formation of Reteaching Economics, a group of early career scholars campaigning for greater pluralism. Robert Skidelsky has been commissioned by INET to develop a pair of MOOCs (Massive Open Online Courses) – one on history and philosophy of economics, another on 'unsettled questions' – material often omitted from conventional programmes. These add to the range of courses delivering heterodoxy and pluralism around the world.

Another driver of these new programmes is student demands for greater pluralism. These calls are not new. Figure 1 below reports responses from an Economics Network student survey from 2002; these were contemporaneous with calls from the Post-Autistic Economics Network (see Fullbrook, 2003) for greater pluralism of theory and method. Recently, though, these calls have been amplified greatly by such groups as the International Student Initiative for Pluralism in Economics, the Post-Crash Economics Society, and Rethinking Economics. Earle, *et al* (2016) solidify these calls within an overarching critique of economics.

Figure 1: Undergraduate students who want a more heterodox experience

- 'The basic problem is that the vast majority of economics in [the course] is orthodox/mainstream. Students aren't offered alternative approaches developed by Post-Keynesians, institutionalists and Marxists. But the problem seems to be the same elsewhere: 95 per cent of the economics taught in higher education institutions is mainstream.'
- 'More of historical account of the development ideas I believe would be beneficial to understanding why we believe the ideas we do today, what was wrong (why they failed/are no longer used) with ideas of yesterday, e.g. going from the Gold Standard to Keynesianism to Thatcherism to today.'
- 'I would like to see more empirical evidence used in lectures to support or maybe contradict the economic models. This would help relate what can be some very abstract ideas to the real world. The few times this has happened I have found it very interesting.'
- 'More focus on non-orthodox economics rather than just neo-classical to give a broader perspective.'

Students' responses to the question: Identify one or two aspects of your degree course that could be improved and say why (Economics LTSN Student Survey Report 2002).

In the light of this critique this chapter examines the rationale and scope for teaching heterodox economics, and pluralism. We now consider working

definitions of heterodox economics and pluralism, a summary of the arguments for teaching them, and an introduction to strategies for doing so.

1.1 What is 'heterodox economics'?

'Heterodox economics' is a problematic term, which is continually debated (cf. Mearman, 2012[1]). It can mean simply 'non-orthodox' but that definition is problematic in two ways. Principally, it begs the further question of whether there is an identifiable orthodoxy; and if so, what that is. For some economists, 'orthodox' remains associated with the neo-classical economics. Arnsperger and Varoufakis (2006) define that in terms of three methodological meta-axioms: individualism, instrumentalism, and equilibriation. Lawson (2013) defines neo-classical economics in terms of an adherence to a particular technical apparatus.

However, others hold that equating neo-classical and mainstream economics is incorrect. First, the term 'neo-classical economics' can mean a set of meta-theoretical principles or methods – as is the case in this chapter; however, it can also refer to a specific historical period in economics. Second, to equate neoclassical and mainstream ignores many recent developments in economic research (Colander, Holt and Rosser, 2004). Unfortunately, despite CORE, many of these theoretical developments still have not filtered into undergraduate teaching. As a result, 'orthodox' teaching still largely reflects neo-classical economics. Hence, in this chapter, the term 'orthodox' refers to the essentially neo-classical material present in the vast majority of undergraduate economics curricula. The term 'mainstream' refers to research.

The second problem of defining heterodox economics as 'non-orthodox' is that it downplays both the heritage and current potency of heterodox theories: they are both a) based in a tradition of alternative theoretical systems, such as those constructed by Marx, Keynes, Veblen, Hayek and Schumpeter and b) living traditions practised in research and other communities, with findings published in journals. Heterodox theories are considerably more than reactions to orthodox theories. For the purpose of this chapter, heterodox means neither simply 'non-orthodox' nor 'non-neoclassical'. Nor is it defined merely in terms of new versus old, i.e. new economic research versus old textbook theory. Rather, it constitutes a set of key characteristics found in the writings of heterodox economists. A summary of these is presented in Figure 2.

Figure 2: A non-exhaustive series of heterodox principles

1. Methodology (rather than just *method*) is important to understanding economics.
2. Human actors are social and less than perfectly rational, driven by habits, routines, culture and tradition.

3. While theories of the individual are useful, so are theories of aggregate or collective outcomes. Further, neither the individual nor the aggregate can be understood in isolation from the other. The micro/macro distinction may be invalid.
4. Economic systems are complex, evolving and unpredictable – and consequently equilibrium models should be viewed sceptically.
5. History and time are important (reflecting (4)).
6. All economic theories are fallible and, reflecting (4), there is contemporary relevance of the history of thought to understanding economics.
7. Pluralism, i.e. multiple perspectives, is advocated (following on from (4) and (6)).
8. Formal mathematical and statistical methods should not be presumed to be superior. Other methods and data types are valuable.
9. Facts and values are inseparable.
10. Power is an important determinant of economic outcomes (cf. Ozanne, 2016).

Not every example of heterodox economics exemplifies every one of these characteristics. Austrian economics, for example, is weak on principle 10. Whilst some economists treat heterodox as a single body of theory (or try to create a single theory: Lavoie, 1992; Arestis, 1992; Shaikh, 2016), others treat it as a collection of theories (Garnett, 2005). Some argue for a coherence of heterodoxy at a methodological level or even in terms of the nature of reality as involving structures of deep causal mechanisms (Lawson, 1997, 2003) or complex adaptive systems (Potts, 2000). Figure 2 includes assumptions with epistemological and ontological standpoints that are widespread in heterodox literature (and therefore tending towards a potentially unifiable body of theory). Given the scale of these principles, students will only have very limited opportunities to understand the implications within the context of a single module. A more thoroughgoing approach would require a review of the experiences offered to students across a whole degree programme.

1.1.1 Method and history

Some points in Figure 2 merit further elaboration. Attention to methodology (1) and to the history of economic thought (5) are hallmarks of a heterodox approach. However, heterodox economists have argued that these two (arguably key) areas are neglected in standard treatments of economics.

As discussed below, the question of what a model is, how it is to be used, how it is to be evaluated, etc. are crucial for anyone wanting to understand economics; and indeed, are useful questions for anyone required to think abstractly. Accordingly, abstraction is a central activity in economics: what does it mean? How are we to think of *ceteris paribus*? In contrast to many standard treatments, a heterodox

module would spend longer discussing those methodological issues and would not set them aside. Rather, they would be revisited repeatedly.

As Hodgson (2001) claims, 'economics forgot history'. This could be true in two senses. It is too bold to claim that orthodox economics ignores methodology and history. However, history of thought is often confined to an optional specialist module. Even newer curricula, such as CORE, themselves only give cursory attention to history of thought (Morgan, et al, 2014)[2]. And yet, it has been recognised that understanding history is important (James, 2012). Thus, Hodgson could be correct in a second sense too: economic models removed historical time from analysis. It is significant that the new Skidelsky MOOC will be on the history and philosophy of economics.

Heterodox approaches tend to take history very seriously. Partly this is self-serving. By pointing to the fact that neo-classical economics was not always the only game in town and by examining critically how economics got to its current state, it creates space for heterodox economics. Nonetheless heterodox economics is not merely history of thought. Rather, it rests on the belief that theories cannot be understood outside their wider socio-historical context. The rise of the *General Theory* is a good example: it reflected past intellectual currents but also the background of economic instability and high unemployment. The struggle between Monetarists and Keynesians is inexplicable outside of its economic context of what was actually happening to inflation. Heterodox economics precludes an ahistorical approach to theorising and asserts that students should be introduced to this way of thinking.

1.1.2 Heterodox pedagogy?

Not surprisingly, there is no single heterodox approach to teaching and learning. However, heterodox economists have made several interventions in pedagogy; and identified several benefits of teaching heterodox economics. It would be inaccurate to say mainstream economists have not shown any concern for pedagogy. For example, Siegfried et al (1991) avow a Socratic approach aimed at independent learning. Forsythe (2010) advocates problem-based learning. However, orthodox pedagogy tends to be instrumental, i.e. directed at more effective learning of and/or *training* students in conventional economics. For example, Coyle and Wren-Lewis (2015) assert that economics is a vocational subject. In many cases, though, this instrumental orientation is often only implicit: this partly reflects that there are few institutional incentives for engaging in deep reflection about teaching.

Contributions from heterodox economics have more often been explicitly informed by other pedagogical principles. Another element of that is to problematize education *per se*. Bowles and Gintis (1976) analyse education in terms of its role within capitalism. Bridges and Hartmann (1975) note the hierarchal nature of

teaching but also stress the problems facing women teachers in establishing their credibility in a masculinist system. They draw on feminist literature and on the radical pedagogy of Freire (1970). A radical or critical pedagogy is student-centred, focusing on emancipation of students via conscientisation, i.e. self-awareness of their own circumstances on their own terms. From the same tradition, Rose (2005) discusses various methods by which they encouraged the co-production of knowledge on their course, for instance via collaborative exercises, a contract grading system, group projects, and simulations. She cites hooks (1994) as an influence. Rose contrasts her approach with the 'banking model' of education, in which students are empty vessels to be filled by instructors. Similarly, Kramer (2007) advocates participatory learning: in this case, students were asked to construct an ideal US economy. Ford *et al* (2007), who also cite Vygotsky and Dewey as influences, provide another example of a *constructivist* approach, in which learning occurs through students' constructing their own meanings, 'scaffolded' by their own experience, rather than simply reproducing others' meanings.

These are just some examples of how heterodox economists have explicitly engaged with educational philosophy to design and evaluate their courses. Barone (1991) for example explicitly recognises the heterogeneity of students. Peterson and McGoldrick (2009) link service learning methods to the achievement of their educational goals. Several authors utilise educational psychology of Perry (1970) in their discussion: *inter alia*, Lapidus (2011), Earl (2000), and Barone (2011). Another strand of this work is around liberal pedagogy, which envisages education as a process of allowing students to develop into analytical, critical, autonomous thinkers. Several authors argue that teaching heterodox economics has clear educational benefits (see Figure 3 below). Many of these overlap with claims for the benefits of pluralism.

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[1] The diversity of understanding of heterodox economics even within the heterodox community is demonstrated by these assorted brief portraits of it by leading exponents.

[2] It should be noted that, technically, CORE is just one module: nothing per se precludes teaching history of thought alongside it.

1.2 Pluralism

Like 'heterodox', 'pluralism' is a problematic term. At a basic level it refers to the existence of alternatives. However, there is an array of possible ways to practise that. Garnett and Mearman (2011) discuss how pluralism has evolved. Pluralism can operate at various levels: within the same theoretical framework, debating evidence; using different theoretical frameworks; deploying different

methodological approaches; or making different assumptions about the world (ontological) or about knowledge (epistemological). For the student and the teacher, these different options present different challenges.

Another dimension of pluralism is the way in which the alternatives interact, if at all. It is possible to create 'ghettos' into which alternatives are pushed: for example, a single optional module in Marxism within a programme which otherwise shuns Marx. This is a weak form of pluralism, one which merely tolerates the existence of the alternative. A programme in which a strand of heterodox modules is allowed, but again with little engagement between those modules and the core also falls into this category.

A stronger, more assertive form of pluralism is one in which different perspectives are considered in tandem, perhaps in contention with each other. The two perspectives can be variants of orthodox thought: for instance neo-classical versus behavioural treatments of microeconomics. However, they can also be orthodox versus heterodox. A thoroughgoing 'contending perspectives' module would contrast the perspectives throughout, including in the assessment scheme.

Whether pluralism occurs, and the form it takes, will depend on several factors. One is the institutional constraints faced by the instructor. The suggestions in this chapter and in the accompanying booklet reflect the different realities teachers face. It may be possible to design a complete pluralist programme, but often it is not. Even in these cases, dogged teachers can get approval for a heterodox or pluralist module within a conventional programme. However, sometimes this is not possible, and the only option open is to insert heterodox material into an orthodox module. And of course, in some cases, even this is not possible. Thus institutional context is crucial.

However, mindset is also important. To get the most out of a pluralist approach, one must be clear about the objectives of doing so. Similarly, a pluralist approach involves setting aside to some extent one's own beliefs about what is correct. It involves giving a fair hearing to material which the teacher ultimately believes is wrong: heterodox teachers know this very well! It also involves engaging with material that is more unfamiliar, and thus it takes time – time which is otherwise used for publishing papers necessary for career survival. For these reasons, teaching heterodox economics and pluralism are challenging.

Furthermore, it should be clear that merely teaching heterodox economics is not synonymous with pluralism. In Figure 1, point 7 claimed that pluralism is a principle of heterodox economics. However, heterodox teachers can be non-pluralist in their approach, if they choose to be. Clearly, as well, orthodox teachers can be pluralist, if they choose to be. One of the reasons to do so is to consider the benefits of pluralist teaching.

1.3 Why teach heterodox economics and pluralism?

Some reasons for giving students opportunities to develop an understanding of the principles of heterodox economics, and for pluralism, are presented in Figure 3.

Figure 3: Reasons for giving students good opportunities for understanding the principles of heterodox economics and for teaching pluralistically

1. In order to understand a model properly, it is important to know its limits. Further, by understanding heterodox principles will lead to a more informed understanding of 'mainstream' economics. For example, behaviouralism is part of the mainstream but it reflects heterodox principles. Hence students will understand the orthodox better if heterodox principles are also taught
2. Heterodox principles exert an important influence on policy (see Ramsden, 2015).
3. As the history of economic thought shows, today's orthodoxy might be tomorrow's heresy. Today's heterodoxy could be tomorrow's mainstream. Students should be prepared for the long run.
4. By analogy with biodiversity, in a complex world economics should have more varieties if it is to survive.
5. The dominance of orthodoxy (or indeed the mainstream) is not a reflection of the superiority of these ideas. It reflects social pragmatism, seeking to increase the esteem of the profession by conforming to a dominant political ideology (liberalism) and by adopting the methodology used in 'hard science'. These desires are reinforced by disciplinary mechanisms such as so-called 'research quality' assessment.
6. The complexity of the world and humans' limited ability to understand it suggest that one perspective may not be sufficient (see Morgan, 2014). Thus, heterodox as well as orthodox economics should be taught.
7. To be effective, economists need a 'bigger toolbox' (Nelson, 2011). Pluralism may aid skill formation and therefore make graduates more employable (O'Donnell, 2009).
8. Teachers as well as students learn and gain from teaching different perspectives (Warnecke, 2009).
9. Theoretical concepts and methodological approaches from heterodoxy, either in general or from specific schools of thought such as Marxism, encourage the development of key cognitive skills as well as open-mindedness and tolerance (Clarke and Mearman, 2003; PCES, 2014). These faculties are, according to Bridges (1992), the mark of an educated mind.
10. A pluralist thinking style is the most effective single factor distinguishing people who reliably predict future events (Tetlock 2005).

The above arguments are now well-established and have been buttressed by recent literature. A significant strand of new literature has gathered evidence to suggest that teaching heterodox economics and pluralism have benefits (see Garnett and

Mearman, 2011). This evidence draws on a variety of approaches, including quantitative but also qualitative and mixed methodologies. There are still relatively few standard experimental studies, and no randomised controlled trials (RCTs) of which I am aware. This will disturb some readers. However, the absence of RCT evidence reflects two factors. First, it is often not possible to construct these trials, particularly in contexts in which an instructor is acting in isolation. Second, there are a number of objections to RCTs in an educational context (Mearman, 2014); hence, single-group studies relying on student (or alumni) performance, feedback and other reflective devices may be all that is available, and may in any case be preferable.

An early evaluation of pluralist teaching by Barone (1991) claimed that his students 'as a result of heterodox integration… moved from dualistic to relativistic to critical forms of thinking' (Barone, 1991: 22). He claims that students' understanding is enhanced by the exposure to a wide range of phenomena. Further, he claims, students are better prepared to engage in policy debates because they are used to dealing with multiple perspectives. A follow-up study (Barone, 2011) made several similar claims, whilst acknowledging that in his context, pluralism had not been embedded sufficiently deeply to be most effective.

It is not hard to find reports of students responding positively to pluralist teaching. Warnecke (2009) reports greater student enthusiasm and highly positive student feedback. Mearman, et al (2011) aver that students on pluralist courses are more engaged and more content. Harvey (2011) reports (based on surveys of students on several runs of a pluralist module) that his students were not confused by pluralism, and rather, left their course more enthusiastic and more confident. However, he warns that his students did show some evidence of being influenced by the tutor's biases.

Mearman et al (2011) also provide qualitative evidence that pluralism increases critical thinking skills; and that stronger contrasts (i.e. between mainstream and heterodox, rather than merely within the mainstream) may increase this benefit. Resnick and Wolff (2011) claim their students were better educated and better equipped to engage with other disciplines, having done a pluralist course which focused on philosophical entry points of different economic perspectives. Cooper and Ramey (2014) report survey evidence from alumni (over a ten-year period) that shows that their pluralist education helped them develop key attributes, including problem-solving. O'Donnell (2009) also provides evidence that pluralist courses aid skill development. Amin and Haneef's (2011) tracer studies showed that their graduates developed professional competence and ethical awareness.

Tetlock (2005) reports on a twenty-year study in which experts from government, academia, journalism, and other fields made concrete predictions about events at least a year in advance. Each prediction involved assigning probabilities to sets of

three outcomes (increase, decrease, or stay roughly the same) for measures such as a currency exchange rate, GDP growth, or a government deficit. Over two eventful decades, hundreds of participants generated 28,000 predictions. There are multiple ways to calculate a score, but by almost any measure the human predictors all fared worse than very simple algorithms. There was no difference in accuracy between experts from the political right or left, but there was a profound difference due to cognitive style. The experts who held to one specific predictive approach—anything from free-market to Marxist—were the most wildly inaccurate. The best predictors were those who considered multiple frameworks in parallel, or who moderated the predictions from one approach by considering that other factors might alter the outcome.

This nascent literature on evidence supports the theoretical arguments for pluralism. It is hamstrung somewhat by the nature of the object of enquiry, and by ethical concerns about experimentation. Both of these aspects reduce the feasibility and desirability of RCTs. Further, direct assessments of abilities such as critical thinking tend to be rather cumbersome and disruptive to the teaching process, and for this reason are avoided. That does limit the evidential base for pluralism. However, the studies cited demonstrate evaluations which are theoretically-informed, rich, and hence valuable.

1.3.1 Student feedback

Module evaluations provide a routine source of information about students' experience of teaching. When the module evaluation gives students an opportunity for a free response the results are usually instructive. Figure 4 presents a selection of student comments in their written evaluations of a heterodox module taught by the author. These are indicative of possible outcomes of heterodox teaching and could be followed up by anyone interested in investigating the likelihood of these outcomes.

Figure 4: Examples of student feedback on their experience of heterodox economics teaching

1. 'I like a mixture so you can get a feeling from both sides of an argument.'
2. '[o]rthodox is easier to learn because heterodox tries to incorporate too many outside factors. I like different opinions, though, so hearing both sides is good.'
3. 'I think to begin the [module] comparing overtly is very difficult but it is much better to know the facts like that. I feel more informed.'
4. 'Towards the end I feel my paper was better and I was able to have better opinions on the topics and more able to put my thoughts together.'
5. 'I learned how to write an argumentative paper.'
6. 'I learned to form more concrete opinions and argue them.'
7. 'The papers have improved my way of thinking about certain topics.'

8. '[m]ost of my papers in high school did not want my opinion so it is nice to have an outlet for my thoughts.'
9. 'I feel I know my own opinions more'; '[m]y writing skills definitely improved as well as my thinking skills.'
10. '[t]he papers were my favourite part of the class. I actually told my mom that the two papers you had us write made me think the most out of any papers I have ever had to write.'

There is evidence here of the challenge posed to students. One student complains that the heterodox approach was too open. Another cites the difficulty that is inherent in contrasting theoretical perspectives. Similarly, Lapidus (2011) reports good feedback on two courses she taught as contending perspectives; but she also notes some negative comments conveying student confusion. For instance, in response to an exercise which problematised the reliability of official statistics, one student wrote: "...I can't seem to relate the answer I want to give, to the terminology of [the textbook]. It's almost like in my head I'm blabbing on and on...and it relates nothing to what I should've learned in [the textbook]" (Lapidus, 2011: 92-3). These comments reflect Earl's (2000) concerns, that comparative analysis at the beginning of a module is difficult for some students.

However, challenge can also be seen as a good thing, driving students towards higher levels of achievement, particularly in their critical thinking. This is apparent in the frequent reference to argument and argumentation. A number of students remark that hearing two sides of an argument is beneficial. Some also believe that their ability to construct arguments has improved.

1.4 Three strategies for teaching pluralistically via heterodox economics

There are three main strategies for incorporating pluralism via heterodox economics in a course or programme. These approaches are all pluralist, albeit to different extents. As outlined above, the different approaches may reflect tutor preferences, tutor resources, or institutional constraints. This chapter considers the three strategies, suggesting activities that can be used in such programmes. More detailed examples of each strategy appear in the companion booklet "Pluralism in the economics curriculum", with extracts from syllabuses.

1 Enriching an 'orthodox' module

This approach uses heterodox concepts to shed new light on orthodox concepts essentially following a standard textbook treatment augmented by heterodox material. This 'orthodox-plus' approach is probably the most common form of 'heterodox' module, given that most undergraduate teaching is orthodox and

opportunities to teach exclusively heterodox material are limited. This approach is described in section 2.

2 A module that focuses on an alternative system of thought

For example, a module might aim to provide students with a rich understanding of the way of thinking found either in a specific strand of heterodox thought, such as Marxism, Post-Keynesianism; or in a synthesised heterodox approach to, say, microeconomics. These modules are rare in the UK and remain unusual in other countries, such as the USA. This approach is described in section 3.

3 Teaching orthodox and heterodox economics as 'contending perspectives'

A series of topics of interest or theoretical concerns are taught first from one perspective, then from the other, allowing comparison. Barone (1991) describes an entire programme organised around this principle. The new programme at Greenwich is designed along these lines. This approach is described in section 4. Table 1 below shows contrasted 'orthodox' and heterodox concepts.

Option (1) is perhaps the most practical and the most commonly used. Option (2) means that justice can be done to heterodox ideas, but is often restricted to specialist, optional 'ghetto' modules, where the development of a critical understanding may be limited. This chapter argues that, pedagogically, option (3) is the most beneficial, because it is based on comparative, critical treatments of both orthodox and heterodox. Also, by committing to comparative treatment, the contending perspectives approach can prevent the confusion which can occur when students are faced with different perspectives only occasionally. However, it *may* mean that fewer topics are covered in a module.

At this point it is useful to note the rich resources now available online, for instance at the Heterodox Economics Directory and at those in the Economics Network's own TRUE Project.

2. Enriching an orthodox programme

2.1 Summary

We will call the strategy of adding heterodox concepts into an otherwise orthodox programme 'orthodox-plus'. Of the three strategies for teaching heterodoxy discussed in this chapter, this is the simplest to implement. The essence of the approach is that orthodox concepts should be interrogated critically; and that heterodox criticisms and alternative concepts can assist this process. Note that the previous sentence was split into two: assess orthodox concepts critically, and use heterodoxy to do so. The first part is crucial. Of course, economics educators could always do better in looking critically – and encouraging their students to look

critically – at the concepts they are studying. This neglect is understandable: time constraints mean that tutors are under pressure to move on to the next topic; and, particularly at lower levels, it is incumbent on tutors that their students merely pass through that stage successfully and that core, underpinning concepts are *learned*. However, they may not be *understood*. Critical examination can increase understanding. All of that could be achieved without using heterodox content but using heterodox work could assist the process of critical teaching. Further, according to the variation theory of learning, thinking comparatively – from a number of perspectives – about an object of learning improves understanding of it.[1]

To make space for the inclusion of heterodox perspectives in an orthodox module, something must be omitted, but what? This is significant precisely because an objection to the above proposal is that key concepts are omitted. What may be sacrificed is some detail, for instance in some of the technical details of the concepts being studied. Salemi (2005) argues that for an introductory economics module, some standard diagrams – he cites cost curves – can be omitted in favour of more reinforcement and application of key concepts. His approach is similar to arguing that 'threshold concepts' – concepts which once understood change the way the person thinks (see Meyer and Land, 2005) – should be targeted in order either to underpin higher-level study or give a basic summary of economics for a non-economist. The same argument could also be applied to the extent of mathematics used in a module. A further approach could be to leave out theories which are less useful in modern economics or spend much less time on them. For instance, CORE omits *inter alia* perfect competition, clearing labour markets, and Edgeworth boxes under perfect competition.

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[1] Space precludes full discussion of variation theory. Essentially, the theory holds that there is no discernment without variation. To understand a part, one must grasp the whole. Thus to understand orthodoxy, one may benefit from examining other parts of economics. See Runesson (2005) for further discussion.

2.2 Evaluation of the 'orthodox-plus' approach

- A critical examination of assumptions is encouraged. As Sutton (2000) notes, assumptions are something which students question (perhaps naturally) but the discussion of which is often postponed – often indefinitely. Referring to questions raised by students about (or against) the practice of reducing complex human actors to simplified mathematical representations of rational maximisers, Sutton (p. xv) claims: 'By the time that students have advanced a couple of years into their studies, both these questions are forgotten. Those students who remain troubled by them have quit the field; those who remain are socialised and no longer ask about such

things. Yet these are deep questions, which cut to the heart of the subject.' This situation is problematic from a pedagogical point of view.

- A discussion of the role of assumptions in economics is provoked. This is not 'orthodoxy-bashing': on the contrary, a discussion of the realism of assumptions leads naturally into one about their role and possibly a *justification* for unrealistic assumptions. That in turn leads to a consideration of models and a greater understanding of how they work and how to think about them. That can be vitally important in understanding economics and in offsetting the apathy many students feel when studying economics.
- Third, the heterodox conception offers an alternative for students to consider. Again, that should be done critically. There are two principal benefits of doing this. First, students are introduced to ideas that have played a formative role in the history of economic thought. Second, the heterodox views are a basis for comparison and examination of orthodox theory, and in line with variation theory cited earlier they provide a background for crystallising the orthodox views. This is the value-added of using the heterodox concept to examine the orthodox – compared with, say, simply drawing on the conclusions of experimental economics, as Becker (2004) suggests.

3. Teaching a heterodox module

3.1 Summary

As discussed above, exactly what comprises a heterodox module will depend on its level and the approach of the instructor. There are essentially three alternatives in constructing a heterodox module. One way is to try to teach a single heterodox approach, such as Post-Keynesianism or Marxism. In that case, considerable depth would be achieved. Most heterodox modules, such as those found via the Heterodox Economics Directory are of this type, as are many of the examples discussed in the curriculum booklet. In each case, consistent with heterodox principles, the module would begin with a discussion of the tradition's methodology, and its place in the history of economic thought. Thereafter, the topics covered will depend on the perspective being considered. Different heterodox schools have had different concerns and thus their literatures are skewed towards those issues. Space precludes a full discussion of all of these options here. However, reasonable guides to content can be based on treatments of the approaches in any texts dedicated to them, history of economic thought texts and recent editions of journals devoted to the tradition.

The second way to teach a heterodox module is to draw on the diversity of heterodox perspectives. One way is to anticipate the contending perspectives approach discussed below and teach a series of topics, in each case considering a

variety of heterodox perspectives. So, on successive topics of, say, methodology, the individual, firms and competition, the aggregate economy, the role of government and income distribution, one would consider the work of each of the heterodox perspectives chosen on those topics. In that way, the benefits of teaching heterodox material are achieved, as are the advantages of teaching multiple contending perspectives.

A third way is to attempt to teach a fairly unified heterodox perspective, not based around one perspective, but by combining elements of different heterodox traditions. The main benefit of this is that one chooses the heterodox school that deals best with specific topics. For example, if one wanted to deal with the question of money, one *could* examine a range of heterodox perspectives on it (for example, Lautzenheiser and Yasar (2005) discuss teaching money in Marx) but it may be equally useful to consider Keynes' work, which is arguably the most important contribution available. One might also discuss the issue of 'macroeconomics' and use that as a reason to discuss the contribution of Keynes to economics.

Alternatively, one could use Keynes to talk about uncertainty, or even, at the introductory level, about markets. The Keynesian beauty contest, in which stock markets are compared to a particular type of newspaper competition, in which entrants are asked to pick the beauty contestant whom they think others will choose, is a good example. That story is a good one: it encourages examination of the notions of the market, its efficiency, its outcomes and the market as an institution, rather than as a quasi-natural phenomenon.

Similarly, one might focus institutionalism on consumer theory, Post-Keynesianism on distribution, and Austrian Economics on competition (and policy). There is also a rich heterodox literature on production. Smith on the division of labour, Marx on exploitation, Bowles and Gintis (1985) on work organisation, and Spencer (2009) on the nature of work are all excellent sources for discussing actual production processes. It is this third approach which will be discussed here. A more detailed example appears in the accompanying publication "Pluralism in the economics curriculum".

3.2 Evaluation of the heterodox module approach

When one is trying to present a summary of heterodox microeconomic concepts, drawing on extensive literatures, not everything can be included. In terms of omission, the list of heterodox concepts not covered would be potentially long but the module can attempt to provide an overview and introduction. It can also build cognitive capacities, such as the ability to think about an issue from different angles. This anticipates the contending perspectives approach discussed in section 4. Obviously, such a module is very different from standard introductions. Some

tutors may be concerned that a heterodox module deviates too far from the Economics Benchmarking Statement and that concern is examined in Figure 5.

Figure 5: Heterodox modules in relation to the Economics Benchmarking Statement

In some significant ways, the heterodox module differs from the description of Economics in the Benchmarking Statement. Concepts identified as core theory may be omitted or even rejected. Interestingly, the new statement (QAA, 2015) removes references to scarcity: hence one of the key differences between it and a heterodox approach has gone. Indeed, some core concerns of heterodox economics have been incorporated: for instance the central role of finance, critical thinking, and sustainability. Crucially, several pluralist terms have been added, for instance that teaching should create "understanding of alternative approaches to the analysis of economic phenomena" and that "explanations may be contested".

Several of the other core concepts listed there might be de-emphasised, neglected, questioned, rejected or even omitted in a heterodox module (see Table 2 in Section 2 of the curriculum booklet). However, their omission makes way for new concepts. Thus, side B of Table 1 below is easily converted from a set of principles into learning outcomes. In addition, though – and this theme should be clear throughout this chapter – learning outcomes *are* achieved in terms of student capacities and skills. Significantly, many of these are consistent with the Economics Benchmarks: abstraction, induction, deduction, analysis, quantification, design and framing – the identification of important variables – are all achievable in a heterodox module. Clearly, some of the conclusions reached about those skills – for example on the appropriate use of mathematical models – *may* be different from a heterodox viewpoint. However, in addition, skills of criticality, comparison and concrete, realistic thought may also be developed.

The above concerns also apply in different ways to the orthodox-plus and contending perspectives approaches. In both, the emphasis will be slightly different to a standard module and potentially some standard material will be omitted or less time will be given to it. However, equally, the development of critical and comparative skills will be enhanced to compensate, as in the case of the heterodox module.

The benefits of teaching a heterodox module are to some extent very similar to those of teaching heterodox material *per se*:

- The heterodox module structures laid out above offer opportunities to discuss methodological and historical questions.
- They confront students with different ways of thinking of the world and about economics.

- Students may consequently understand the orthodox material better, because they have been forced to question it, to examine objections to it, and to consider an alternative.

Additionally, teaching an entire module of heterodox material allows more depth and breadth of material to be achieved, and thus the benefits of teaching that material are amplified. Further:

- The benefits of studying heterodox material are achieved at a *programme* level. For example, students have space to confront 'normative' questions usually confined to policy analysis or philosophy. Indeed, that is a feature of the heterodox approach.
- Students are invited to question whether the heterodox approach is superior or inferior to – or perhaps just different from – the orthodox material they have been learning.
- They have the opportunity to study an entire system of thought and attempt to employ it.
- *If* heterodox theory is more realistic than orthodox, then students develop a useful applicable toolkit of concepts which cannot feasibly be learned in a brief one- or two-week treatment.

4. The 'contending perspectives' approach

4.1 Summary

Arguably, the best way to achieve the development of comparative and critical capacities is to combine the two approaches above. This can be done in a 'parallel perspectives' approach, in which issues or concepts are considered from different perspectives in parallel. This is pluralist but somewhat weakly so. A stronger version of this is 'contending perspectives', in which different perspectives are brought intentionally into contrast. The essence of this approach is summarised in Figure 6.

Figure 6: Characteristics of a 'contending perspectives' approach

1. Core economic concepts or problems are examined from an orthodox perspective (as would be done in an orthodox module).
2. The orthodox perspective is criticised from a heterodox perspective (as in the orthodox-plus design discussed above).
3. The concept or issue is discussed from a heterodox perspective (as in the module design discussed in Section 3).
4. Any orthodox rebuttals of the heterodox position and debate that has occurred are examined.
5. Students are invited to evaluate the debate and argue for a position. In some ways, this may have already been done in the heterodox module, if issues

were dealt with in turn from multiple heterodox perspectives. However, the contending perspectives approach does this more explicitly and systematically and allows both orthodox and heterodox positions to be examined.[1]

In terms of learning outcomes, students will gain awareness of a variety of substantive concepts (albeit possibly slightly narrower in scope than on any individual orthodox or heterodox module). However, the key to using the approach successfully is not to compromise on the need to be critical and comparative. The contrast between the perspectives is utterly crucial and must pervade the presentation and assessment of the module being taught.

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[1] In theory, one could start with heterodox concepts. In an introductory module that makes most sense. In higher-level modules, in which students have most likely already studied some orthodox economics, the orthodox is most easily taught first.

4.2 Examples

This section outlines a contending perspectives approach. We start with general discussion of the distinction between orthodox and heterodox economics, based on a model of ten competing principles. The two sets of ten principles are presented in Table 1 below and are offered as a useful teaching device. That discussion places particular focus on the purpose of economics, the methods of economics, and the role of values in economics. Section 3 of the curriculum booklet sets out a particular Introductory Microeconomics module structured around contending perspectives.

At whichever level a contending perspectives approach is applied, a crucial first step is to get students thinking comparatively as early as possible and about fundamental issues. A useful device to assist that process is to employ Table 1, adapted from Knoedler and Underwood (2003). The principles shown there are not meant to be exhaustive but are an example which individual tutors can adjust according to their modules. The principles shown apply well to a microeconomics module.

Table 1: Ten Things Every Student Should Learn

(adapted from Knoedler and Underwood, 2003)

Orthodox (Side A)	Heterodox (Side B)
1. Economics is the study of choice under conditions of scarcity.	1. Economics is about the social processes of providing for people's needs, not merely choices and scarcity.

2. Economic actors are motivated by rational self-interest to maximise their satisfaction from consumption (based on a given set of preferences).	2. Both scarcity and wants are socially defined and created.
3. Economics, practised correctly, is a 'positive science' premised upon value-free, objective knowledge. The role of the economist is to engage in the science of 'positive' analysis of the economic processes described above.	3. Economics is not 'value-free' and ideology shapes our analyses and conclusions as economists.
4. The history of economic thought is a specialist subject inessential for the study of contemporary economic theory.	4. The history of economic thought is critical to the study of 'basic principles' of economics.
5. The individual – understood as an entity separated from others – is the principal unit of economic analysis.	5. The individual should be understood, but as complex and connected to others – and as a means to understanding the operation of the whole economy.
6. Economies and markets tend to equilibrium. Equilibrium is a foundational concept in economics.	6. Although equilibrium can be a useful concept, economies generally do not tend to equilibrium; indeed, there may be no equilibrium to tend to and thus, economics should focus on dynamic processes rather than equilibria.
7. The market values (prices) established in a 'free market' economy are the critical guide to economic efficiency. Anything that 'distorts' free market values reduces efficiency, thus imposing costs on society.	7. Valuation is a social process.
8. Although a free market is believed to be the ideal way to achieve efficiency and maximum social welfare, there are many failures in the market requiring intervention by government.	8. Markets are social institutions that could never work as posited by the orthodox theory. Many of the failures described by orthodoxy are essential features of markets.
9. Distribution of wealth and income rests on marginal production of individuals, determined by their characteristics.	9. Distribution is shaped by membership in groups according to race, gender and class, and the relative power exercised by those groups.
10. The natural world, the source of all energy and materials and the repository for all waste, is not a necessary (complementary) element in production.	10. Ecological literacy (economy–ecology interface, unity between biophysical first principles and economic sustainability) is essential to understanding the economic process.

One useful way to employ the table is to print it on two sides of a sheet, with the orthodox principles as side A, the heterodox side B. This resource has been used successfully at Principles level.[1] It is one of the first resources given to students. They may immediately read it all – and if this stimulates their thinking that would be desirable – but it may also introduce too much early confusion. Thus it may be better just to have students refer to it as directed by the instructor. The initial segment of the module must be devoted to creating the impression of a division and making students comfortable with that. For beginning students, without preconceptions – or perhaps for those from other disciplines – it is straightforward to argue that there are simply two competing views, and then to explain them. Certain points from the ten things sheet are desirable and indeed necessary to establish the orthodox/ heterodox distinction.

The first issue to discuss is 'What is the prime focus of economic analysis?' Immediately students see the standard scarcity view contrasted with other views. As Table 1 shows, a heterodox economist might regard the economic problem as one of social provisioning – of needs, not wants. By questioning whether their wants are indeed unlimited, and whether their resources are scarce, students understand better what the orthodox postulate of scarcity means, and how it applies to real-world situations. Some students may reject the scarcity postulate as static and too geared towards selfish satisfaction; for others though it will resonate with their own budget management concerns.

After discussing the purpose of economics, the author finds it useful to consider the methods of economics. As outlined in section 1.1, heterodox approaches contrast with textbook models in their recognition of history. Orthodox models tend to be framed in logical time, which is reversible. This is clearly unrealistic and excludes much apparently significant historical detail. However, students quickly realise that models must exclude. That leads into a contrast between abstraction and idealisation. Abstraction is the ignorance of some factors in order to focus on the essence of a phenomenon. Idealisation is the creation of idealised entities that deviate strongly from reality. Abstraction is necessary in economics because of the complexity of the world. However, arguably, idealisation is more common in orthodox models. Thus, economic man is a device that does not represent any real humans. However, that may not matter in terms of good theories. With some students, it may even be possible to discuss Friedman's (1953) view of theories as predictive devices.

Point 3 on the sheet is also essential for the contending perspectives approach. It concerns the positive/normative distinction. The orthodox side A presents the positivist view that analysis should be value-free and objective. It is relatively simple to ask students whether they think this is a desirable aim and, if so, whether it is possible. Having the students read the introduction to Chang (2014) on 'political economy', or Harvey (2015: ch. 2) on economics as science, or Stretton (1999: ch. 5) on ideology assists that discussion. For Barone (1991) it is a major

benefit of contending perspectives that they allow value bases to be made clear and evaluated. In so doing, he argues, contending perspectives stop sneering and encourage healthy conversation and co-operation.

Stretton's (1999) book also facilitates the consideration of the role schools of thought play in economics. His early discussion of the development of economics is useful because it hints at point 4 in Table 1, on the role of historical context, but also establishes that there are several traditions out there and that they are worthy of consideration. Indeed, Stretton's approach is to examine briefly the history of economic thought, examine Smith and the classical growth model first, and then to show how the neo-classical economics took on only one part of the classical approach, namely distributional concerns. By reading these extracts from Stretton, students learn:

1. that there are several perspectives on economics;
2. about key figures in the heritage of economics;
3. that current theories are the latest in a long line of theories, some of which they develop, others they reject or change fundamentally

Some of the distinctions in Table 1 may appear rather stark but that is intentional. The stark distinctions serve as a vehicle to bridge them. For example, take point 8. In fact, perhaps few orthodox economists would argue (as strongly as that) in favour of the notion of free market capitalism, and perhaps many heterodox economists would not subscribe to the notion of a completely managed capitalism. In reality, there is more of a continuum of views. However, the two extremes serve as an entry point into a discussion amongst the students of markets and the role of government. This would most likely occur later in the module. It allows the free market view to be put across, examined and then contrasted with the view that all markets are institutional creations and therefore managed (which would also be evaluated). When those notions are presented simply, they become accessible to students. A case study such as the marketisation of health care or education is topical, personally relevant and an effective vehicle for understanding and discussing the two views as presented. Such a discussion could then lead on to more complex considerations and theories–for example, the new institutionalist approach.

Once the initial distinctions have been established, it is possible to move into a discussion of various economic concepts. That is where a discussion of module structure becomes relevant. Further detail on possible module structures can be found in the companion publication "pluralism in the economics curriculum".

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[1] In terms of its content, some points about the sheet should be noted. In general, it presents a workable set of heterodox principles: it is similar to the principles

listed in section 1.1. However, Knoedler and Underwood come from the institutionalist tradition and some of their alternative principles will reflect that. Nevertheless, the tables can be tailored to reflect a particular perspective, or to suit the needs of a particular module. For example, number 7 on the heterodox side, 'valuation is a social process', is quite vague. It probably reflects the concern expressed in a number of institutionalist texts and modules about instrumental valuation (the notion that value is ascribed only in terms of its consequences). However, it could also be interpreted as reflecting the Marxist labour theory of value and the (social) determination of the surplus. Or it could be explained via the Keynesian beauty contest, in which social-psychological factors determine share prices.

4.3 Summary of the contending perspectives approach

A thoroughgoing contending perspectives module can cover all the required orthodox concepts as well as heterodox concepts. The comparative and critical approach starts on day one and is reinforced through the entire module, in exercises, class discussions and assessment (see below). Although the author has not formally tested whether this approach generated better marks for students, it certainly improved student perceptions of the introductory microeconomics module and seemed to attract more students to opt for economics. These findings are supported by the evidence reported in section 1.3.

The author employed a similar method in modules on intermediate microeconomics, industrial economics, and economics of the environment. In the first case, orthodox and heterodox were contrasted in the same way as in the level 1 module, but considering higher-level material. In the second case, three perspectives were used: neo-classical, Marxist and new institutionalist. In the third case, environmental economics was contrasted with ecological economics. In all three cases, the contrast began almost on day one of the module and was pursued throughout.

4.4 Objections to the contending perspectives approach

There are several objections offered to teaching heterodox economics. Space precludes a full discussion here, but some of these objections are worthy of mention. One is that heterodox economics is pointless and that students should merely learn orthodox economics. Hopefully the arguments in section 1 refute such claims. The other questions commonly raised are:

- Is it asking too much of students to have them cope with multiple perspectives while taking in complex economic material?

- Will students find competing perspectives approaches too difficult and unattractive *per se*?
- Will including heterodox material reduce the intellectual depth of the economics programme?

The first two questions rest on the belief that criticism and scepticism breed nihilism, and that students will learn nothing if they are taught to criticise. Even those who accept the need to criticise the orthodoxy claim that the basics need to be learned first. The danger of course is that once learned, the basics are impossible to question, and that the aims stated above of open-mindedness and critical thinking can be thwarted if students embrace the basics too vigorously. One strategy is to teach alternative basics from the beginning. A way to get students used to being critical is to immerse them in a programme in which criticism and comparison is endemic.

However, it is a genuine concern that students will be discouraged if they see only fallibility of theories and alternatives and see no hope of reaching answers. Earl (2000) shows that an instructor who tries to push students too quickly will come unstuck and lose them. As Earl notes, the comparative or relativistic way of thinking does not occur overnight: nor can students be dragged to that level. Most start off as what Earl calls 'dualistic', i.e. right and wrong, thinkers: one theory must be the whole Truth, or it is useless. A tutor should be able to demonstrate their expertise by delivering the Truth to students. It is difficult for students to move from dualistic to relativistic thinking. Even when students are at higher levels of thinking in their everyday life, for instance when discussing football, music or other aspects of popular culture, they can revert to lower levels in academic life, leading them to demand 'right' answers and to feel uncomfortable answering anything other than narrow technical questions. Lapidus (2011) echoes these concerns.

As Earl (2000) notes, it is imperative to communicate to the students early on–and to repeat–what you as a lecturer are trying to do. This can also be achieved through the design of assessment. As outlined below, essays of increasing length and significance in terms of marks can ease students into the habit of thinking critically and openly. A stress on the need to make an argument and develop a position can be similarly beneficial. Therefore, when teaching contending perspectives in particular, it is essential that students are treated carefully. Attempts to force students into thinking comparatively, etc. too quickly can lead to them attempting to escape from the process, or taking easy options.

On the question of intellectual depth, the arguments of section 1 should show that teaching contending perspectives may actually increase intellectual standards. The students' ability to think critically and open-mindedly is a crucial intellectual capacity. As Earl notes too, students' ethical capacities may also increase, as they learn to show respect for other views yet find ways to criticise them and make

tentative commitments to a position (see also Barone, 1991). Barone also notes that when heterodox modules and contending perspectives were introduced into the curriculum at Dickinson College, USA, the 'neo-classical' content was strengthened: technical subjects, such as quantitative methods and applied calculus, were made compulsory for economics students.

In short, there appear to be many barriers to teaching a pluralist approach. However, as Earl (2000: 23) notes: 'Most academic economists do not try to find out whether all these barriers really exist and are insuperable; they simply take them for granted.' This section has demonstrated that in fact the barriers can be overcome if lecturers are prepared to try. Further, there may be many benefits to students of doing so.

5. Assessment strategies

In principle any type of assessment could be used on the modules discussed above. Like all forms of assessment, whatever is set should assess:

- understanding,
- the ability to structure an answer,
- criticality,
- writing and other stylistic features,
- ability to gather evidence and
- essay writing skills.

However, some specific elements of the heterodox perspectives discussed above should be assessed:

- the ability to establish a position and offer an opinion supported by some evidence, be it theoretical or empirical;
- evidence of having considered power;
- the ability to compare perspectives;
- reflexivity;
- evidence of having thought about method.

5.1 Assessment schema

Clearly, the extent to which those elements are assessed depends on the level and type of the module. For example, a first-year student may have less expected of them in terms of reflexivity, writing style and research skills, given that these are transferable skills developed during the higher educative process. Similarly, a student on an orthodox-plus module would have less stressed placed on comparison. The assessment scheme will also affect what is assessed: obviously, a scheme comprising only multiple choice tests will not improve essay writing skills

or the ability to develop an argument. However, tests are good ways of quickly testing understanding.

Tests can be very useful in particular on contending perspectives modules. As Earl (2000) notes, students need to be eased into thinking comparatively. One way he suggests is to ask students to write essays and to provide extensive feedback on them. That process is very time consuming. Tests create space in the tutor's time and can be conducted in-class for ease of organisation. An alternative of course is to use on-line tests, for instance programs which create unique sets of questions, and which are self-marking. Some examples of these are available at the *Economics Network* website. Both elements of those tests – the setting and marking of questions – remove an administrative burden from academic staff. Self-managed use of computer software can also assist learning. The only limitation in a heterodox or contending perspectives module is that most of the existing tests are geared towards orthodox content.

A final examination can be a way of testing all the skills simultaneously, through a mixed question format, incorporating short answer, data-response, medium-length and essay questions, all of which types the student would be expected to attempt. The short- to medium-length questions may be compulsory with students given a choice of essay question. Short answer questions may require simple factual responses – for instance to identify which of a list of economists could be regarded as either orthodox or heterodox. Other questions require slightly longer, more detailed answers – for instance to explain a particular model.

5.2 Essays

Perhaps best of all, essays test the ability to develop a position or opinion as well as conceptual understanding. Essays can be used as one element in a multi-method strategy. They can also form the main component of assessment. It may be that more than one essay is assigned. In that case, it may be wise to require shorter essays earlier on and give these less weight. That allows students who are unaccustomed to essays to adjust to them and is particularly important in the case of contrastive or position essays.

In this section, some examples of essay questions are presented. The examples can in principle be used on any of the module types discussed in this chapter, but some of the questions are more applicable to the types than others.

5.2.1 Mixed competence/criticism questions

All essays should demonstrate criticism and understanding, of course. However, some questions can be explicitly aimed at establishing that a student understands some theory before then explicitly asking them to engage in criticism or comparison.

An easy way to construct the separate elements of a question is to write it in multiple parts. For example, students may be asked to deal with a specific problem in consumer theory, before being asked critically to evaluate three of the assumptions underlying it. In the first part of the question they would be rewarded, as they would on any module, for technical correctness and logic of their answer. In the second part, the student is expected to elucidate the assumptions (indicating their understanding) before criticising them. They would be credited for drawing on the critical literature they may have been assigned. Exam questions could be a mixture of a similar type of questions. Clearly such questions target understanding and criticism, but also the ability to structure answers in a well-written way. They are most useful on orthodox-plus modules.

5.2.2 Critiques

Whilst we expect all essays to display criticality, some questions can explicitly ask for it. Criticality can be of oneself: for example on econometrics modules, it is useful to ask students to complete a project and then ask them to raise objections to their own method.

On modules covering theory it is easier to ask students to directly criticise theoretical claims. For example, one might ask students to: 'Evaluate the usefulness of game theory in understanding real-world phenomena such as cartels or arms races'; or 'Evaluate whether neo-classical consumer theory is useful in explaining consumer choices'. Clearly, in both cases, if the question forms part of one of the module types described here, there would be an expectation that heterodox material is drawn upon. Similarly, one might ask students to: 'Critically evaluate Galbraith's claim in Affluent Society that advertising creates demands in consumers (Galbraith changed his own position later)'. That question would be suitable at either an introductory or higher level. It would sit well on any of the module types discussed, but obviously would be very much at home in a heterodox module.

Good answers to all of these questions will be able to identify weaknesses but contextualise them in the general nature of models.

5.2.3 Comparative questions

Comparative questions explicitly ask students to compare two (or more) positions. For example, on a heterodox module, one might ask: 'Is competition good? Contrast competing heterodox positions on this question.' Principally the students should compare the Marxian, Post-Keynesian and Austrian theories of competition, which all define and evaluate competition differently. This is a higher-level question. On a macroeconomics module, students could be asked to consider rival approaches to economic growth, with a focus on capital accumulation. Clearly, the question could be adapted to any module type, for instance by inviting students to

compare orthodox and heterodox views on a specific topic. In this type of question, understanding is expected, as is the ability to organise a response. Crucially, comparative skill is assessed directly. Also, a good answer would identify the crucial criteria by which to compare the positions.

5.2.4 Position papers

The assessment issues are most interesting on the contending perspectives approach. A strategy has already been hinted at of using comparative essays to encourage students to reach a position by a reasoned argument. An extension of that is aimed at assessing – in addition to the other criteria for assessment discussed above – whether students could reach a position based on competing perspectives. In one microeconomics module taught in this way, the author asked students to write three position papers: one on consumers, one on firms and one on markets. As an example, the three papers from one run of the module were:

1. How do consumers make choices?
2. How do firms increase their profitability? Are these methods good or bad for society?
3. Should markets or government be relied upon to organise economic activity? Explain your answer.

Clearly, conceptual understanding was an important criterion, but equally, indeed perhaps more importantly, the ability to construct an argument to reach a position – while doing justice to both sides of the debate – was highly significant. Of course, it was perfectly possible – and indeed often happened – that a student reached the conclusion that the right answer was to be found by synthesising the insights of both perspectives and bridging the gap between them. For example, although students accepted the persuasive effect of advertising, rejected the notion of unexplained preferences, and acknowledged the importance of social factors in individual choice, they would maintain that the choice remained individual, and that some sort of calculation of prospective well-being informed it.

6. Top tips

- Encourage the students to write essays in which they have to argue for a position.
- Stress the role of history in economics and economic thought.
- Comparison is difficult so students must be guided through the process: explain the teaching strategy you are using.
- Structure the module/course so that competing perspectives are reinforced: start early and repeat often.
- Use/construct readers as a substitute for or complement to textbooks.
- Use autobiographical accounts to show how economists change their mind and why.

- Offer extensive feedback on assignments – perhaps create space for this by refusing to give advanced guidance.

7. Resources

Again, it is worth pointing out that the volume of resources available online for teaching heterodox, and pluralist economics has grown considerably in the last decade. Of particular note are those available via the Heterodox Economics Directory and the Economics Network TRUE Project.

7.1 Single textbooks appropriate for pluralist modules

A common problem on all modules is that students often demand that their lecture and seminar material be supported by a single textbook. Using a single textbook can have advantages: students can get more out of a book with which they are familiar and a single textbook is generally cheaper than a range of books. This demand presents a problem for modules teaching heterodox content, because unsurprisingly most textbooks – or books able to play that role – are written from the orthodox perspective. However, a few exceptions stand out:

- Harvey (2015) is adapted from materials used in teaching an introductory module on contending perspectives. Further discussion of his module can be found in section 3 of the curriculum booklet and in Harvey (2014). The book is avowedly pluralist, and begins with a claim that speaking only one language creates a limited view of human consciousness. Thereafter, it contains a series of chapters on seven different schools of thought, starting with neo-classical economics. It also covers Austrian, Feminist economics, Marxism, New and Old Institutionalism, and Post-Keynesianism. It begins though with a consideration of economics as a science. This opening chapter is meant to problematize notions of truth, but also to establish criteria for assessing different theories: these come principally from logic.
- Resnick and Wolff (2012) offer a similar approach to Harvey's. Again, their material is drawn from a module they taught. It is discussed in Resnick and Wolff (2011). They contrast three schools of thought: neo-classical, Keynesian and Marxian. The book's central premise is that all theories have what they call an 'entry point' and logic. For example, they say neo-classical theory's entry point is individual humans' desires and capabilities. This is tied, they say, to determinist cause and effect relations. Similarly, Keynesian and Marxian theories have theirs. By considering these questions first, no one theory is prioritised, and each one can be compared according to accepted criteria.
- Dow (1996) takes a methodological approach to examining schools of thought in macroeconomics. The advantage of this is that many of the

differences between schools are methodological; and compare/contrast questions are often answered well if they address key methodological themes, such as predictive capability, the nature of the individual, etc. rather than merely expositing the two views and then attempting a contrast.
- Snowdon, Vane and Wynarczyk (1998) is another text aimed at higher-level macroeconomics students and, like Dow, it outlines different schools of thought.

These books eschew reach conclusions about which approach is 'best'; rather they allow students to make up their own minds.

Heterodox concepts are most effective when the student is exposed to them early and often. Thus, some introductory texts would be useful. Again, most of the textbooks on the market tend to be written from a neo-classical perspective, even when attempts are made to address other views and other ways of thinking. There are some exceptions, however. Chang (2014) offers a commentary on modern economics. Stretton (1999) is a book aimed at an introductory level student. It is interesting in a number of ways, principally because of the order of its chapters.

- Rather than adopt a conventional module structure, the book comprises sections (each containing several chapters) on 'studying economics', economic growth, demands, productive institutions, distributive institutions and economic strategy.
- Crucially, Stretton places an early emphasis on method and on the history of thought. This immediately impresses on the reader that economics is a changing subject. This encourages the student not to think of theories as fixed and correct forever.
- Significantly also, Stretton introduces schools of thought: not as objects to be studied in depth, but as ways of thinking that can be applied to different problems.

Earl and Wakeley (2005) offer another resource, designed specifically with contending perspectives in mind. It is explicitly practical, pragmatic and pluralist. Its focus is on business decision making and it deals particularly with dynamic problems of firm start-up, maintenance and rejuvenation. It embraces both orthodox and heterodox, where heterodox is defined as a synthesis of behavioural, Post-Keynesian and evolutionary approaches. Its main resource is a set of applied contemporary-real world examples. Significantly, like the Kemp and Wunder simulation discussed above, the book develops an analysis on entrepreneurship. In other ways, the book reflects both traditional courses and heterodox concerns. For instance, one of its first topics is markets; however, the same chapter also deals with the nature of economic models. That then reflects the traditional order of modules but embraces the heterodox concern with methodology.

Dorman (2014) offers twin books which offer pluralist ways to teach microeconomics and macroeconomics. Both books emphasise critical thinking and understanding theories in context. They both also attempt to update the textbook with new evidence and current research. For instance, a large portion of the macroeconomics book presents evidence about the international macroeconomic environment. These data would clearly need to be updated: but this is an opportunity for learning via research. These books do not eschew orthodox material, but it is taught in a more realistic and policy relevant fashion than is often the case with textbooks.

Similarly, Fine (2016) offers a pair of companion books on microeconomics and macroeconomics which explicitly seek to deliver orthodox material in a critical way, drawing on heterodox material. These books are particularly useful for orthodox-plus modules. The macroeconomics edition (Fine and Dimakou, 2016) is also useful as a primer to heterodox theory.

7.2 The multiple resource approach

The utility of a single textbook approach can be questioned, of course. Using only a textbook can discourage students from reading widely, and to think that they can rely on one text – no matter how many times they are told the contrary. A single book can also encourage the belief that there is only one way of thinking; in the context of this chapter that is a serious problem.

An alternative approach could require students to buy several key texts. Barone (1991) reports that students were expected to buy one book per perspective studied, for example Dugger (1984) on institutionalism and Littlechild (1978) on the Austrian approach. Such a strategy will usually come up against a cost constraint. The modules described in section 3 of the curriculum booklet adopted this approach and encountered that constraint. See also the mixed resource approach in Figure 9 of that booklet.

7.3 Using a reader

An alternative is to adopt a reader. Snowdon, Vane and Wynarczyk (1998) is one such readymade reader. Heilbroner's *Teachings from the Worldly Philosophy* (1997) is another. However, another option is to construct a reader from key texts, perhaps including short handouts and newspaper articles. This has the disadvantage of being a little labour-intensive but has the distinct advantage – assuming copyright issues have been resolved – of providing the students with key material in a manageable format. A danger is that the students will regard this as an exhaustive list of readings, but nonetheless it might constitute more reading than they would otherwise have done.

Using readers is one strategy advocated by Earl (2000) and adopted by Bucknell University. One of their readers is available as Schneider *et al.* (2005).

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The Handbook
for Economics Lecturers

Sustainability in Economics

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1 Introduction

This Handbook chapter addresses the challenge of incorporating sustainability into Economics curricula. There is considerable evidence that there is demand for sustainability education. According to Forum for the Futures Future Leaders Survey of UCAS applicants in 2007/8, students are very concerned about the future of the world and identify environmental crises as important. Around two thirds of students said they wanted more sustainability in their syllabus. They also thought (42% in 2007/8) that learning about sustainability would help their future careers. Over three quarters think significant changes are necessary now regarding how the world operates/is organised (Forum for the Future, 2007, 2008).

In addition there is considerable evidence that employers regard training for sustainability to be crucial in graduates. Cade (2007) showed that employers and students were paying greater attention to ethical issues including sustainability but that universities were having trouble catching up. The Independent (2009) reported that students with sustainability skills are in demand. Forum for the Future (2010) has several publications on the business case for sustainability. Business in the Community (2008) shows evidence of demand from employers for sustainability skills. Businesses are increasingly aware and taking on the message that sustainability matters. Organisations such as the Ellen Macarthur Foundation have strong links with businesses such as B&Q and Kingfisher Group, who appear to support the 'closed-loop economy' message. The City and Guilds (2008) identify a shortage of green skills that needs to be addressed. Further, the EU Council has formally adopted education for sustainable development (ESD) as a policy goal (Council of the European Union, 2010).

The challenge is considerable, but also interesting, even for those with no interest in sustainability. Why? As will become apparent, the task of placing this issue in the curriculum involves a range of choices for the programme designer; it also requires the teacher to take an inherently multi-faceted, complex and interdisciplinary concept and place it in a disciplinary context. In addition, it forces the tutor to be aware of the pedagogical issues that become acutely manifest: the engagement of the student, helping them through their inevitable confusion, and the achievement of resolving their problems.

TOP TIPS

"Use examples to illustrate unfamiliar sustainability concepts: make it personal not abstract. For example, ask students to consider their own consumption patterns. Ask them to consider their university as a system. Murray (2011) may be a good resource."

However, there are several reasons for trying to meet these challenges, not least because overcoming them could be personally rather satisfying. Second, given the prominence of the topic, the student is likely to be initially at least enthusiastic and engaged with the topic. Third, given the contemporary context – of climate change, resource crunch, biodiversity loss, food delivery challenges, and so on – dealing with sustainability is arguably important. Fourth, the students will gain tremendously: given the multi-faceted, complex nature of sustainability, students will develop depth of understanding, the ability to weigh up conflicting opinions and value systems and make decisions in the light of them, and develop systemic thinking skills. Your students will come out better educated at the end.

2 Getting started

Teaching sustainability involves choices. All teaching does, of course, but given the relative novelty of the subject and the lack of established resource bases, say, compared with core microeconomic theory, there are fewer ready-made guides on how to design sustainability curricula and how to deliver them. That lack of pre-existing structure can be liberating, but also daunting. However, the choices are unavoidable. There are two main sets of choices to be made. One is whether to integrate sustainability across the curriculum (if it is possible within institutional constraints) or whether to create specialist niches within it. That choice is followed by others, about the depth of integration, and about the theoretical approaches considered. We shall return to those issues shortly. Before that, the tutor needs to consider what they understand by sustainability. This chapter is designed to help tutors make these choices.

2.1 What is sustainability?

A common sense definition of sustainability is that a thing can last. However, what is it that lasts? A firm, an economy, a society, a species, an ecosystem? And when it lasts, does it grow or improve, does it deteriorate, or none of these? In other words, is sustainable development possible? Is it possible to trade off one type of sustainability – say, ecological – against another – say, economic? Are human manufactured goods equivalent to those produced in the rest of nature? Given these questions (and others) it is perhaps not surprising that there are so many definitions of sustainability (see Box 1). Perhaps the dominant definition of sustainability is from the Brundtland Report:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987: 54).

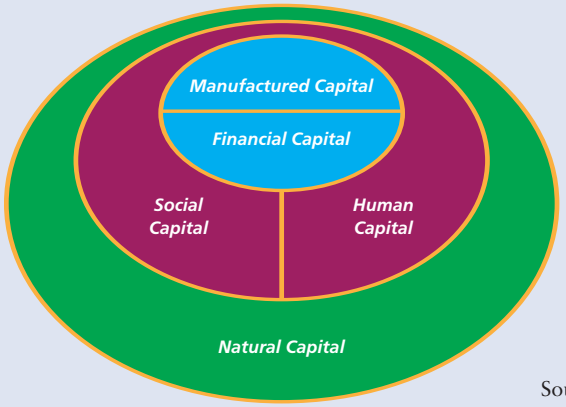
If this definition is reformulated as: 'Future generations should inherit a stock of resources such that they can enjoy a quality of life at least equal to that enjoyed by present generations', it then becomes apparent that economics has at its heart the study of processes and behaviours that are also of paramount importance to moving towards sustainability. However, some authors from a strong ecological perspective have expressed dissatisfaction with such definitions. They argue that the whole notion of sustainable development is flawed, as they argue that growth and sustainability are fundamentally incompatible. They even hold (although the Brundtland definition is not guilty in this regard) that sustainability is incompatible with what might be described as 'business as usual'. Others, such as Birkeland (2008) argue for positive development, in which for instance new buildings or eco-retrofitted buildings are carbon-negative (i.e. the carbon emissions used in their production and operation is less than that produced by them via plants, solar panels, etc.). Recently, from an ecological economics perspective, Jackson (2009) has also discussed resilience of economies (and communities) as being able to withstand external shocks, such as swings in the oil price. However, this notion is not a replacement for sustainability.

Introducing sustainability to students can be done in a number of ways. One approach might start from an ecological perspective, which sees natural cycles that support ecosystems as the implicit foundation of any discussion of sustainability. An overview of these natural systems is necessary as the basis for exploring the impacts of different economic systems and activities. A few natural cycles could be introduced in early lectures or virtual material. These might include

Box 1: Some views of sustainability

Most views of sustainability are concerned with the resource stock left for future generations. There are two common classifications of resources – the Five Capitals model (see below) and the conventional traditional classification into natural, human and man-made resources. Most discussion of sustainability by economists is in terms of the familiar three-resource model.

The Five Capitals



Source: Forum for the Future

Much of the discussion of sustainability amongst economists is concerned with the relationship between economic activity and the natural environment. This reflects the existence of a large body of environmental economics research and literature and a less extensive oeuvre within ecological economics. It also reflects the urgency of issues surrounding climate change, resource depletion and pollution. It should be emphasised that any consideration of sustainable development should also discuss the conservation of all five capitals. Manufactured, financial and human capital are central to the conventional economics curriculum and not considered further here. Natural capital is the main focus below; however social capital should also be considered, albeit briefly, as it has escaped the attention of most economists. The concept of social capital originated in sociology (see, for example, Putnam, 2000) but has considerable currency in regional economics and is one of a multitude of diverse factors explaining differences in the performance of nations, regions and cities (Dasgupta, 2002). Social capital includes dimensions such as the strengths of institutions, behavioural tendencies towards collaboration, co-operation and mutual support, and strong community and interpersonal networks.

Various views of sustainability are discussed below, starting with the weakest formulation, in the sense that it imposes the least restriction on economic activity.

Very weak sustainability

The aggregate quantity of all resources is constant or increasing such that

$$\Delta Kn + \Delta Kp + \Delta Kh \geq 0$$

Where there is substitutability between natural capital, Kn, manmade capital, Kp, and human capital, Kh. Under this view, Kn can be destroyed as a result of development providing one or both of Kh and Kp are increased to compensate. This represents a very limited view of the benefits that flow from the natural environment and incorporates little understanding of the life-supporting role of ecosystem services.

continued…

Weak sustainability

Under this view, other resources remain substitutable for natural capital but keystone elements and processes are not substitutable. These are essential for the survival of ecosystems and must be protected. This position can be criticised on the grounds that it pays only grudging attention to the most obvious susceptible elements of ecosystems while accepting a general degradation and depletion of Kn.

Strong sustainability

There is recognition of the lack of understanding of complex ecosystems. The approach introduces uncertainty and responds by adopting the precautionary principle and incorporating safe minimum standards. Under this perspective, the reduction in Kn is limited.

Very strong sustainability

Most ecological economists support definitions of sustainability that can be classed as very strong. An example is Herman Daly's four operating principles:

1 Renewable resources: the rate of harvest should be less than or equal to the population growth rate

2 Pollution: waste discharges should be below assimilative capacity and cumulative pollutants reduced to as close to zero as possible.

3 Non-renewables: the benefits from exploitation should be split between distributed profits and investment such that a renewable substitute is available at depletion

4 Macroeconomic controls: minimise physical material and energy throughput in the economy and control population growth

The technological fix

It is easy to stimulate discussion of views of sustainability around one or two issues of wide concern such as climate change, water resource shortages or marine acidification. A starting point might be to set students in groups to prepare an assessment of one or more of these problems to present to the class. Then, after each presentation, ask the class as a whole 'what can be done about it?' Usually a range of positions emerges ranging from 'no growth' through to 'science will find a solution'.

the carbon cycle, making connections with climate change; the hydro cycle, with a focus on areas of water shortage and the food chain, with discussion of the need for dietary changes if a growing population is to be supported. The advantage of exploring the ecological perspective from the outset is that the concept of sustainability is readily understood. If this approach is followed, the concept can be introduced as the preservation and encouragement of these natural cycles and ecosystems to maintain or increase bio-diversity. Another approach is to introduce ecological systems when relevant to particular economic topics. However, this leads to a fragmented understanding of what is essentially an interrelated set of natural systems.

TOP TIPS

"Don't moralise. Admit that a great deal of the discussion around sustainability is value-driven and stress the importance of various different positions on it. "

This might be heavy going for those students not particularly committed to sustainability and be perceived as 'preachy'. Also, for economists the material might be somewhat inaccessible. An alternative approach therefore is to start from more familiar precepts. The concept of the Triple Bottom Line (Elkington, 1997) may help here. The traditional notion of a bottom line is profitability. The Triple Bottom Line concept suggests that for sustainability, profitability must be married to ecological and social sustainability. Thus, profitability may need to be sacrificed (to some extent) in a trade-off with the other dimensions. Such trade-offs ought to be familiar to economics students.

The Triple Bottom Line relates to another useful concept, the 'Five Capitals' approach to sustainability (see Goodwin, 2003) shown in Box 1. Definitions of the economic problem in introductory courses almost always introduce scarce resources as the defining context of an economic system. The conventional approach is to present the three major categories of resources: natural, human and man-made. To these, entrepreneurship, financial capital and technological knowledge may also be added. This is very close to the 'Five Capitals'. These are natural capital, human capital, manufactured capital, social capital and financial capital. The model is the basis of one definition of sustainable development. Goodwin suggests that for sustainability, the total stock of the five capitals should be maintained although the depletion of one type can be compensated for by the increase in others. For example, lost agricultural land (natural capital) could be replaced by a shopping centre (manufactured capital); or forests could be replaced by carbon capture and storage power stations. But, this substitutability is frowned upon by adherents to stronger views of sustainability. However, it should be noted that mainstream economics is concerned with the flow of resources into the economic system while the discourse of sustainability focuses on stocks and the rate of depletion or degradation.

It is important that students are exposed to (at least some of) these different definitions, in order to demonstrate that sustainability is a contested concept. That understanding ought to make it clearer to them why there is so much debate about sustainability. However, the tutor clearly cannot juggle all of these balls in the air at once and must make some choices about how they define sustainability in their approach. This choice is also crucial, because it will condition the extent to which they might wish to integrate sustainability into the curriculum, whether they take a more or less interdisciplinary approach, whether they consider (for instance) economic sustainability alone, and to what extent they wish to incorporate approaches to sustainability which lie somewhat outside the mainstream (for example in *ecological economics*). Indeed, the definitions of sustainability help define the distinction between mainstream and ecological economics: the former favour very weak or weak sustainability, while the latter favour strong or very strong sustainability.

TOP TIPS

"Engage students in real problems; including discussing openly the global challenge of sustainability."

Further, if the tutor wishes to discuss sustainability in a broader sense (for instance via the Triple Bottom Line) they might use the different definitions as entry points into debates about policy, good business practice, etc. Some policy options (for example, some so-called 'technological fixes') would be ruled out if one took a strong sustainability approach.

2.2 Integrate or specialise?

If a tutor regards sustainability as of fundamental importance, they may wish to integrate it fully into the Economics curriculum. Whether they are able to will, of course, depend on institutional constraints and their own skills of negotiation. Those concerns are beyond the scope of this chapter. Given that one could integrate sustainability, there are different ways to do this. At one end of the spectrum, a programme might be designed according to problem-based learning (PBL) principles: the problem to be addressed would be achieving an economy that supports a sustainable world, and all the learning would be working towards a solution (see for example, Forsyth, 2010). PBL in its purest form allows the curriculum to unfold as the course progresses. That of course requires great skill on the part of the instructor. Witham and Mearman (2008) discuss some existing uses of PBL in ecological economics courses. That there are some examples of PBL in this area is perhaps not surprising, because sustainability lends itself to a PBL approach: clearly sustainability is a 'big', multi-faceted problem, meaning that the course could unfold in a multiplicity of ways. As discussed below (Assessment) one can design coursework assignments or exam tasks around specific problems.

If PBL is a step too far, a course could still begin with the problematic of a sustainable biosphere and then explore the implications of that for an economy via more conventional teaching.

Alternatively, sustainability could still be the central theme (or one of a small number of themes) in a curriculum. Where appropriate, all modules would be organised with sustainability in mind. That would involve constructing examples, exercises and assessment that are all concerned with sustainability. Boxes 2 to 5 also discuss ways of delivering standard concepts such as the circular flow of income with added sustainability content. Such tools would be useful even if sustainability were not a central theme, but instead was a topic which needed to be included in all modules. This last form would be the weakest form of integration, in which sustainability is tacked on to a standard module, often at the end. Section 3 below discusses a standard introductory and one standard intermediate economics course into which examples and applications from sustainability are incorporated easily.

In the strongest forms of integration, students may learn all they need about sustainability simply by doing other modules. However, in those cases, and certainly in weaker forms of integration, students may have had their interest in sustainability stimulated and desire more specialised, detailed knowledge. So, even if a student has been on a programme that integrates thoroughly sustainability at level 1 (and/or 2), they might desire specialist modules at level 2 and/or 3. At this point, the choice for the tutor becomes one of which approaches to choose. Again, this may reflect their understanding of sustainability. Those who understand sustainability more narrowly may choose to deliver sustainability solely according to mainstream principles, as found in standard treatments of environmental and/or natural resource economics. Those who take a broader view of sustainability may wish to deliver an ecological economics perspective. In this latter group, as indicated above, it may be possible to begin with a discussion of a sustainable biophysical ecosystem and derive the economics from it. A third alternative would be to try to deliver the two approaches in parallel or debate. Such an approach presents many challenges but may also yield many benefits (see for instance Mearman, 2007 on heterodox economics; and Mearman, *et al.*, forthcoming, for a discussion of this).

TOP TIPS

"Don't try to shoe-horn in too much material. The course you create must remain coherent, and varied."

The main body of the chapter examines in detail how these different alternatives could be delivered. Section 3 explores ways in which sustainability may be taught in standard economics modules. Sections 4 and 5 discuss different variants of specialist courses on the environment or sustainability: Section 4 discusses a course on economics of the environment, with sustainability emphasised, in which environmental and ecological economics perspectives are compared. Section 5 discusses a course in the economics of sustainability.

3 Teaching sustainability in a standard module

The first available way to integrate sustainability into an economics curriculum is to simply tack it on as a subject at the end. However, in practice such topics tend to get dropped, or not included on exams. A more effective way to integrate sustainability – though requiring greater co-operation from staff – would be to use examples from sustainability. Table 1a outlines an introductory economics course, taking in microeconomics and macroeconomics, into which applications to sustainability have been added. The table presents possibilities for inclusion:

Table 1a: Introductory economics course

Topic	Sustainability augmentation
Microeconomics	
Positive/normative distinction, etc.	Multiple ethical bases: triple bottom line (see Elkington, 1997)
Scarcity; economic problem	Scarcity: absolute versus relative
Markets: supply and demand	Carbon markets; oil market (could include 'peak oil')
Demand theory; elasticity	Effect of a tax on petrol; road charging
Theory of returns and costs	End-of-pipe technology and costs[1]
Theory of the firm	Increase of resource/raw material/energy costs
Market structures yield (see Box 2)	Joint profit maximisation – fishing and maximum sustainable
Market failure	Externalities of pollution
Micro policy	Carbon rations, petrol taxes; optimal amount of pollution
Macroeconomics	
Circular flow of income	Circular flow extended to include biosphere (see Box 2)
Macroeconomic objectives	Sustainability as an objective; an extra trade-off
Economic growth	Sustainable development; alternative measures of well-being, such as Index of Sustainable Economic Welfare (ISEW), Happiness indices, and the Happy Planet Index (HPI); environmental Kuznets curve (see Box 7)
Keynesian macroeconomics	Green stimulus packages (see New Economics Foundation, 2008)
Unemployment	Green jobs
Inflation	Price of green products; finite resource cost inflation; backstop technology (see Box 8) as a response to inflation
Money demand and supply	Green economics treatments of money as debt; carbon as a currency; local currencies
Monetary policy	Green quantitative easing
Fiscal policy	Green stimulus packages; carbon and pollution taxes
International trade	Transport costs; the Kyoto protocol; localism versus globalism
Exchange rates	Carbon trading markets

[1] End of pipe technology refers to adaptatons of existing plants to reduce pollution.

TOP TIPS

"Utilise the extensive range of software packages available. See Section 7 for some examples."

tutors can pick and choose topics depending on how deeply they wish to explore sustainability. The sustainability topics do have some logical progression, but they could be taught independently.

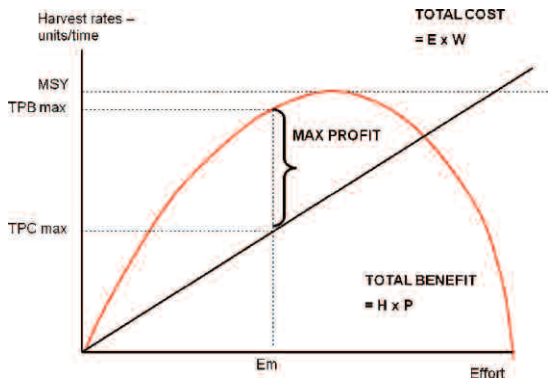
Some of the sustainability topics included are easy to include, whereas others require more ingenuity. Examples of the former are the discussion of the effect of a tax on petrol as an example of elasticity; the carbon market as a market to study; and the treatment of pollution externalities. On the macro side, the effect of natural resource costs on inflation, the use of fiscal policy for green stimulus, and the measurement of standards of living are also simple to introduce. In the category of more difficult topics would be those that require conceptual shifts, such as the discussion of multiple ethical bases, joint profit maximisation, and sustainability as an economic objective (see above; and see Box 2 below).

Box 2: Renewable resources

Theories of the exploitation of renewable resources are covered in most standard environmental economics texts covering natural resource economics. Students are interested (at least to some extent) in the escalating price of fish and chips and this represents a good context for discussing the management of fish stocks and behaviour of fishing enterprise under different regimes.

Information has an important role in the sustainable harvesting of renewable resources (see for example, Clark, 1990). If those exploiting the resource act in their mutual long-term self-interest and have full information about the impact of various levels of harvesting on stock levels, then the risk of over-exploitation is removed and the maintenance of carrying capacity is more likely. It is fascinating that traditional hunter-gatherer societies often had such information systems embedded in their cultures, reinforced by a system of beliefs and rituals.

The figure below shows the outcome of restricted access to a renewable resource, for example, where the number of operators is restricted through a licensing system.



The figure above shows the outcome of joint profit maximisation where hunters or fishing enterprises act to limit their activity (effort) so that the maximum harvest relative to effort is achieved. As effort (E) increases, the harvest rate (H) initially increases but peaks at the maximum sustainable yield (MSY) where stock density and food supply allows the maximum rate of reproduction. Additional effort causes stocks and hence population density to fall and increasing difficulty in mating. Joint profit maximisation (at Em) requires barriers to entry and restriction on individual enterprise effort. Good information on fish stocks, catches, etc. will enhance stability. With open access, additional effort is made, stocks fall and the reproduction rate falls so that profit is zero.

In the diagram, W = wage rate, P = price per unit of catch, TPB = total private benefit, TPC = total private cost.

All would involve the commitment of some time by the tutor. Even more challenging (as hinted at by the discussion of multiple ethical bases) can be ventures into other disciplines. Examples are the extended circular flow of income (see Box 3 below), end-of-pipe technology and its effects on costs, green treatments of money (see Scott Cato, 2008: ch. 5), 'green' quantitative easing, and discussions of geological theories, such as peak oil. Whether or not and how these get taught will depend on how much time is available, the willingness of the tutor, and the availability of relevant supporting resources. As in Table 1b below, the topics above can be delivered either as an entire suite, or more likely, selected to enrich a standard module, alongside examples from other relevant broad topic areas.

The extended circular flow model has a natural resource stock located at the centre and the flows of materials and services to and from the household and productive sectors indicated by arrows. An approach that has proved successful is to present the conventional circular flow in a lecture and ask where the natural environment and ecosystem services are. It is conventional for students to answer that these are contained within land. Ask the class for examples of the inputs that come from land. Usually students ignore the ability of the natural environment to provide waste assimilation services. They also ignore the waste assimilation and amenity services provided to households. That omission is the justification for making these ecosystem services explicit by adding to the diagram as above.

Clearly at the introductory level there is plenty of scope for examining sustainability issues. At the intermediate level, this is also true. In this case we shall discuss an intermediate microeconomics course with sustainability material included. One could of course also construct an intermediate macroeconomics course augmented for sustainability. The issues of integration, resourcing, specialist knowledge required and time constraints are present as in the case of the introductory course. In some respects they are even more acute because the technical level of the material is higher. In other respects, though, integration of sustainability is just as easy, if not easier. Table 1b outlines an intermediate microeconomics course augmented for sustainability. As above, although it is possible to deliver all of these augmentations, that is not necessary. The suggested discussion topics can be inserted individually into a conventional course.

Box 3: Extending the circular flow of income

The circular flow of income is a foundational tool in economics, and is typically found in introductions to macroeconomics. The typical circular flow model presents flows of income, expenditure, goods and services between groups of economic actors. The version below is highly simplified, collapsing government and import sectors into 'businesses'.

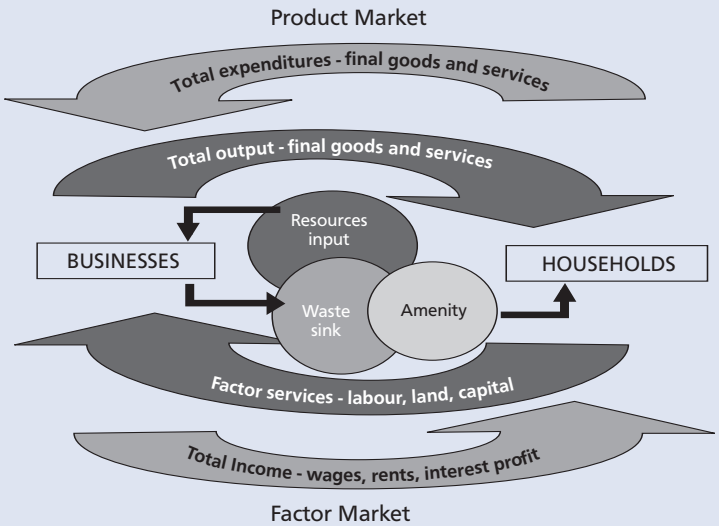


Table 1b: intermediate microeconomics course

Topic	Sustainability augmentation
Consumer theory	'Economic man' vs. 'Eco-man' (see Becker, 2006); willingness to pay (WTP), willingness to accept (WTA); cost benefit analysis (CBA)
Analysis of choice under risk and uncertainty	Problem of non-probabilistic (Knightian) uncertainty? Question the value of the expected utility hypothesis under uncertainty
Analysis of investment appraisal and long-term decision making	Assumptions made? Discounting and the environment? Precautionary principle
Isoquant theory	Questioning the nature of capital; natural capital; the shape of isoquants
Theories of the firm	Alternative goals: business ethics
Labour markets	Basic income schemes
Market structure and efficiency	OPEC and oil prices
Game theory	Climate change negotiations and compliance –see discussion of classroom games.
Price discrimination	Peak flow pricing
General equilibrium analysis	Welfare effects of climate change
Public goods and merit goods	Environmental impact evaluation
Externalities and their internalisation	Pollution and its abatement

For example, once students have discussed consumer theory, it is an easy step to discuss the notion of an eco-man (cf. economic man) whose concerns with sustainability may override utility from consumption of some goods; or for whom preferences are lexicographic in favour of sustainably-produced goods. Also, indifference curve analysis can be used to discuss willingness to pay and willingness to accept (see for example, Perman *et al.*, 2003: ch. 12). Notions of compensating and equivalent variations help illustrate cost benefit analysis. The topic of valuation is discussed further in Box 3, which also discusses cost benefit analysis; and the software package CBA Builder (Wheatley, 2010) is discussed in Section 7.

For some of the topics shown in Table 1b the sustainability aspect is very clear: for example, general equilibrium, public and merit goods, and externalities are often taught anyway using environmental examples. For some of the other aspects it is also fairly trivial to introduce sustainability. For instance, OPEC is often used as a case study in oligopoly. The sustainability angle could be extended to discussing broader aspects of OPEC strategy, such as linking production to reserves. The theory of peak oil could be discussed at this point. Sustainability also lends itself to a discussion of price discrimination. An interesting exercise in price discrimination is to present students with apparent examples of it – such as fair trade versus other coffee, feed-in electricity tariffs, organic versus non-organic food – and discuss whether (and why not) these are true examples. Modelling climate change treaty negotiations and compliance could also be a good vehicle for teaching game theory. It is easy to use a simple Prisoner's Dilemma to discuss the likelihood that one country would renege on climate deals; and then discuss why this analysis might explain why climate deals are difficult to negotiate. It is also easy to incorporate discussions of sustainability into the topics of investment appraisal and long-term decision making. Clearly, as discussed in Box 3, discounting is a crucial feature of valuation of ecological objects, and of CBA. Some students may appreciate the chance to discuss concrete cases of a non-financial nature; others may wish to discuss what discount rates ought to be. Ackerman (2009) provides an illuminating discussion of discount rates from the

TOP TIPS

"CBA Builder, like any tool, takes practice to master. Ask students to perform multiple evaluations."

Box 4: Valuation

Cost benefit analysis (CBA) is an ideal point at which to introduce the valuation of environmental assets. CBA has been criticised for failing to evaluate environmental impacts, merely describing them in physical units. Over the past 30 years, methodologies for evaluation in money terms have been evolving, although these are not widely used as they have proved expensive and unreliable. Nevertheless, it is often argued that it is better to have some monetary evaluation rather than a physical measure that is not included in the net present value and thus easy to ignore. The application of valuation techniques has been given a boost recently by attempts to evaluate ecosystem services and 'green infrastructure' by central and local government (see for example www.greeninfrastructure.org.uk).

Total economic value of natural capital

Discussing total economic value (TEV) with students as an introduction to evaluation encourages reflection on the meaning of value in economics. TEV is made up of use value and non-use values. Use value can be direct where, for example, a lake is used for fishing, or indirect, where it provides the setting for a pleasant walk. Non-use value is usually divided into a number of categories representing different ways in which a natural asset may bestow value:

- *Option value* arises from the retention of the asset for possible use in future, for example moorland which might be used for grazing or forestry in future.
- *Quasi-option value* is based on a possible use which may arise in future due to new knowledge about the asset. An example would be the Amazon Rain Forest where many plant species remain to be catalogued and some might yield a valuable drug for medical use.
- *Existence value* derives from an emotional attachment people feel for natural assets that acquire some cultural significance, even though there may never be an opportunity to experience the assets at first hand. Threatened species such as whales, rhinos and tigers evoke strong feelings as do iconic landscape features – Everest, the Danube, the Grand Canyon. Subsets of existence value include heritage value (the desire to preserve the asset for future generations) and vicarious use value (associated with contemplating the enjoyment of the asset by others).

Evaluating environmental impact

Most development incurs environmental costs as a result of the destruction or degradation of environmental assets or by causing pollution. For example, building a new road will interfere with natural drainage, cause pollution of watercourses, and act as a barrier severing wildlife habitats. It will result in noise and congestion to local communities in the construction phase. It will continue to have an impact on amenity by causing noise and pollution subsequently. In many cases, the impact will reduce the use value of the asset. Direct use may be associated with a marketed output and the reduction in this is the basis for evaluating impact. Indirect use may also be marketed where entrance fees are charged. Where there is no money transaction, there are three main methods of evaluation:

- *Contingent valuation method (CVM)* elicits values from a representative sample of an appropriate population by describing a context where an environmental asset is (usually) destroyed. Respondents are then asked how much they would be willing to pay (WTP) to preserve the asset or how much they would be prepared to accept in compensation (WTA) for the loss. Unique among valuation methods, CVM can capture all the components of TEV.
- *Travel cost* assumes that the expense of travelling to visit an environmental asset is a good proxy for a price for the benefits of the visit. By surveying a sample of visitors to

...continued over

the asset and collecting travel cost and other socioeconomic data, it is possible to generalise to the total population of visitors and construct a demand curve for the benefits flowing from the asset. The method only captures use value.

- *Hedonic pricing* uses the variation in the prices of dwellings or remuneration levels associated with different environmental conditions as a source of evidence of the WTA for tolerating those conditions. The most frequent application has been the variation in house prices with proximity to some nuisance (such as aircraft noise from an airport) or some environmental asset (such as a riverside location). Applying the technique requires the collection of house price data in the area, together with house and neighbourhood characteristics that might also have an influence on price. Econometric estimation of a house price function will allow the component of the price associated with the environmental attribute of interest. This is the basis for deriving a WTP or WTA associated with the attribute. Again, this method only captures use values.

Benefit transfer

As more studies of the values of environmental assets and conditions are completed, a database of valuations can be built up. Increasingly, it becomes possible to use the results of previous studies as the basis for valuation in new projects without having to carry out an asset valuation from scratch. The UK repository of valuations is available here.

A critique of valuation methods

Detailed descriptions of the methods briefly outlined above can be found in most standard texts on environmental economics. These usually include a listing of the shortcomings of the methodologies with more detail on operationalisation. Suffice it to say that, as the number of studies have built up, the range of values for similar assets has been disturbingly wide suggesting serious reliability issues.

Introducing valuation to students

This is a very rich area for exploring issues in applied economic methodologies and for discussing underlying theoretical issues. As an introductory exercise, groups of students can be asked to choose an environmental asset to value and then be given 15 minutes or so to sketch a valuation methodology they might apply. Each group then describes their methodology and this leads to some interesting discussion of problems and challenges.

viewpoint of sustainability. More difficult for economics tutors to discuss might be questions of the nature of capital (and therefore substitutability); and non-probabilistic uncertainty. Yet, uncertainty of this type is pervasive in sustainability questions. Sensitivity analysis can assist us in imagining future scenarios but it is instructive for students to consider what they would do when they simply do not know future risks.

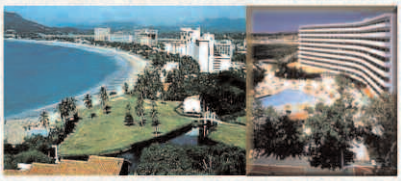
CBA (see Box 5) is an excellent application for students to consider. It has clear policy implications and usefulness and deals with concrete examples. CBA is used in a variety of contexts within government. It also serves as an excellent pedagogical tool, as it can stimulate discussion about what and how to measure objects, whether or not they are amenable to measurement and, if not, how to deal with them. CBA Builder (Section 7) is a good tool for teaching and for students to master Excel. It is therefore useful on any applied microeconomics course. Further, attitudes to CBA are also one of the division points between environmental and ecological economists: the latter are sceptical of CBA and at best favour cost-effectiveness analysis.

Box 5: Cost benefit analysis (CBA)

Investment appraisal (IA) is a good starting point for introducing CBA. This establishes the basic cash flow foundation, the distinction between one-off capital and recurring current expenditures and discounting. IA can be presented as capturing the private costs and benefits of a project. The introduction of external costs and benefits transforms IA into CBA.

Presenting a case study helps to emphasise the relevance of the subject. An example taken from a study of tourism development in Minorca is shown below:

Private investment appraisal



NPV = £1.73m per 1000

High rise Year	Inflow (Profit) £m	Outflow Capital £m	Outflow Extern £m	Net flow £m	Discount Factor	Net DCF £m
2004	2.50	15.00		-12.50	0.9091	-11.36
2005	2.50			2.50	0.8264	2.07
2006	2.50			2.50	0.7513	1.88
2007	2.50			2.50	0.6830	1.71
2008	2.50			2.50	0.6209	1.55
2009	2.50			2.50	0.5645	1.41
2010	2.50			2.50	0.5132	1.28
2011	2.50			2.50	0.4665	1.17
2012	2.50			2.50	0.4241	1.06
2013	2.50			2.50	0.3855	0.96
TOTAL	25.00	15.00		10.00		1.73

NPV = £8.12m per 1000

Villa Year	Inflow (Profit) £m	Outflow Capital £m	Outflow Extern £m	Net flow £m	Discount Factor	Net DCF £m
2004	6.50	35.00		-28.50	0.9091	-25.91
2005	6.50			6.50	0.8264	5.37
2006	6.50			6.50	0.7513	4.88
2007	6.50			6.50	0.6830	4.44
2008	6.50			6.50	0.6209	4.04
2009	6.50			6.50	0.5645	3.67
2010	6.50			6.50	0.5132	3.34
2011	6.50			6.50	0.4665	3.03
2012	6.50			6.50	0.4241	2.76
2013	6.50			6.50	0.3855	2.51
TOTAL	65.00	35.00		30.00		8.12

The study compared the provision of 1000 bed spaces in an extensive villa style development with concentrated high-rise resort development. The students tend to think that villa style development is more sustainable and the IA shows that it provides a much greater private NPV. However, the external costs that are included in CBA show that the high-rise concentrated development generates a greater social NPV. This is largely due to the very great infrastructure cost of providing utility services and access to developments spread all over the island, together with the greater land take, energy consumption and water demand associated with villas each with their own swimming pools and air conditioning systems.

Of particular relevance to sustainability is discounting. There is an argument that intergenerational equity implicit in the resource based view of sustainability demands a discount rate of zero. A valuable discussion of the theoretical basis of discounting can be based on issues of inflation, risk and time preference.

Students can construct their own CBA using CBA builder (see Section 7).

CBA leads naturally into the evaluation of environmental impacts (see Box 4) The potential contribution of CBA to deciding macro policy priorities has been illustrated recently in the Stern Review (Stern, 2006), in which it was the key methodology for assessing the benefits of intervening to reduce carbon emissions and thus to reduce the likelihood of further global warming.

4 Teaching a contending perspectives course on economics of the environment

All of the course structures contained in this chapter are of course simply materials from which to draw. Above, one could choose to teach the courses as laid out, or pick elements to include in one's own introductory or intermediate microeconomics courses. Both of these courses are core to the curriculum, and are ideal if one's goal is to integrate sustainability into the curriculum. However, if one chose instead to create specialist courses, or if the goal was to allow students to build on earlier core courses, a different model is required. The next two sections discuss two possible options: one is a course on economics of the environment; the second (Section 5) is on economics of/for sustainability.

The first is presented again as a set of possibilities. There are a number of ways in which one could teach a course on the economics of the environment. A standard approach is to teach 'environmental economics'. Such a course would emphasise the principles of the left column in Box 6. This draws on literatures called 'environmental economics' and 'natural resource

Box 6: Ecological and environmental perspectives

Environmental economics	Ecological economics
Orthodox, neo-classical approach (in general), emphasising rationality, optimisation and efficiency.	More affinity with heterodox, non-orthodox economics, emphasising power, change and social nature of the economy
'Economy–first' approach. Applies economics to the environment.	'Ecology-first' approach. Draws on natural sciences.
Efficient allocation of scarce environmental resources.	Scale crucial. Efficiency and distribution also important. Importance of equity.
Predictability of the long run (at least probabilistically)	The long term is inherently uncertain. The long term is paramount. The precautionary principle applies.
Microeconomic emphasis	Macroeconomic or holistic or systemic emphasis
Analysis is value-free: there are no over-riding moral imperatives	Analysis is inevitably value-laden: there can be a moral imperative to protect the environment, other species, etc., as well as a survival imperative.
Markets are generally efficient and produce socially-optimal economic outcomes. Market and exchange solutions to economic problems are emphasised. Public goods do represent problems.	Markets are social institutions, which might or might not (generally thought not to) produce so-called optimal economic outcomes.
Externalities emphasised.	'System' approach makes nothing 'external'.
Government intervention might be a necessary evil in some cases (e.g. public goods). Proper allocation of private property rights should solve most problems.	Government is on the whole inevitably necessary to intervene in markets, which will not generally work, and to negotiate international treaties on climate, etc.

economics', which tend to be constructed on conventional economic principles. As an alternative, or complement, one might teach 'ecological economics', a literature in which the items in the right column of Box 6 are emphasised. Again, there is a choice about to what extent one employed ecological economic principles and concepts. One could integrate them into an essentially conventional course on environmental economics, either extensively or piecemeal. Or, one might choose to teach from the ecological economics perspective. In terms of sustainability, this could be justified if one agreed that ecological economics is the 'science of sustainability' (Costanza *et al.*, 1991).

Many of the concepts in the left-hand column of Box 6 are familiar to most economists, being derived from standard theory. A typical course on environmental economics might look something like the left-hand column. Another variant is to deliver 'natural resource economics' in which both renewable and non-renewable resources are considered. Ecological economics is a somewhat younger branch of the discipline. The focus is more on approaching ecological processes than from an economic perspective. Two names are particularly prominent in ecological economics: Herman Daly and Robert Costanza. They demonstrated the immense value of natural systems by attempting a monetary valuation of them, and the total value they derived dwarfed the value of other inputs into economic systems (Costanza *et al.*, 1991). Daly also proposed a steady-state economy in the sense that it operates so as to avoid further ecosystem degradation but rather enables natural systems to recover (Daly, 1991). There is considerable overlap in the subject matter of ecological and environmental economics. The key difference is one of orientation: environmental economics tends to embrace the neo-classical paradigm as an analysis of the economic system and seeks to incorporate environmental assets and services into that behavioural model. The objective is to maximise economic welfare. Ecological economics gives priority to the health of complex interrelated ecological systems and considers how economic behaviour can be modified to that end.

A third alternative is to teach both 'environmental economics' and 'ecological economics' in debate or, in parallel, i.e. as complementary or contending perspectives. Again, the instructor faces a choice of how to do this. In the course shown below (see Table 2) the contrast between the two views of economics is presented almost immediately.

The course begins by outlining the current world situation. It is hoped that this would stimulate interest. It is important to stress at that point that there are a number of issues to consider. Whilst it is important to bear in mind that there are dissenters to the near-consensual view on anthropogenic climate change, it is unproductive to get stuck on that issue; it is better to move on to questions of biodiversity loss, resource depletion and the like.

After this opening follows the discussion of the two contending (or complementary) perspectives. Again, at this point, the instructor has to choose whether to see the perspectives as arguing over who is correct (contending) or as both providing insights that fit with those of the other (complementary). This choice affects the entire delivery of the course and is particularly acute in its assessment. Students can be asked to consider a problem from both perspectives and consider which one is better, how to use both, or even be invited to supersede each in a novel combination. Whichever of these routes is taken, there is a danger of confusing students; however, these dangers can be reduced if the contrast is introduced early in the process, and if it is reinforced often, particularly in assessment. Thereafter, the course is a series of topics on which each perspective has a bearing to differing degrees.

TOP TIPS

"Using multiple perspectives can be challenging to students. Guide them carefully, but do not push them through the contrasts."

It is true that much of the early material is from natural science and it would be unreasonable to expect economics instructors to be au fait with many of them. For example, most would not have a command of the laws of thermodynamics; however, some rudimentary knowledge of them would be required. The crucial point to get across is of entropy and of how it is necessary to have systems that are open. Similarly, it requires an ecologist to understand fully the nature of ecosystem services; however, the main

Table 2: Contending perspectives course – environmental versus ecological economics

Topic	Emphases
Current state of the world	Major issues: resource depletion, global warming and climate change; pollution; combined problem of population growth and inequality
Two views on economics	See Box 6 on ecological and environmental economics
Ecosystems	Notions of materials balance; keystone species (Paine, 1969 is the seminal piece)
Thermodynamics	Laws of thermodynamics
Sustainability	See Box 1; damage functions, assimilative capacity
Growth and the environment	Environmental Kuznets Curve (see Box 7)
Externalities and property rights	Optimal level of output and pollution; policies to achieve them
Cost benefit analysis	See Box 5
Ecosystem services – valuation	See Box 4 on valuation
Sustainability and biodiversity	Quasi-option value see Box 4
Human populations and ecology	Food; agricultural sector; diet
Resource use and renewability	Finite and renewable resource models – MSY (see Box 2); Hotelling model (see Box 8)
Trade and pollution	Off-sets; UK exporting ecological/carbon footprint via FDI
Climate change	Carbon footprint; the Stern review; impact of climate change
Adaptation and resilience	Carbon capture and storage (CCS) technology; localism; flood defences; genetically-modified crops

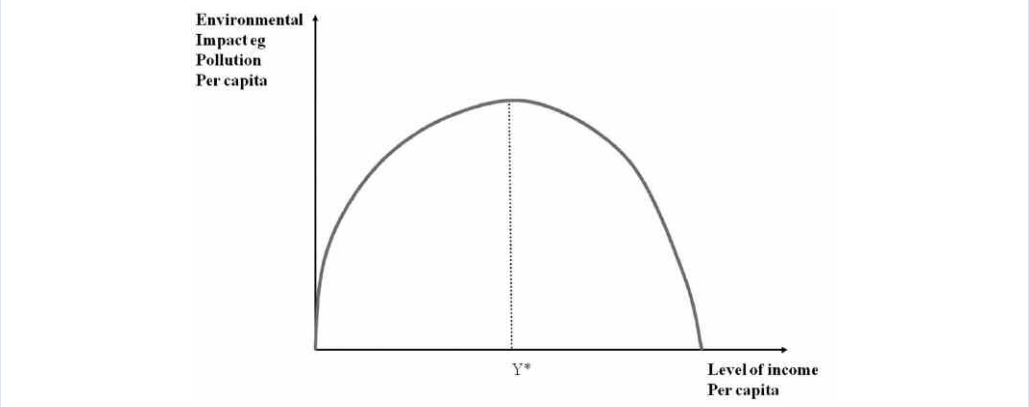
point of this discussion is to make clear the roles of carbon sinks, etc. and to encourage students to think more broadly about, say, a field than simply its marketable value. Fortunately, standard texts in ecological economics deal with this need by offering definitions of concepts such as damage functions, assimilative capacity and the like.

Many of the other points have already been discussed, and draw on the material elsewhere in the chapter. On many of these there is considerable debate between environmental and ecological economics. For instance on valuation (see Box 4) while ecological economics acknowledges that conventional valuation methods such as WTP and WTA, hedonic pricing, etc. are useful they are more sceptical about their value. Ecological economists are more likely to argue that vital ecosystem services are not amenable to valuation at all, or at least only with considerable scope for error.

The scope for debate continues throughout the course, finishing off with the highly contentious topic of climate change and the controversial Stern Review (2006). The Review is a very useful pedagogical device because it is possibly the most thorough application of techniques of economics of the environment to questions of sustainability (and certainly the most well-known) so provides an excellent vehicle via which to reflect on the rest of the material in the course. Also, the Review is useful because it has been vigorously opposed from both sides of the debate. For example, Nordhaus (2007) has argued that the discount rate assumed by Stern is too low. Dasgupta (2007) is concerned that Stern's discount rate does not take into account sufficiently intragenerational equity. Ackerman (2009) criticises the attempts at valuation within the *Review*. An obvious capstone to this course would be a debate between groups of students on the Stern Review, in which they are expected to draw on relevant concepts from the course.

Box 7: The environmental Kuznets curve

Growth is the most contentious macro-economic objective for sustainability. Ever since the limits to growth hypothesis was put forward in 1972 (Meadows *et al.*, 1972), economic growth has been seen as the enemy of sustainability by most in the green movement. The hypothesis is easier to support now than it was 35 years ago and makes an ideal platform for discussing sustainability at the national level. An opposing view is centred on the environmental Kuznets curve hypothesis, which suggests that as nations become wealthier a point is reached where environmental damage *decreases* with further economic growth and increases in wealth (Grossman and Krueger, 1991). There are many critiques of this hypothesis. One of the most telling is that the finite resources of the planet constrain the ability of all nations to reach the level of wealth that represents the point of transition from a direct relationship between income growth and environmental damage to an inverse one. The most damning critiques challenge the empirical evidence for the relationship and show that few damage indicators reveal a turning point across those nations for which data are available. Furthermore, the hypothesis does not appear to apply to carbon emissions (Bradford *et al.*, 2005).



The EKC provides a rich platform for debate. Initially it is appropriate for students to prepare for this by looking at the empirical evidence for the hypothesis. Students should be directed to the results of the original paper by Grossman and Krueger (1995). A recent appraisal of the various critiques that followed over the subsequent 15 years are referred to in Carson (2010). These critiques deal with methodological issues, in terms of data, functional form and analysis. Few of the original pollutants investigated by Grossman and Kruger and shown by them to comply with the hypothesis survive this scrutiny. Students should be able to glean this from the Carson paper and relay their understanding to the class as a whole. However, there are more fundamental issues that students can be guided to in discussion. Even if the EKC held for significant pollutants in one economy, the differing development trajectories of the major global economies are out of phase. Thus at the global level, the rapidly growing BRIC economies and emerging market economies, all at various points on the upward section of the EKC, would more than offset the mature economies which might be at various points on the downward section. Finally, the long lag between the generation of some pollutants and the subsequent ecosystem impact further confuses the picture.

5 Teaching an applied course on sustainability economics

The above course is one on economics of the environment, in which special attention could be put on sustainability. However, one could go a step further and construct a course specifically on sustainability economics. Courses on sustainability economics remain unusual. The course below (Table 3) is constructed based on one taught by the authors, combined with some other examples of good practice from around the world.

We feel that in a course on sustainability, starting with the problematic of a sustainable biosphere is unavoidable and desirable. It is essential that students understand the nature of the biosphere, and thence its sustainability, before moving on to consider what economic (and other) systems would be needed to achieve sustainability. One way to approach the question is to lecture about some basic concepts, but then take the main components of the biosphere: soil, marine, hydrosphere, natural forest, wetlands, etc., and divide the class into groups to report back on each part. This could be used as a model for the rest of the course.

One of the consequences of teaching a sustainability course in this way is that students are exposed to economics of complex systems. This exposure may be of benefit in itself. Complexity economics is a relatively young discipline and shares many of its roots and much of its history

Table 3: A course on sustainability economics

Topic	Tasks or exercises
Sustainable biosphere	Group reports
Complexity and systems	Complexity game (see below)
Entropy and thermodynamics	Energy hierarchy and its appropriate use
Circular economies and closed systems	Ellen Macarthur Foundation video; materials balance
Definitions of sustainability	See Box 1
Core concepts in ecol econ – scale, distribution, efficiency	Ecological footprint (see REAP in Section 7)
Economic growth and physical limits	Critique of Environmental Kuznets Curve (see Box 7); notion of critical resources: peak oil (see Box 8); (see LowGrow model in Section 7)
Measurement of economic activity	Happiness/HPI discussion
Triple bottom line	Ethics; campus walk (see Box 9)
Valuing natural capital	See Box 4
Cost benefit analysis	CBA builder (see Boxes 4 and 5; Section 7)
Public goods	Classroom games (see Box 10)
Property rights	Notions of commons; anthropo-ecological systems
Eco-product design and lifecycle analysis	Biomimicry; show and tell: students bring products to discuss their design and production in terms of sustainability
Population	Food; agricultural sector; diet

with ecological economics; yet it has a broader application, and has been expounded by significant figures in economics such as Kenneth Arrow and Thomas Sargent. Complexity economics has many implications for both theory and practice. It suggests that even with simple behavioural rules (and hence it has connections with behavioural economics) purposive agents in complex systems can generate unpredictable and potentially explosive outcomes. This has implications for theory: simple rational maximisation becomes less plausible; for methods – agent-based modelling is preferred and the typical mathematics of economics is regarded as inadequate; and for policy – small policy changes can have large and unpredictable outcomes. One way to explore this is via a simple complexity game in which students are divided into small groups; each student receives a card with four rules of behaviour on them (at least one of these might be their objective) to which they must adhere. The object of the game is to show the multiplicity of possible outcomes when faced with simple rules.

By exposing students to these concepts, complexity economics can benefit them but also alarm them. However, arguably in studying sustainability, complexity is essential because it attempts to capture interconnections and systemic effects in ways that even DSGE models do not (see, for example, Colander *et al.*, 2008). Further, by tapping into modes of thought currently used by governments and other researchers, students are increasing their employability.

TOP TIPS

"Introduce students to a delicately balanced ecosystem, so as to understand the complexity of sustainability. Example: a delicately balanced ocean floor ecosystem, whereby bacteria process organic detritus in various ways, some of which lock up carbon and some of which do not, dependent, crucially on the presence of a virus (see *The Economist*, 2010)."

Box 8 : Non-renewable resources

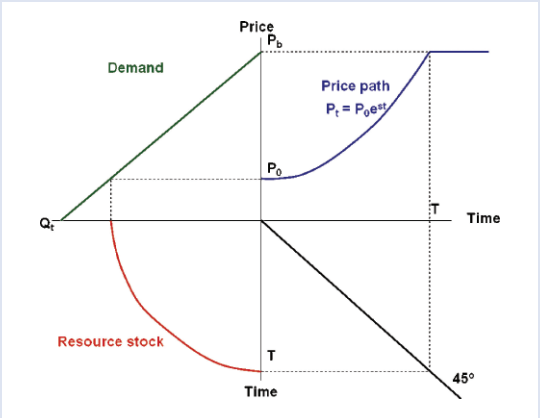
Resource depletion models

The efficient allocation of resources assumes perfect information is available to assist both producers and consumers in their decision-making. One of the key problems in achieving sustainability is that finite resource costs do not necessarily reflect scarcity. This has been most evident in the case of oil and metals – it is arguable that this failure of the price of these resources to reflect scarcity is due to a combination of a lack of information about remaining reserves and a degree of monopoly power combined with short-termism on the part of certain producers and speculation (Krugman, 2009).

In the case of oil, this has resulted in long periods of relative stability at historically low prices (1985-2006) with shorter periods of extreme volatility (1972-1985 and 2007 to the present). The predictions of economic models of finite resource depletion are at odds with this reality. They assume perfect information and suggest a steadily increasing price path up to the point at which the resource is depleted and an alternative technology takes over (see, for example, Hotelling, 1931, shown graphically below).

The model assumes that exploiters of the resource act to maximise the present value of the future stream of royalties (revenue less extraction costs). This requires that the price path in the top right-hand quadrant reaches the backstop technology price Pb at the point that the resource is fully depleted. This is shown by going down through the bottom right-hand quadrant to the

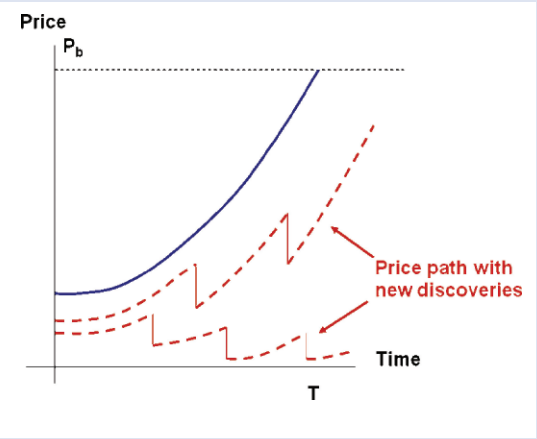
...continued opposite



resource stock quadrant, bottom left. The starting price P0 relates through the demand curve to the starting stock position.

It is useful to start a discussion of the actual price path of oil in relation to the model above. Students could be asked to research the historical path of oil prices from, say, 1945, to the present and show this graphically.

At first sight this empirical evidence seems at odds with the price path and the class can be asked to try and reconcile the model to reality. After discussion of the actions of OPEC in restricting supply and speculators in increasing demand, the impact of new discoveries of reserves can be introduced as shown below. This illustrates the impact of information.



Information also has an important role in the sustainable harvesting of renewable resources (see Box 2).

There is increasing evidence that government economists use complexity in their own work, even if they are perhaps unsure how to do so.

The course contains several elements which could be applied to any of the other models above. For instance, the concept of ecological footprint captures the notion of sustainability quite well; and it is empirical and can be evaluated using the REAP software (see Section 7). Under the heading of growth, the macroeconomic consequences of low growth (or even de-growth) could be explored via the LowGrow computer simulation model (Victor, 2008) (see Section 7). A discussion of growth as an objective creates the potential for a discussion of happiness literature, which has much contemporary currency. The literature is varied but includes large econometric analyses so can be a valuable way to explore empirical issues as well as those associated with utility maximising consumers. The issues of valuation and CBA were discussed above, but clearly are important here. A show and tell session, in which students bring in examples of products into class for critical analysis, using life cycle analysis, might be an effective way to discuss that analysis but also asks the students to explore everyday objects from a new perspective.

In a discussion of ethics, following on from definitions of sustainability, is the notion of clashing ethical bases and contesting needs. This clash is captured well by the concept of the Triple Bottom Line (see Section 2.1). One way to explore this concept is via a campus walk, to demonstrate that each part of the university campus has on it competing demands which must be resolved. Obviously each one would be different and would need to be investigated beforehand.

Box 9: Campus walk

It is essential that students see concrete examples of sustainable and non-sustainable design and practice. Case studies can be useful in this regard, as can an assessment that requires the students to go out to evaluate actual organisations. A useful place to start is on one's doorstep: the campus. Many educational institutions have made recent efforts to be more sustainable, often through energy efficiency measures which can generate financial savings. So one would expect to be able to find many examples of sustainable buildings and processes on university campuses. Start in the classroom. Ask students to look around and identify sustainable and non-sustainable objects or design features. Students will note double-glazed windows, motion sensors, thermostats and even carbon dioxide sensors, the amount of natural light entering the room, and the number of electrical appliances, for example. Leaving the classroom, students can observe how corridors are lit and heated, whether doors and windows are closed, and how frequently they spot a recycling centre, for example. A campus with some design innovations assists in this task, as students may see – or be invited to see – smart heating and lighting systems, electricity generation or water heating from solar panels, integrated drainage systems, improvised wildflower and wildlife areas, and innovative spaces that are naturally lit and also facilitate social activities that enhance social sustainability. All of these are potential cases for cost benefit analysis.

Pedagogically these campus walks are also valuable. There is a significant element of active learning present. Clearly the tutor must act as a guide, and plan a route that is likely to have items of interest on it. The instructor must also be open to surprise finds and consequently odd questions. The students must be sufficiently knowledgeable to be able to spot relevant features; so it may not be advisable to schedule the campus walk early in the year. However, as part of a PBL approach, students may be directed to a feature of the campus with particular sustainability issues. Instead, or as well, the university or campus itself could be the problem object to be studied. Such an approach allows students to be more engaged with the topic, and with their campus. It may be that an unforeseen consequence of this activity is that students do things on campus that they otherwise would not. If there is flexibility in assessment, these new student activities could themselves become objects for analysis. For example, students could film their own campus walks, perhaps as group activities, and then show them to their peers.

Box 10: Classroom games

Classroom games have been identified as a way of engaging students with economic concepts. Some existing Economics Network resources explicitly address sustainability issues. Others can be adapted.

Copestake (2010) discusses a *climate change game* that can be played in different formats to allow for different levels of economic knowledge and different levels of complexity in the game. The game explores concepts such as public goods and the iterated Prisoner's Dilemma to explore some of the economic issues connected to climate change negotiations and compliance. The game can also enhance students' transferable skills by employing Excel spreadsheets. As always, such games can be adapted to take into account different theoretical frameworks. In this case, the game rests on theoretical presuppositions, such as the simple self-interest of nations. Tutors might wish to explore that presupposition and the consequences of abandoning it. On the same topic, the BBC has designed a climate change game, which could be used to explore the issues around climate change negotiations and compliance.

Sloman (2002) discusses an international trade game in which some countries are natural resource rich and others may have more manufactured capital. That allows for the immediate discussion of types of capital and their substitutability. The purpose of the game is then for each country to engage in trade to its national advantage. The game is designed to allow 'shocks' to occur, so it is an easy adaptation to introduce into the game ecological shocks, perhaps through the forms of resource price spikes, and to investigate their consequences. Guest (2007) discusses a set of games with implications for sustainability, including on public goods, auctions and trading. These latter two are important in a sustainability context because of the growing importance of emissions trading, carbon permits and other market-based carbon reduction schemes.

The Economics Network resources also contain several games that are more general but again have uses in courses on sustainability. Sloman (2009) discusses an expected value game based on the television programme *Deal or No Deal*. Clearly this game has applications for sustainability, for example in the notion of risk. This can be extended to discuss non-probabilistic risk and the concept important in sustainability of the *precautionary principle*. Sutcliffe's (2002) press briefing game and Pigott's (2002) journalistic writing assignment are useful in the context of sustainability given its inevitable political dimension and the importance of communicating findings on sustainability effectively to the public.

The paper aeroplane game, discussed by Mearman (2007), has some similarities to the tennis ball game discussed by Guest (2007) and by Hedges (2004). This is a game originally designed to illustrate diminishing marginal returns in production, but is easily adapted to explore aspects of sustainability. The game asks students to make paper aeroplanes in groups in which increasing numbers of students are involved in production. In the basic form of the game, it is expected that marginal productivity would eventually stop increasing. Students can explore how design of the product and of the production process can affect productivity. There are several sustainability angles on this. Students may consider how efficient the process may appear if energy use is taken into account. Students may also debate the extent to which waste is produced in the process. Students could discuss the likely sources of raw materials and the associated sustainability issues. They might also consider product design and the potential for remanufacture and maintenance of the product. One of the principles of cradle-to-cradle production (McDonough and Braungart, 2002) is that the product should be produced where possible from recycled materials, and that there should be no waste from the production process.

6 Assessment

As has been suggested many times already, assessment is crucial in delivering and generating learning of sustainability. A key principle is to use assessment to encourage engagement. This can be achieved by basing it around practical problems and objects around the students. As always, where possible, a variety of assessment methods is desirable, reflecting the multi-faceted nature of sustainability.

Given the interdisciplinary content of the sustainability curriculum, students may be exposed to very unfamiliar concepts. Pop quizzes and short tests (including multiple choice) can provide easy ways to test understanding of these new concepts, and to provide instant feedback to the students on their own learning. The classroom exercises can also provide opportunities for formative assessment. For example, students can be asked to present their ideas on how to achieve economies of scale in the most sustainable ways. They might be asked to write a reflective piece on their walk around their campus. Indeed, the university can be a valuable source of material which to study. As an example, in a module called *Sustainable Business* we have asked students to engage in coursework that allows them to study anything relevant to sustainability. In this case, almost two thirds of students choose to evaluate a real company or event. Many of those have been studies of what is going on at our university. The university has the advantage of being personally relevant to the students and therefore engaging; and of course it is also convenient, and with some minimal co-operation from university facilities and administrative staff, students can gain access to a wide data set on which to base their analyses.

Other classroom exercises could be part of the strategy for formative assessment. One is that of a guided role-play. Students could be asked to consider a scenario and then take roles of various stakeholders in it. For instance, a planning application may have been made for an incinerator. Students could adopt the perspective of a local resident, a planning officer, a local councillor, an environmental assessment expert, and a representative of a group offering the alternative technology of pyrolisis. This exercise helps develop skills of argumentation and presentation, challenges students to think flexibly, and helps them develop an holistic approach to real-world problems. This exercise could be drawn on subsequently, say in the exam: students would be presented with text of a variety of perspectives and then asked to make an assessment. In the latter case, the exercise clearly forms part of formal assessment, but the former could be formative, and could easily be adapted to employ peer assessment and feedback.

TOP TIPS

"Use assessment as a tool for engagement: some assessment early on ensures that students master crucial core concepts."

Evaluations of real cases tend to be either on current practices of the company or on the environmental impact (via CBA) of a major event, such as mining, or rock festivals. The key determinant of success on this project is whether the student embraces and applies an analytical framework. Where students go wrong is when their projects are too descriptive or lack criticality. The same principles apply when using real-world case studies. In-class cases allow students to explore changes in practice, such as new product lines or production techniques. Again, there are formative assessment opportunities in asking students to present their reflections on these developments. Additionally, in exams students can be presented with such examples and asked to reflect on them. It would also be possible to make some element of the exam open-book assessment, in which students draw on work they have done in class to address either cases they have been working on, or cases new to them. Another option might be to provide a case study to be studied in advance of the examination, with the questions unseen until the exam. In this way, depth of understanding, knowledge and analysis is encouraged.

7 Software resources – used as a teaching and assessment tool

LowGrow is a computer simulation of a macroeconomic model for Canada developed by Victor (2008). The model is an aggregate demand-aggregate supply framework – marrying a typical Keynesian expenditure function with a conventional production function. However, the model has several novel features that make it useful for teaching sustainability. The model has outcomes for conventional macroeconomic variables such as unemployment and growth but in addition tracks greenhouse gas emissions, forestry and poverty. This last element addresses the aspect of sustainability concerned with equity. A further central feature is that, as the name LowGrow suggests, the model examines low growth scenarios.

Students can interact with the computer model by changing key policy variables and witnessing the outcomes. Furthermore the model has several pedagogically advantageous features. The majority of its variables and policy tools are pretty conventional, so students familiar with typical macroeconomics syllabuses can easily adapt to the model. Further, Victor (2008: ch. 10), in conjunction with Victor and Rosenbuth (2007), explains the model in detail. He shows how the model can be represented graphically and in equation form. Victor also discusses the econometric work underlying the calibration of the simulation model. LowGrow therefore has a number of aspects that make it excellent for teaching, at a number of levels.

CBA Builder (Wheatley, 2010) is an Excel-based program designed to allow the user to conduct a cost benefit analysis, together with a sensitivity analysis. The software has several features that make it a useful resource for teaching. It is quite user-friendly and has an accompanying manual containing information on the calculations it performs. Hence it can be used as a tool for reinforcing concepts such as discount rate, net present value and more general concepts such as short and long-run costs. It can therefore be used as an investment appraisal tool. However, by adding in data on externalities CBA Builder can be used for environmental analysis. The sensitivity analysis allows students to understand contingency, which in turn fosters their ability to use judgement and caution in policy decisions. The other benefit for students is in terms of employability: Excel is regarded as a highly useful tool and CBA Builder allows them to develop further their competence in it. CBA Builder has received positive feedback from users.

The Resources and Energy Analysis Programme (REAP) software, developed by the Stockholm Environmental Institute at the University of York, enables students to engage with a number of sustainability issues relating to lifestyle. The current consumption patterns across the UK based on MOSAIC data are used to derive area sustainability profiles in terms of ecological footprint in global hectares, carbon footprint in tonnes and footprints of a range of other pollutants. Geographical areas down to district level can be accessed or new study areas created by aggregating districts. REAP is conceived as a policy instrument whereby local authorities can try out different policy scenarios covering areas such as transport, housing and population growth, and gauge the footprint impact.

A workshop that engages students can be based on their own home district. Overseas students can choose an area they have visited. Initially, students can be asked to find a series of footprints relating to their areas. These can be compared in group discussion and some reasons for differentials suggested. As a second stage, students can enter the scenario mode of the software and try policies which might reduce footprints in their areas. It is a sobering exercise for students to try and evolve policies that bring the ecological footprint down to the sustainable level of 1.8gha.

Experience with using the software suggests that it is best to start with an introductory group session in a PC lab, defining the metrics and investigating home area profiles. The scenario capability of REAP should be introduced and then students set the footprint reduction exercise to be completed in their own time.

REAP licences for teaching are free and can be obtained through contacts on the website.

The online scenario tool DECC Energy calculator tool is useful to investigate the implications of energy policies. Experience shows that it works best as a seminar exercise where the class as a whole can vote on the various policy decisions. The various implications of strategies can be discussed and the wide range of questions that arise answered. The calculator can be accessed online.

8 Research

The University of York reports REAP is used to great effect at undergraduate and postgraduate levels (based on an interview with Anne Owen, Research Associate specialising in Sustainable Consumption and Production, Stockholm Environment Institute, University of York). REAP is a highly sophisticated model that helps policy makers to understand and measure the environmental pressures associated with human consumption. It is aimed at policy makers and can be used at the local, regional and national levels. It generates indicators on:

- Carbon dioxide and greenhouse gas emissions measured in tonnes per capita.
- The ecological footprint required to sustain an area in global hectares per capita.
- The material flows of products and services through an area measured in thousands of tonnes.

REAP has applications in a wide range of policy areas including transport, housing and planning. The program's powerful scenario tool models the impacts of policy changes and facilitates working with alternative futures based on different trends or assumptions.

At York, REAP has been used in teaching on both the BSc and MSc/Diploma Environmental Economics and Environmental Management. At the undergraduate level, it is used to support multi-criteria analysis of sustainable lifestyles while at Masters level, it facilitates the analysis of the impact of lifestyle changes such as reducing food waste and healthy eating. It is important to use a problem-based approach to introducing REAP. Just taking the students through a 'what REAP can do' demonstration does not engage them to the same extent.

There are other versions of REAP available: REAP Petite, which is designed for simulations at the community level; and at the opposite extreme, EUREAPA allows comparative analysis of sustainability indicators at the EU national and regional levels.

8 Case studies (in practice)

This is an unusual area and therefore there are few examples of practice. Plumridge (2010) surveys contemporary provision of areas of the economics curriculum relevant to sustainability. Below we draw extensively from that work to describe relevant case studies.

At the University of Bath, a concern with sustainability is prominent in research and some staff have international reputations in environmental and natural resource economics. There is an interdisciplinary research centre concerned with sustainability, namely the Institute for Sustainable Energy and the Environment. There are two optional modules concerned with sustainability offered at level 3: Environmental Economics, and Natural Energy and Resource Economics. The latter is actively underpinned by research by teaching staff. In the case of these specialist modules, tutorial discussions revealed that, initially, students did not have much familiarity with the concept of sustainability or with areas of economic analysis that were relevant to the concept.

At UWE, Bristol, some economics module leaders are responding to institutional incentives by introducing sustainability issues. A level 2 module, the Business and Economics of Fun and Games, includes applications of economic analysis to the sports and tourism sectors. In the latter, there is consideration of sustainable tourism. At level 3, there has been a long history of teaching environmental economics as an optional module. The recent move of economics into the Bristol Business School resulted in this module being repositioned as Sustainable Business. Some 60 per cent of the content is common to the previous environmental economics module. There is some pressure from students to introduce a module in sustainable business at level 2. As a response, Good Business, Bad Business and Sustainability (GBBBS) has been designed. Recognising the importance of values in the study of sustainability, GBBBS has a strong emphasis on ethics and corporate social responsibility, as well as introducing foundations of sustainability and frameworks for the economic analysis of it.

The University of Sydney offers a course in the political economy of the environment, which stresses the role of political economic processes in shaping the relation between the economy and the environment. It is an example of a contending perspectives course on the economics of the environment (see Table 3 above). The course uses a mixed assessment strategy. It also deploys a reading kit rather than assigning a textbook, which allows students to read widely and for them to be exposed to canonical readings. Students provide very positive feedback on the course, citing it as engaging, relevant and challenging; and they report that it develops their ability to think about problems from multiple perspectives. Some of the feedback received suggests that there is an important affective dimension to taking such a course.

We can also report that colleagues at Keele University, the University of Missouri at Kansas City, and Flinders University have run successfully modules that stress sustainability. They report positive student feedback, engagement and successful achievement of learning outcomes.

References/resources

Resources

Books

These books are economics textbooks. They would be suitable at levels 2 and upwards, although for each book, clearly students at level 2 would need more help in understanding the material presented.

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These books are intended as companion texts; they are not textbooks. They deal with sustainability issues such as energy, change management strategy, and personal consumption decisions. They are suitable at many levels, although some of the technical detail is more suitable for higher level students.

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The Handbook
for Economics Lecturers

Economic Classroom Experiments

By Dieter Balkenborg and Todd Kaplan

1 Introduction

In our experience, economic classroom experiments are a great way to introduce students to economic key concepts. They are fun for the students and for the teacher. While perfect teachers may not have to rely on anything but their charisma, both the interest of our students in the material we taught and our student evaluations improved with the introduction of this technique. In this chapter we want to discuss some effective teaching experiments and explain how and why we used them in our teaching. We will also describe how to run classroom experiments and which resources are available.

We will concentrate primarily on teaching experiments that are derived from research experiments and are hence based on a specific economic model and address a specific behavioural hypothesis. Independently there exists a tradition of using gaming, simulations and role-play in teaching. We will only occasionally refer to this approach, which is discussed (with several excellent examples) in a different chapter of the handbook.

Arguably, economics is developing into an experimental science and our teaching should appropriately reflect this development. All leading economics journals now regularly feature articles on experimental economics. The development was recognised when Daniel Kahneman and Vernon Smith obtained their Nobel prizes in 2002. Interestingly, Vernon Smith obtained his prize for showing that markets and economic theory work even under harsh conditions, while Kahneman's work showed that the rationality assumptions underlying most of traditional economic theory do not accurately describe human behaviour even in simple decision situations.

Likewise, economic teaching experiments can be used to illustrate how economic concepts are helpful in explaining observable behaviour. They can also be used to discuss its limitations critically.

Economic experiments can be a great motivator. Vernon Smith himself was motivated in his research by his experience as a PhD student participating in market experiments carried out by Chamberlain. One of the authors became an economist because of his participation in economic research experiments. Many of the researchers who fostered the breakthrough in experimental research have started to use experiments in their teaching. In the words of Charles Holt (1999) classroom experiments have become 'the most exciting new development in teaching economics'.

Taking advantage of this breakthrough and running your own classroom experiment is just a few keystrokes away via the Internet. It should not take more than a day to get acquainted, for instance, with Charlie Holt's Veconlab.

There are also strong arguments that teaching experiments work most effectively in the classroom with pen-and-paper. We will compare the advantages and disadvantages of different ways of running experiments.

2 Why use economic classroom experiments?

'The various experiments conducted made the module much more interesting, understandable and most importantly enjoyable' (from a student evaluation).

Again, experiments are a fun way not only to learn, but also to teach. They can inspire students to learn more about a topic and provide an easy way to engage students in discussions. Stated in the terminology of Kolb (1985), they provide the concrete experience on which reflective observation can be based. The teacher can use this experience in classroom discussions and guide the students towards 'abstract conceptualization', i.e. the understanding of new theoretical concepts, which can then be used to analyse the data and other economic phenomena. For instance, students who have experienced cut-throat competition, in an experiment based on the Bertrand model discussed below, understand very well how zero profits arise and are a result of equilibrium. This active learning experience will last well beyond the course, in quite a different way from just seeing the theoretical analysis of the model and the claim that it is applicable in many economic situations. Seeing theory work in action helps the credibility of our science. This is further enhanced since experiments are a great way to get students closer to current research.

Another advantage of experiments is that they work well for all levels of students (even sixth form). Experiments can introduce a topic in a comprehensible way to students from many different backgrounds and skills, in particular to those with low mathematical skills.

Scientifically proven benefits

There have been a number of recent studies trying to determine the benefits of using classroom experiments. The basic methodology is to keep the lecturer and module fixed, while randomly assigning students to two groups, one with experiments and one (a control) without experiments. Afterwards, one compares performance.

Emerson and Taylor (2004) found that experiments boosted microeconomics students' scores on a standardised test for understanding college economics, TUCE. They found that experiments increased the scores of both females and males but helped females close the gender gap. They also found that experiments benefited the weaker students (lower grades overall). Dickie (2006) also found an overall improvement in TUCE scores by using classroom experiments.

Ball, Eckel and Rojas (2006) ran wireless experiments in a principles of economics class and found that experiments improved the overall mark on the final examination. Again, they found that the benefit was stronger for females than males. They found that the benefit was highest for first-year students. They also found that experiments significantly improved teaching evaluations of the lecturer and the degree to which students found the course stimulating.

Durham, McKinnon and Schulman (2007) and Emerson and Taylor (2004) both find that experiments benefit different personality types differently, with read-write learners benefiting less than those that prefer learning by doing.

3 What are economic classroom experiments?

The easiest way to answer this question is with a simple example. This experiment only takes a few minutes to run.

Case 1: The guessing game (hand run)

Guess a number between 0 and 100. You will be guessing this number with 72 other people. The guess closest to two-thirds of the average number wins. Ties will be broken randomly. Please write your guess down before reading further.

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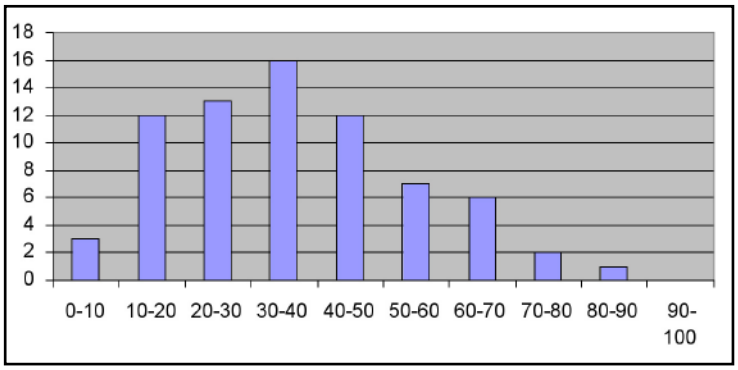
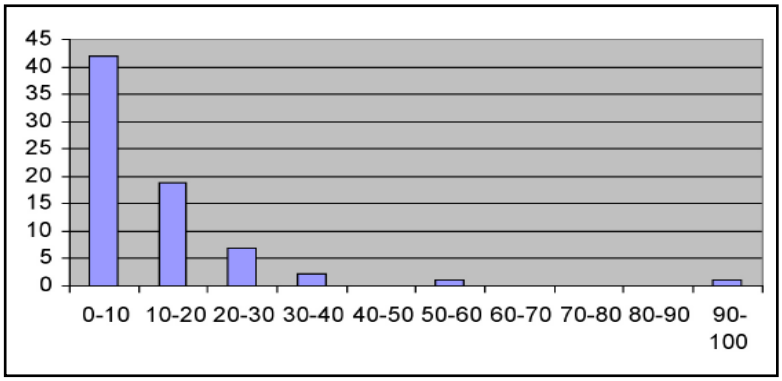
Here are the results run on second year microeconomics students at the University of Exeter.



The average was 36.68. Two-thirds the average was slightly under 24.5. The winning guess was 24. Were you a winner?

After showing them the results (of the previous year), these are the questions we discussed with students: Why did you write down your guess? If you thought everyone else was choosing their numbers randomly, what would you guess? If everyone thought the same as you, what would you guess? If everyone was rational, what should they guess (i.e. the equilibrium)? There were 6 guesses above 66.667. Does it ever make sense to guess above 67?

We then asked them to guess another number under the same rules. Before going to the next page, what do you think happened to the guesses?



The average was 12.4 (of which two-thirds is 8.3).

While we can show the unique equilibrium in this guessing game is 0, we saw that in the first iteration guesses were wildly off this. This deviation from equilibrium is typical. The game has been run numerous times (see Nagel, 1995; Camerer,1997). At the Wharton School of Business, the average was 40, as it was among a group of CEOs. With Caltech undergraduates, the average was 30, unusually with 10% at 0 (too smart for their own good). For a group of economics PhDs, the average was 25. In the second iteration, things are always quite different and guesses are drastically lower. Thus, when the game is repeated equilibrium theory does much better.

So, what makes this an economic experiment? There is a clear prediction from economic theory that is tested by having students respond as the agents in a model.

From this game, one can clearly see the advantages of classroom experiments. The experiment is fun for the students to play. When a similar game was played by asking newspaper readers (Financial Times) to send in a guess (Nagel et al., 2002), there were thousands of responses. Even though the experiment is very simple, it generates plenty of discussion amongst the students. By playing the game, they also quickly grasp the concept of equilibrium and its prediction, far more easily than by explanations alone. Moreover, it teaches students to think about whether the models we teach them apply, and to see for themselves when they do or do not. As in this case, they often see both possibilities. As Colin Camerer (1997) puts it, 'So game theory, which seemed so laughable at first, does predict what people will do with repetition. Again, psychology helps us understand what happens at first, and game theory tells us what will happen eventually as people learn. We need both to understand the entire picture.'

Hints for running this experiment

1. Run the first round of the experiment at the end of a lecture. The students have to write their names and a guess onto a piece of paper which you can collect in a box at the end of the lecture. You (or some assistant, for instance a student) can then put the numbers into a spreadsheet and the winners be determined.
2. Explain the result at the next lecture and then play another round.
3. Instead of showing the results of the first round, one can discuss typical results (e.g., the one above or those in Nagel's paper). Then play both rounds in one session.
4. It is nice to give a prize to the winner such as a book. Freakonomics or the Undercover Economist are suitable prizes which are not very expensive. Prizes should be announced before the experiment. If you have only one prize, let students throw a coin to decide whether the prize goes to the winner of the first or second round.

4 Types of classroom experiments

There are three ways of running classroom experiments: hand run, computerised and homework. For instance, we ran the above guessing game experiment by hand.

A. Hand run experiments

Hand run experiments can be as basic as asking for a simple raise of hands (or electronic polling). One can ask who would co-operate and who would defect in a symmetric prisoners' dilemma. There are also simple experiments such as the previously discussed guessing game or the auctioning of a £1 coin. Two-by-two games can be played by having slips of paper in two different colours, one for each type of player.

Hand run games can become more sophisticated and require more interaction between the players. One of the first experiments run in a classroom was a hand run experiment by Chamberlin (1948), called the pit market experiment where students act as buyers and sellers (see case 2 below). The pit market experiment can be run with little effort using playing cards. (The pit market is like an old-style commodity exchange, where each commodity is traded around a pit.) The prisoners' dilemma and public good games can also be run in the classroom using playing cards to cheaply and effectively distribute the pay-offs. More complex trading games can be used in order to illustrate the impact of asymmetric information on market efficiency. For more details see the following links:

- 'Classroom Experiments & Games (Economics Network theme)
- 'Case Study: Introducing Classroom Experiments into an Introductory Microeconomics Module (Economics Network).

A more involved hand run experiment is the International Trade Game (see handbook chapter on Simulations, Games and Role-play); although not based upon a research experiment, it is very useful at conveying a wide area of fundamental economic concepts.

Advantage

Hand run experiments have several advantages. Some are suitable for large lectures; others can take just a few minutes to run. Hand run experiments are often an excellent way to engage students, since the interaction is face to face (as in the trade game or the pit market) and some can involve physical activity (as with flower pot/tennis ball http://www.bized.co.uk/educators/ 16-19/economics/firms/lesson/dimreturns.htm or http://www.economicsnetwork.ac.uk/showcase/hedges_tennis.htm)

Disadvantages

There may be reasons why you may want to use forms of experiments other than hand run experiments. One difficulty is that certain hand run experiments may require careful preparation, including room structure. They also may require assistants, volunteers or another lecturer. This requires careful coordination beforehand. From our own experience it is quite

dangerous to try to 'wing-it'. During one experiment in a class of 300, we were not organised about how to tabulate the results. Both of us had intended only to sample the data, but had not agreed how to do so. We were later told that in the middle of the class students were taking bets on which one of us would slug the other first

Hand run experiments may require several practices before the lecturer gets the procedure down to a fine art. This may cause a variation in the student experience. There are also a limited number of rounds for which one can run within a lecture or session. Data collection and entry into an Excel spreadsheet can take time and effort. It is quite easy for the data to get lost. When the experiment involves large groups of students, feedback may be delayed for instance until the next lecture. It is also quite easy for students to avoid participating.

Helpful hints for hand run experiments

- 'At the beginning of the semester/term, cut simple strips of paper (you may want to use two colours).
- 'Bring several plastic bags from home to collect answers.
- 'Give verbal instructions/display question.
- 'It is often sufficient to sample and evaluate only a few answers. Or one can randomly select some students to participate in one round of the experiment.
- 'One can display last year's results rather than wait until the data are evaluated.
- 'Many experiments can be run using a deck of playing cards (see Holt, 2007).
- 'Know what you are doing beforehand, particularly when working with assistants.

Case 2: Pit market (hand run)

This case study was written by Bradley Ruffle. A pit market is a suitable experiment for any level of student – sixth form up to postgraduate. It is particularly suitable for microeconomics, industrial organisation and public economics.

The primary benefit is to teach students the relevance and robustness of the competitive-equilibrium solution. Extensions allow for the demonstration of price floors and ceilings and the tax-liability-side equivalence theorem. The pit market is designed to be run by hand. For a computerised experiment that demonstrates the competitive solution, a double-auction market is the nearest equivalent.

Procedures

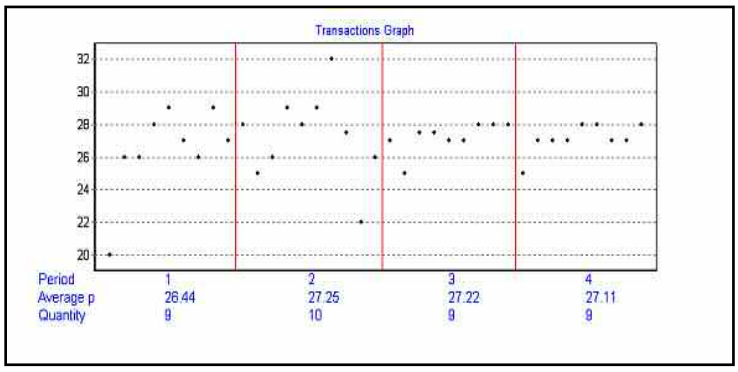
Prior to the experiment, prepare two sets of cards; one from which buyers' valuations are drawn and the other from which sellers' costs are drawn. You can use playing cards (see Holt, 1996) or prepare your own with any numbers you like on them. Make sure you choose the cards ahead of time so that the resultant supply and demand curves overlap where all or almost all of the units may be traded at a profit at the competitive price.

When the students arrive, divide them into two groups of buyers and sellers. Ensure that there are at least four sellers and four buyers for convergence to the competitive outcome. The groups of buyers and sellers need not be of equal size. Give each student a record sheet (included along with instructions for participants in the downloadable file (link below)) to track their progress. Distribute randomly one or more cards to each of the buyers and sellers from their respective deck of cards. After everyone has received one or more cards, allow students to enter the pit (a large open space in the classroom) where they freely negotiate with one another. When a buyer

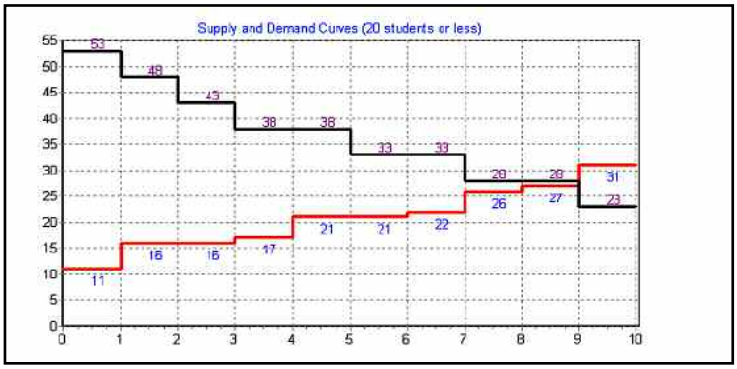
and a seller agree upon a price, they report their negotiated price to one of the experimenters and turn in their cards face down. To speed up convergence to the competitive equilibrium, recruit a helper from among the students to write the negotiated price on the board for all to see. Have a timekeeper announce the time remaining at regular intervals. At the end of the round, collect all unused cards, shuffle and redistribute randomly for the next round.

Discussion of results

In an introductory microeconomics course, the pit-market experiment can be conducted prior to teaching supply and demand and the competitive equilibrium, to motivate the relevance of these topics. I prefer to conduct it immediately following the lecture on these topics. Begin by showing students the results from their experiment in a transactions graph (software downloadable from the link below).



Also, show them the distributions of buyers' valuations and sellers' costs and ask them to explain why prices converged to the particular observed levels (27 to 28 in the example above). Surprisingly, in a principles course, you will rarely, if ever, hear the correct answer. Instead, students will claim that the observed prices 'are the average of all of the cards,' or 'at these prices buyers and sellers earn the same'. Use asymmetric supply and demand curves (like those in the figure below upon which the transaction prices above are based) in order to reject these explanations and focus on the profit maximisation motive and the forces of supply and demand



Review the textbook assumptions underlying the competitive-equilibrium model and discuss why some of these assumptions are unnecessary for convergence (e.g. full information and the inability to collude or form cartels) and others are imprecise (e.g. 'large' numbers of buyers and sellers). Market efficiency, alternative market institutions and the role of displaying transaction prices on the board (or information more generally) are additional topics for class discussion

Extensions

Expect prices and quantities to converge to the competitive equilibrium within three or four rounds. If you have additional time, you might want to shift either the demand or supply (this

requires a careful change in playing cards used), then it is fun to ask the students to guess what you did (based upon the changes of price and quantity). Also you might try imposing a price floor above the competitive price or a price ceiling below it. More interestingly, announce an n-unit tax on the buyers imposed on each unit traded and listen to them groan. The following period replace the tax on the buyers with an (equivalent) n-unit tax on the sellers. Afterwards, you can display to students the outcomes from these two tax periods; namely, that the net prices paid and received and the quantity traded are equivalent in the two tax treatments and the incidence of the tax depends solely on the relative elasticities of supply and demand. See Ruffle (2005) for a further discussion of experimental tests of tax incidence equivalence and the analogous theorem for subsidies.

Further reading

There are two textbook chapters that describe how to run pit markets: Bergstrom and Miller (2000) and Holt (2007). In addition there are two articles describing the procedures Holt (1996) and Ruffle (2003).

Downloads

http://www.econ.bgu.ac.il/facultym/bradley/Publications/pitmarket.zip

B. Computerised experiments.

When an experiment requires many rounds and complicated matching schemes it is easiest done on a computer network. A typical example is the Bertrand duopoly game where it is best to use two different types of matching (fixed/random) and/or two different group sizes.

A large selection of computerised experiments is available via Charlie Holt's Veconlab, Econport and our own FEELE website. Typing any of these keywords into Google will lead you directly to the relevant site. Veconlab offers the most information and help for a beginner. Once this system is familiar, it is easy to switch to our site which is deliberately of a similar design. Econport offers the best market experiment software, in particular for some experiments on financial markets. It is well-documented and easy to understand. How well it works in your computer lab depends on the ingenuity of your university IT group. The more complex and convoluted their firewall system, the less likely it is that the JAVA applets Econport uses will work and communicate without problems. This system has to be tested in every room where you intend to use it, preferably by your computing officers and IT services.

Advantages

Many of the most popular classroom experiments are offered via the Internet for free. Apart from this, the big advantage of computerised experiments is their availability and the ease at which beginners can get started. The student experience tends to be uniform. The results are available immediately and can easily be distributed to students for evaluation. In many cases, there are tools provided for simple analysis of the results. A large number of rounds can be run as well as several treatments. An experienced instructor or teaching assistant can handle a computer classroom alone, although it is easier, particularly if there are more than ten students, if one instructor concentrates on the software and another on the students.

Disadvantages

One main disadvantage is that the experiments are standardised. While there are some parameters a lecturer can change, there is not the broad opportunity for drastic innovation that a hand run experiment offers.

A second problem is the requirement to have a special computer room (and it helps to have a projection screen for the instructor's computer). There is the usual hassle of reserving the room and organising the students to meet there. On a practical level, there is a limit to how many students can fit in the room. When there is a large class, you may have to split it up into several groups. This creates an additional teaching burden. The alternative is to use tutorials, which may have a higher opportunity cost.

Another problem is that in many cases the experiment tends to run as fast as the slowest student. You constantly have to control the monitor program to see how the experiment is progressing and may also have to check the screens of individual students. Students often check their email or Facebook accounts and therefore the experiment becomes stuck. If the experiment runs too slowly, boredom may set in, creating a free-rider problem for students paying attention. Once things are started and running smoothly, there is also the danger that the instructors may check their email as well and not realise that there is a delay. Luckily there is now a KIOSK program that keeps the computer locked in the experiment (see the hints).

Finally, there is a risk of technical problems, such as software bugs, network failure and IT-related problems. This is particularly true for experiments using technically more advanced software. However, such problems have only rarely occurred with our software and that of Veconlab, since they require only a standard web browser.

Helpful hints for computerised experiments

- 'Place two students per computer to make decisions jointly. The students will discuss their options and this will typically lead to better decisions; they will 'catch on' quicker and have a deeper learning experience. It also helps foreign students who have difficulties with the oral or written instructions. Moreover, the amount of web surfing, etc. will be reduced. It also eliminates the danger of holding up the whole class with a single toilet break.
- 'Give instructions by email or handouts beforehand. Again, this helps non-English speakers and students with reading difficulties, in particular dyslexic students. Getting students to read and understand the instructions takes substantial time out of the experiment.
- 'Let students in different sessions play the same treatments in a similar order. Otherwise, they do not have the same learning experience.
- 'Try setting up and playing the experiment beforehand. One can do this by setting up a smaller number of players in different web browsers on a single computer's desktop (sometimes one needs different browsers rather than different tabs within a browser). This would help you not only decide if you like the experiment, but help decide what treatments and parameters to run. It is also important to have you see what the students see, for discussion and questions.
- 'Try configuring the experiment beforehand. Doing so saves time and reduces the number of errors or restarts. There is, however, a limit to what is possible, since many experiments need the full number of participants (or terminals) to be logged in before the experiment can be started. Luckily, both Veconlab and our website are currently enhancing the possibilities to change the number of participants on the spot.
- 'Prevent email checks by students. The terminals can be run in KIOSK mode which prevents students from using the computer for anything but the experiment. Via our FEELE website you can start the KIOSK program to either run our experiments or those on Veconlab (simply google 'feele kiosk'; this requires Internet Explorer).
- 'Distribute handouts explaining how to log in; reduces 'finger trouble' and saves time.
- 'Number the handouts beforehand and distribute one per computer; avoids headcount errors when configuring subject numbers.

Case 3: The hold-up problem (computerised)

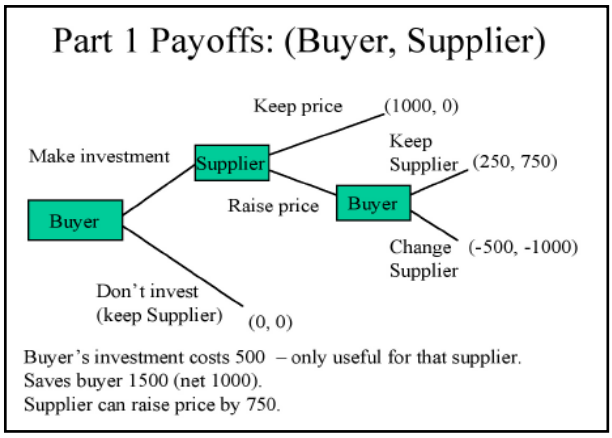
The hold-up problem is central to the theory of incomplete contracts. It shows how the difficulty in writing complete contracts and the resulting need to renegotiate can lead to underinvestment. We describe here the design of a simple teaching experiment that illustrates the hold-up problem. The model used is a simple perfect information game. The experiment can hence also be used to illustrate the concept of subgame perfect equilibrium and the problem of making binding commitments. In contrast to other perfect information games like the ultimatum or the trust game, the backward induction solution predicts well in our experiment. It is hence a good experiment to conduct in order to illustrate game theory before models where fairness considerations are discussed.

The hold-up problem (see Hart, 1995) results from situations where it is difficult to write complete contracts. When one party has made a prior commitment to a relationship with another party, the latter can 'hold up' the former for the value of that commitment. It is argued that the possibility of hold-up can lead to underinvestment in relationship-specific investments and hence to inefficiency. An often quoted (but also sharply disputed) historic example concerned the US car industry. Fisher Body had an exclusive contract to supply body parts for the cars of General Motors. They were the only ones who could deliver the parts according to the specifications needed by GM. In the 1920s there was a sharp increase in demand that exceeded all expectations that were held at the time when the contract was written. It is claimed that Fisher Body used this unforeseen development to hold up General Motors, amongst others, by increasing the price for the additional parts produced.

In our highly stylised game there are two players, the Buyer (aka GM) and the Supplier (aka Fisher Body). In a first stage, the Buyer makes a relationship-specific investment (i.e. decides to set up their line of production such that it depends on specific car body parts delivered by Fisher Body). Then (due to the unforeseen increased demand), the Supplier has the opportunity to raise the price (for the additional demand). In case the price is raised, the Buyer can, at their loss, change the Supplier.

We run two treatments of this game which differ only by one parameter. We sketch here the computerised version available via our FEELE website. More details, and a hand run version, are discussed in (Balkenborg, Kaplan and Miller, 2009a, b). In both treatments it is optimal for the Supplier to hold up the Buyer and for the Buyer to accept the hold-up. In the first treatment it is optimal to invest even if there is a hold-up while in the second treatment it is better not to invest due to the hold-up. We choose this set-up because it allows students first to learn that there will be a hold-up and then to experience the economic consequence of underinvestment caused by the hold-up problem. We tend to run 8–10 rounds of each treatment with a different random pairing for each round. An even number of players is needed.

The first game is given in game tree form in the following graph.



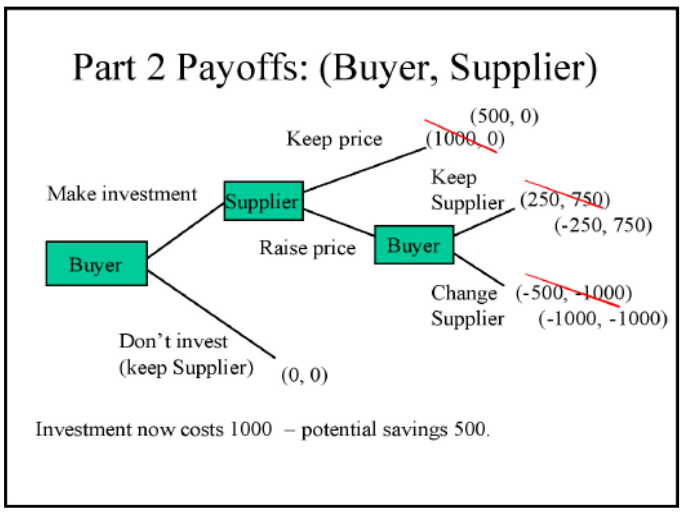
If no investment is made, both players get zero. The investment costs 500 and the gross value produced is 1500. In the initial contract all surplus goes to the Buyer and they get 1000 while the Supplier makes zero profit. The Supplier can hold up the Buyer by raising their price by 750 and leaving the Buyer with 250. The Buyer could change the Supplier, but this hurts everybody. The Buyer loses their investment and the Supplier loses all their business with the Buyer.

Once the number of players is determined, we can complete the set-up of the experiment and give the students the access code to log in to the experiment via our website. They are then assigned the roles of Buyers and Suppliers and can work through the computerised instructions. In each period the program randomly matches Buyers and Suppliers. Sequentially the game is then played, with first the Buyer deciding whether to invest, followed, if applicable, by the Supplier's decision whether to raise the price and the Buyer's decision whether to change the Supplier.

In the following screenshot the Supplier is asked to keep or raise their price. The design of the screen is very simple to keep the emphasis on the basic decision.

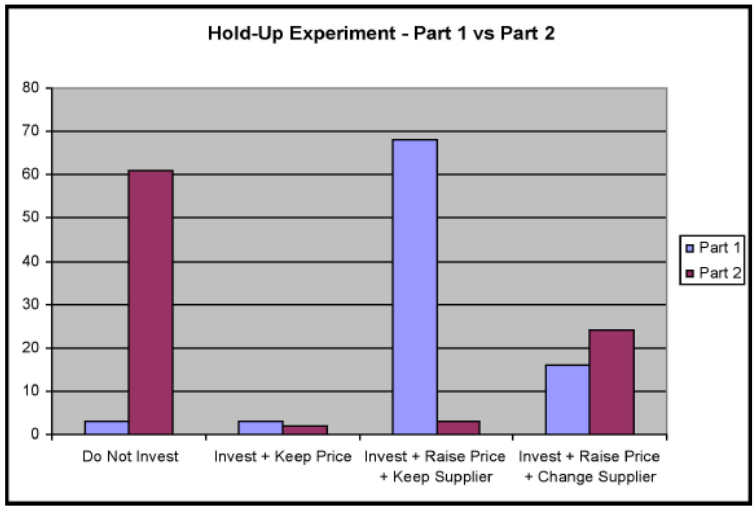
Typically subjects learn quickly to play the backward induction equilibrium. This means that the Buyer learns that their threat to change the Supplier is ineffective because it is too costly, and therefore the Buyer is held up, i.e. the price is raised. It still pays for the Buyer to make the investment.

This changes in the second treatment. The only number we alter is the cost of the investment which is raised to 1000. As a consequence, the Buyer loses from the investment if they are held up. The payoffs are now illustrated in the following game tree.



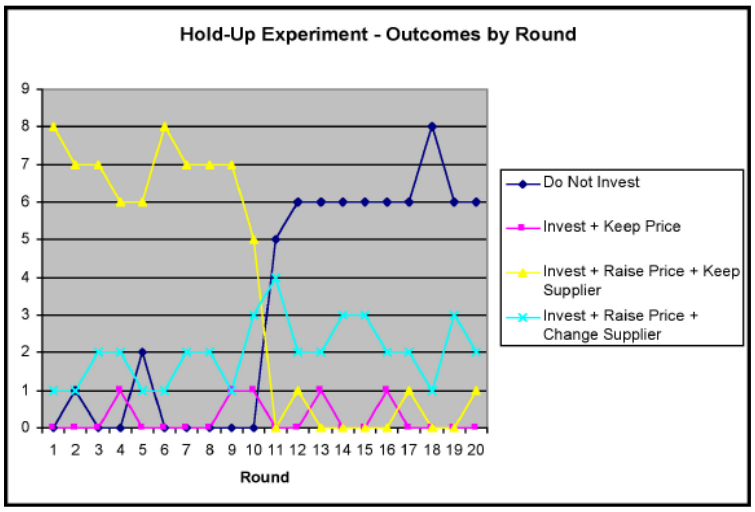
In part 2 of the game the Suppliers are typically held up when possible, and the investment is made much less often.

The next figure shows how often each possible outcome arose in the experiment.



Notice that there is a minority of Buyers who switch Supplier after the price has been raised. (This did not happen in all the sessions we ran.) The rationality of these Buyers is an important point for class discussion: what were they trying to achieve?

The second figure shows the development from period to period.



Case 4: Price competition (computerised)

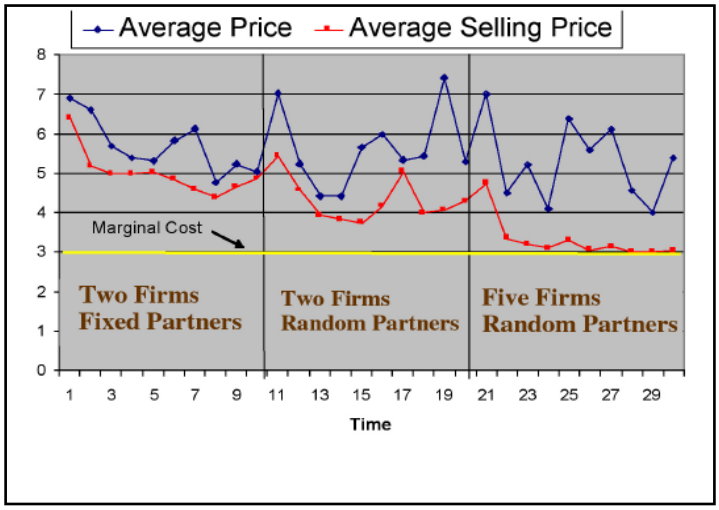
One of our favorite computerised experiments is on Bertrand competition (available on both Veconlab and FEELE). We have had success running this experiment with students from sixth form level up to corporate executives. Students act as firms in a market. Each period in time, they choose prices. The customers (played by the computer) go to the firm with the lowest price (in the event of a tie, the demand is split equally). Each firm has constant marginal cost and, given the demand of the consumers, the Nash equilibrium is for firms to charge a price equal to their marginal cost, leading to zero profits (see Kaplan and Wettstein, 2000).

You can see the results of the experiment in the figure below. These results are typical. With two firms in a repeated situation, the prediction of perfect competition fails. Even without explicit communication, firms can collude. To quote an anonymous student

'I learnt that collusion can take place in a competitive market even without any actual meeting taking place between the two parties.'

This changes quite drastically for a larger number of firms and random matching. Here, the competition is fierce and the profits are driven out of the market. To quote another student

'Some people are undercutting bastards!!! Seriously though, it was interesting to see how the theory is shown in practice.'



It is especially important in this experiment to display the selling price in addition to the average price chosen since that indicates the profits in the market. Only by seeing the selling price can one clearly see the strength of the equilibrium prediction.

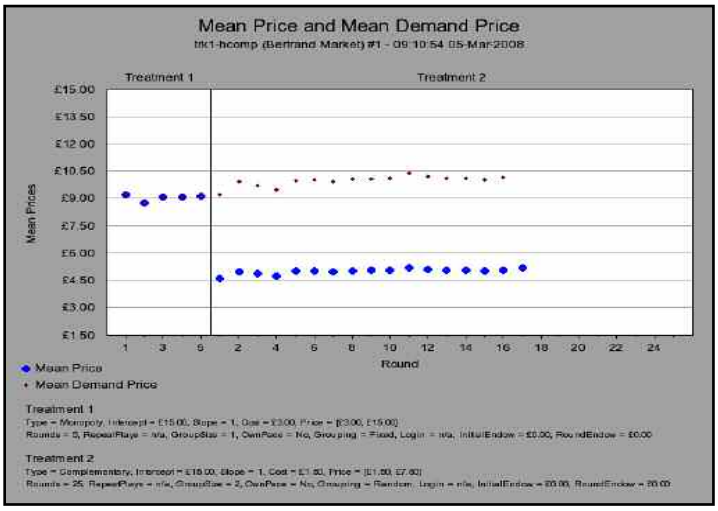
Bertrand competition with complements

A lecture on industrial organisation will discuss the advantages and disadvantages of different market structures. A counter-intuitive concept is that more competition is not always better. Duopoly may be worse than monopoly. This is the case when a monopoly sells two complementary goods and is then split into two firms to sell each good separately. The theoretical analysis shows that consumers pay a higher price for a pair of commodities after the split. In a crude analogy, being robbed twice is worse than being robbed once for the consumer. The analysis is clearly relevant for competition policy: for instance, the decision on whether to split Microsoft up into two separate companies, one that sells the Windows operating system and one that sells Microsoft Office (Excel, Word, etc.) Krugman (2000) argues just this in his column entitled 'Microsoft: What Next?' In agreement with the economic analysis, the US government agencies decided against such a split.

To convey this concept, FEELE provides a computerised experiment based upon a similar hand-run experiment by Beckman (2003).

Looking at the following graph of results, we started students in a monopoly situation facing a demand of 15p and a constant marginal cost of 3p. The profit maximising price is 9p. Students found this price fairly rapidly. When we broke up the company into two separate companies producing complements and competing in a duopoly, there was a clear increase in the price to over 10p (the equilibrium price is 11p).

It is of particular teaching and learning value that the model is just a seemingly minor variation of the standard model of price competition which we use in microeconomics. (The standard model uses perfect substitutes instead of perfect complements.) For the standard model one observes sharp cut-throat competition which erodes profit possibilities: a completely opposite result.



One can run a combination of both Bertrand games against former subjects with the following: http://www.projects.ex.ac.uk/feele/feele_experiments/subject_access.php?quick=bertrand

Case 5: Bank runs (computerised)

Once relegated to cinema or history lectures, bank runs have become a modern phenomenon that captures the interest of students. Now a simple classroom experiment based upon the Diamond-Dybvig Model (1983) can demonstrate how a bank run, a seemingly irrational event, can occur rationally. The computerised version of this experiment is available from our FEELE website

This model captures elements of what a bank does. We will focus on the conversion of long-term loans (mortgages) into short-term deposits. It is this conversion that leads to the fundamental problem of bank runs

In the model there are depositors and a bank. There are three time periods: yesterday, today and tomorrow. Depositors placed money (say £1000) in a bank (yesterday) before learning when they need the money. Depositors either need their money today (impatient) or tomorrow (patient). There is a 50% chance of being either type. The depositors that need money today get relatively little utility for the money tomorrow. The depositors that need their money tomorrow can always take the money today and hold onto it.

The bank has both a short-term and a long-term investment opportunity for the money. The short-term investment (reserves) is locking the money in the vault. This investment returns the exact amount invested. The long-term investment returns an amount R tomorrow. It is illiquid and returns only L<1 today. The depositors that invested £1000 yesterday have a contract with the bank. They can withdraw their money today and receive £1000 or wait until tomorrow and receive R*£1000. The bank meets these potential demands by taking half as reserves and half in the long-term investment.

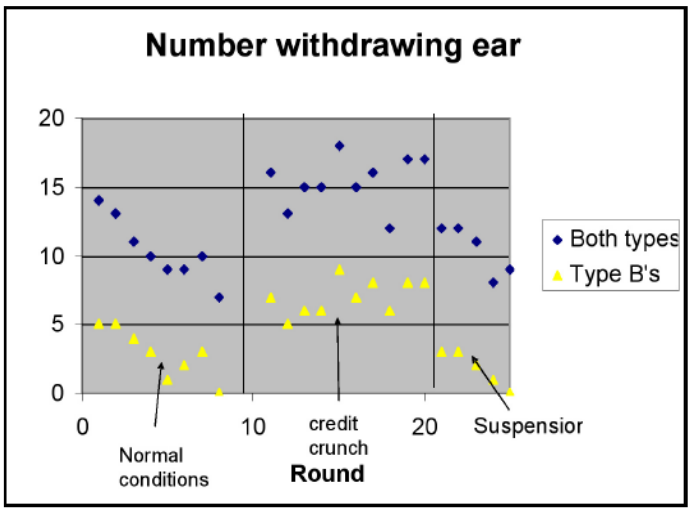
If all the depositors withdraw the money according to their types, then the bank will meet all the demands. In this case, each depositor has an incentive to indeed withdraw according to their type. Hence, all impatient depositors withdrawing today and all patient depositors withdrawing tomorrow is a Nash equilibrium.

While the contract is fulfilled in this Nash equilibrium, in other cases the bank cannot always remain solvent. If too many depositors try to withdraw today, it will not be able to meet the contract tomorrow. It is then optimal for all depositors to withdraw today. This other equilibrium is a bank-run equilibrium.

The experiment is then to see under which conditions a particular equilibrium arises.

Results from a computerised session

The following figure shows the results of a classroom experiment run in Exeter on a single group of 18 students. Investor types (roles) were randomly re-allocated at the start of every round, with 9 students being type A (impatient) investors and 9 students type B (patient) investors. The experiment lasted 23 rounds and there were 3 treatments. In the first treatment, lasting 8 rounds, conditions were set for R=2 and L=.5 (we call this 'normal conditions'). Toward the last few rounds of this treatment, the students settled into the normal equilibrium. Type As withdrew today and type Bs withdrew tomorrow. In the second treatment, lasting 10 rounds, we had R=1.1 and L=.11. We might refer to this as a 'credit crunch'. Tight conditions for the bank: not much leeway if depositors try to withdraw early. In this treatment, there was a run on the bank. In the third treatment, lasting 5 rounds, we also had R=1.1 and L=.11, but payments were halted after 9 depositors withdrew from the bank early. This suspension stopped the run on the bank. There was an instant effect that steadily improved.



There are many topics for lively discussion. Obviously, it is worthwhile to connect the experiment to current events. Another topic is to discuss various ways to help avoid a bank run (suspension, deposit insurance, the government stepping in). While not in the experiment or model, this leads to discussion about moral hazard.

C. Homework experiments

Homework experiments are simply classroom experiments that are meant to be played at home instead of during class hours. The most basic is a simple one question and answer format with feedback and summary of the results discussed in class. There is an elegant website by Ariel Rubinstein that is designed especially for this purpose. A slightly more complicated homework experiment is to run a more advanced individual choice experiment with some immediate feedback (for instance we have a computerised Monty Hall problem that is played several times). Finally, it is possible to have students play against a fictitious player such as a robot playing a particular strategy or against prior human players. The first example we know of using this option is Charlie Holt with his traveller's dilemma experiment available on Veconlab. We now offer for most of our experiments 'quick log-in' versions where you play against a past group of participants.

Another innovation by Charlie Holt is running the standard multi-player experiments by having students log on from home at a specific time in the evening. There are also experiments (such as prediction markets) that can be run over several weeks. In fact, such homework experiments (such as the Iowa political stock market) predate the web.

Advantages

The main advantage of a homework experiment is that it can save lecture and tutorial time. There is very little hassle and one does not have to worry about time limits. They provide great flexibility to both students and lecturers.

Disadvantages

Overall, the lecturer has little control with homework experiments. There is no guarantee the student is the one playing the game. If the experiment requires interaction among subjects, there is no means to stop collusion. If it is an individual choice experiment, one student can advise another. Without additional incentives the overall participation rate can be low. Though for some experiments we have had the opposite problem of some students playing the game several times in order to beat the previous performance. Currently there is still a limited variety of home-run experiments which every student can do by him or herself. One can invest the extra co-ordination of running group experiments at a specific time. Even with these one needs to keep the group size small so one player does not hold the rest up (toilet breaks are problematic here).

Helpful hints for homework experiments

- 'Use some sort of incentive for participation.

Case 6: Price discrimination (homework)

In essence students are given here the repeated opportunity to select the best price schedule when various forms of price discrimination are possible. The student is the seller who can sell up to two identical items to each of two different buyers. Each item costs £5 to produce. The computer takes the role of the two buyers who have the following valuations for the item:

	1 item	2 items
Buyer A	£20	£20
Buyer B	£30	£40

As illustrated in the table, the second item adds no value for buyer A, but a value of 10 for buyer B. Twenty rounds are played. In the first five rounds the same, uniform price has to be set for each unit sold to any buyer (uniform price, no price discrimination). In the next five rounds different prices may be charged to different buyers, but the same price must be taken for each unit (third-degree price discrimination). In rounds 11–15 the prices have to be the same for both buyers, but different prices can be charged for different units (second-degree price discrimination). Finally, in the last five rounds different prices can be taken per unit and per consumer (first-degree price discrimination).

It is best to let students do the experiment before price discrimination is discussed in the lecture. One can then discuss each scenario in a classification of price discrimination. The lecturer can ask the students how much money it was possible to make in each scenario and why. It will become transparent why the detailed form of price discrimination matters.

In analysing results in second year microeconomics, 90 students participated in our experiment. Only two managed not to get the right answer ever in the first five rounds. The next five rounds are more difficult and about 25% have difficulties in finding the correct answer. Rounds 11–15 are the hardest and only 50% get it right most of the time (i.e. at least two times out of five). There is only a slight improvement for the last five rounds where about 40% of the students never get a profit above 40 and hence do not see how to get a higher profit out of buyer B by

discouraging them to buy a second unit. Admittedly, we did not give incentives for good performance and so we see that there is a substantial fraction of non-serious answers (about 20%). Still, it is revealing to see where some of the students have serious difficulties to which one can respond in a class discussion

5 Integration into a module

In using experiments there are many challenges that must be overcome. These are for lecturers, students and the modules overall. Lecturers have a limited amount of time in lectures. Students have limited time too (both inside and outside the classroom). Proper assessment and motivation of students can be a challenge as well. Here we try to answer a number of issues that need to be considered when implementing experiments

1. Which particular experiments to use?
2. Which type of experiments to use (homework, hand run, computerised)?
3. How many experiments to use?
4. How to count experiments toward the final mark?
5. How to base exam questions on experiments?

Two brief case studies on modules using experiments and their student evaluation

Case 1: Intermediate Microeconomics (100 students).

Intermediate Microeconomics in Exeter, part 2 (100 students, lectures, surgeries and experimental sessions). We ran simple 2x2 games and auction games within the lecture. Students had to do 8 out of 6 computerised assignments (Wiley Plus), 3 homework experiments and 6 experimental sessions, in order to get 10 out of 100 marks for the module. Apart from that, participation was voluntary, to allow for different learning styles. The incentive was for participating, not for getting it 'right'. (We intend in the future, however, to have for each experimental session a short questionnaire with simple questions of understanding.) It was not expected that every student would do every session. Each experimental session was run twice to allow many students to participate. Participation in experimental sessions was increasing over the year. The lectures would frequently refer back to the experiments, discuss the results and compare them with the theoretical analysis. The module was surprisingly successful in the students' evaluations, with an average above 4 out of 5 on the goodness index, and the highest score for the question on how useful the experiments were for the module. The response rate was higher than for many other comparable modules (40%). Exam results were similar to those in previous years, however we did not make a systematic evaluation.

Case 2: Third Year Option (30-40 students).

Another type of module is where each lecture is designed around experiments. Each week there is an experiment followed by a lecture based upon the experiment. This has worked successfully in both a Corporate Strategy course for executives (10–15 students) and a third-year course (30–40 students). The third-year course was meant for economics students that had taken microeconomics and had a diverse number of topics. There were experiments on markets and market structure: Bertrand Competition, Bertrand Complements, Vertical Markets, and Double Auction with Taxes. Experiments on multi-player simultaneous choice games: Bank Runs, and Network Externalities. Two-player sequential games: Hold-Up Problem, Team Draft, Ultimatum Game, and Signalling. Also there were several individual choice experiments: Price Discrimination, Lemons Game, Monty Hall, and Search.

For the third year module we have detailed student evaluations for 14 classroom experiments. Overall, students found they learned from experiments 3.8 on a 1–5 scale. They rated the fun 4.05. This order is consistent with 12 out of the 14. When there were technical difficulties in running the experiments, it significantly hurt the ratings in both categories. In addition, homework experiments (all individual choice) were less popular. The most popular experiment by average rank of learning and fun was the Bertrand Competition experiment (run on FEELE) which was first in fun and second in learning, following by Team Draft (FEELE), Ultimatum game (Veconlab), Signalling (Veconlab), and Bank Runs (FEELE). Another noteworthy experiment was a tax incidence experiment using Econport's Marketlink double-auction software. It had an average rating of 4.41 out of 5 for fun, even though students rated the learning only average.

Which particular experiments to use?

Here are some recommendations:

Microeconomics is the module with the most experiments developed for it, so it is fairly easy to fill.

Macro: Denise Hazlett's website has several experiments. In addition, for a large class, Currency Attack (available on the FEELE site) works well.

Money and Banking: There is the bank-run experiment described here as well as a computerised Kiyotaki-Wright experiment based upon an experiment by Denise Hazlett.

Finance: The Holt bubble experiment is recommended. The double auction on Econport is able to impress many, in particular the version for an asset market. During the opening of a new finance centre at Exeter we demonstrated this software and many of those in industry were hooked. There are also some experiments that can be used to introduce behavioural finance. For one, the Monty Hall experiment shows how poorly people do as individuals, but things look quite different when the game is placed in a market setting (one can refer to a Journal of Finance article on this). An experiment that proved popular with the students is the Being Warren Buffett experiment. This was developed at Wharton and we have a computerised version of it on FEELE.

Game Theory and Decision Theory: The Rubinstein website is an ideal source for homework experiments on both topics. Veconlab offers some excellent experiments for game theory, but also for Bayesian learning. Team draft and the Hold up experiment on the FEELE site are good introductions to backward induction. Quick and simple hand run experiments, e.g. many of the questions used by Kahnemann and Tverski and simple experiments on one-shot 2*2 games. For repeated games one can use a repeated prisoners' dilemma or one can play a repeated Cournot duopoly using Veconlab.

Industrial economics: Again, this is a module for which plenty of experiments exist, for instance on Veconlab or FEELE.

Introductory economics: The size of the lecture is crucial. The guessing game, a simple insurance game (see the classroom experiments site on wikiversity), and a hand-run public good game can be done with little effort. If at all possible one should run a double auction or pit market experiment to discuss market equilibrium. The student activity on decreasing marginal returns using tennis balls or plastic flower pots (http://www.economicsnetwork.ac.uk/showcase/hedges_tennis.htm) is highly recommend and can be done with a sample of students even in big lecture halls. A colleague of ours just ran (with some help from other staff) the international trade game (see Sutcliff's handbook chapter (2002) on Simulations, Games and Role-play) in a group of 100 students.

Which type of experiments to use (homework, hand run, computerised)?

Type guidelines

- 'Large lectures (>100 with no tutorials): Use short hand run or homework experiments. It is possible to be more sophisticated with wireless technology.
- 'Medium lectures (40<#<100): Make use of computerised experiments or (more labour intensive, but also more fun) hand run longer experiments in tutorials.
- 'Small lectures (<40): You can use computerised experiments in place of lectures if you have access to a computer room.

How many experiments to use?

There is no minimum or maximum. We have had classes that have run an experiment a week and particular lectures (like one on game theory) that run several short experiments in a single lecture. In microeconomics we ran weekly experimental sessions on a voluntary basis. We had a regular following, but also people who never came. It is important for the students not to feel overloaded and to experience a variety of teaching approaches. We think that one, sometimes very short, sometimes longer, experiment per topic is ideal.

How to count experiments toward the final mark?

We found the most successful strategy for employing experiments has been to give marks for participation, not success, in an experiment. Participation was optional and a potential replacement for turning in homework. Also, we have successfully required lab reports that consist of explaining students' strategy in the experiment, analysing experimental results and answering a few simple questions (short answer/multiple choice) on problems relating to the experiment. Implementing a computerised version of such a lab report is quite simple using the Veconlab's surveys.

Dickie (2006) confirmed Emerson and Taylor's findings that experiments improved TUCE scores: however, they found that this benefit disappears if one bases credit on performance. We guess that this may be due to at least a perceived randomness in performance, although we have noticed that the same students do well across several experiments throughout the term. In any case, perceived randomness can not only hurt evaluations, but could raise the alarm of a teaching committee. Giving prizes for performance seems to draw no criticisms. There does not seem to be an objection to a lottery for a prize just a lottery for a grade.

We feel it is useful to have exam questions based upon the experiments: more the carrot than the stick. This leads us to the next point.

How to base exam questions on experiments?

There are studies showing that experiments helped to improve test scores both on the TUCE (general knowledge) test and in standard exams. Still, the students are unaware of this, and there is always room to tie things together more closely. Moreover, common sense tells us that for a quantitative exam, having a tutorial based upon mock questions similar to the exam is liable to boost scores more than running an experiment with only a tangential connection. The first year we ran experiments, we found that a handful of students thought that the experiments were at the expense of valuable tutorial sessions, and were being run for the benefit of the lecturers. Clearly, tying the exam more closely to the experiments should help.

In many cases, experiments can help students learn a particular exam question. For instance, the network externality experiment on the FEELE site is specifically based on a chapter in Hal Varian's Intermediate Microeconomics book. More generally, the signalling experiment on Veconlab is extremely helpful in teaching signalling to undergraduates. We believe this may have the most value added, in that without experiments we found it difficult to teach signalling. Likewise, the price discrimination experiment is based upon a style of test question, rather than the other way around.

For other cases, the experiments may help general understanding, rather than learning a particular algebraic manipulation. With Cournot duopoly, an experiment may help students grasp simple comparative statics, while algebraic manipulations are subject to sign errors.

Naturally, any exam question can be used as a homework question, but one can also have homework questions based upon analysing the data from an experiment. The FEELE site has an option to create a link of the results in both numeric and graphic form for the students (via the button of 'View Results (Subject)'). This makes the task fairly easy. Since the data from the experiment are available, they can be used to develop exam questions: for instance, to what extent does the experimental data fit the predictions of the theory?

General hints

- 'Usually do experiments before covering the material in the course.
- 'Let students participate in preparation, execution and evaluation (especially in an experimental class).
- 'Relate some exam questions to experiments.
- 'Do not be too obsessed with preserving a research environment.
- 'Use two students per computer to induce discussion and reflection.

6 Resources

There are many resources available via the web. A good starting point is a wikiversity site that we started called 'economic classroom experiments'. To get there just google 'economic classroom experiments'. This describes how to run many classroom experiments and has links to all the other resources mentioned here. You are invited to help to develop this website. If you find any links missing, please add them. If you can report on a teaching experiment you conducted, you are cordially invited to make your report available via this website. The site is among a selected group of Wikiversity Featured Projects.

If you wish to run a computerised classroom experiment, the easiest site to get started is Veconlab, developed by Charlie Holt. This site consists of almost all the basic economic classroom experiments. Holt has also written a textbook Markets, Games, and Strategic Behavior (2007) that has a chapter for many of the games available on this site. The site is very reliable and works anywhere you have a web browser.

Another site, FEELE, is one which we developed as part of an FDTL5 grant. It mimics Holt's site and is meant to be a complement. Since we offer KIOSK you may also want to start Veconlab experiments via our website.

Econport has a beautifully written version of the double auction (Vernon Smith's basic demand and supply curve experiment) with extensions to financial markets. The site also offers a very useful online handbook for micro economics and much more.

For a game theory or microeconomics course, one should take a close look at Ariel Rubinstein's site. He makes it fairly easy to design the module as a whole and track student responses. All the experiments are homework experiments on decision and game theory and are played via the web so do not take up lecture time.

Denise Hazlett has details of six of her macroeconomic experiments via the website http://people.whitman.edu/~hazlett/econ/.

Last but not least, there are plenty of resources and links available on the webpage of the Economics Network http://www.economicsnetwork.ac.uk/themes/games.htm

7 Conclusions

We hope the above has whetted your appetite to start using economic classroom experiments as a tool for active student learning. We have discussed advantages and disadvantages and given a number of concrete hints. We would like to encourage you to try them even if you are in general somewhat sceptical of experimental research. See for yourself how a simple experiment can

demonstrate to students that economics 'works'. Discuss with your students what can and cannot be inferred from the experiments. You may at first decide to adapt only a small portion of your module in order to try out a single classroom experiment or a few short homework exercises. Even this, we think, is time well spent.

We realise that a major cost to the instructor of using experiments is the uncertainty of how they will work and the fear that it will take significant effort to introduce them. It may seem easier to just keep using the same old teaching materials. We hope that the concrete examples in this handbook chapter will reduce the perceived cost and encourage you to get started.

If we have managed to convince you that the benefits outweigh the costs, then please contact us with any questions, suggestions or simply to report on your experience. Good luck!

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Detection and Prevention of Plagiarism in Higher Education

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Contents

Notes

[i] The usual disclaimer applies.

[ii] This chapter builds on (and extends) a previous version written by Jeremy B. Williams entitled Plagiarism: Deterrence, Detection and Prevention which was written for the Economics Network in 2005.

1. Introduction

Charles Caleb Colton once observed that ‘imitation is the sincerest form of flattery’. Whilst this may be apt in many instances, there is a point in the intellectual space where imitation is more akin to theft. This is certainly the case in the higher education sector where, in the internet age, the increasing incidence of student plagiarism has become an ever-increasing cause of concern.

Plagiarism may be defined as the use of another person’s words and/or ideas without acknowledging that the ideas and/or words belong to someone else for someone’s own benefit. It is not a new phenomenon, but there is little doubt that it is a growing problem that lecturers and universities need to address systematically if the underlying causes, rather than the symptoms, are to be addressed.

The problem is not limited to Economics but given that Economic departments tend to have a significantly higher number of students than other degrees, above average class sizes and a significant proportion of international students, it is arguably more likely to be of especial relevance to economics academics.

At the heart of the problem is not only the increasing availability of easily accessible electronic resources, whereupon it has become so much easier for students to ‘cut and paste’ slabs of unedited text but it has become much easier to order a complete, bespoke piece of work from one of the many available online providers. This can sometimes lead to assignments being submitted that are inadequately referenced, highly unfocused or, worse still, largely or entirely someone else’s work.

This chapter considers the various strategies currently being employed to stamp out plagiarism. These include the use of ‘honour codes’ that incorporate punitive systems to discredit plagiarists, the various proprietary and freeware packages available for the electronic detection of plagiarism. More importantly it discusses some practical prevention strategies that includes designing and implementing types of assessments that make plagiarism more difficult to take place.

The discussion will concentrate, first of all, on the defining characteristics of plagiarism and how it manifests itself in the current university environment. This is followed by a brief discussion on the factors deemed to be responsible for plagiarism, and the mechanisms subsequently employed by various institutions to deal with its increasing incidence. The discussion concludes by arguing for an integrated approach founded upon a commitment to assessment regimes that reward critical analysis rather than content regurgitation.

To proceed down this path, it is further argued that assessment items need to be designed in such a way as to present students with authentic learning environments: that is, settings for assessment that engage students with real and relevant tasks, with palpable and practical learning outcomes. Of all disciplines, economics is one that readily lends itself to this approach.

The main aim of the discussion, therefore, is to demonstrate that, while introducing measures to improve deterrence and detection of plagiarism is important, this is essentially a reactionary approach. It is unlikely to yield lasting benefits and might not be efficient to stamp out the most serious types of plagiarism. It is argued that the source of the problem is systemic, and that the focus needs to be on *prevention* of plagiarism through the use of innovative and engaging assessment. To this end, it is further posited that information and communications technologies (ICTs) can be of invaluable assistance – the very technologies that have led to the burgeoning student plagiarism problem in the first place.

2. Plagiarism in Higher Education

'Plagiarism' derives from the Latin word *plagiarius*, meaning 'kidnapper' or 'abductor'. It is the theft of someone's creativity, ideas or language; something that strikes at the very heart of academic life. It is a form of cheating and is generally regarded as being morally and ethically unacceptable.

It should not be surprising, therefore, that plagiarism is such an emotionally charged issue and that agreeing on what plagiarism is might not always an easy task, especially when we talk about punishing this practice. Plagiarism can be the result of sloppy referencing, honest errors and different cultural and ethical values with respect to academic work.

Therefore, one key aspect when we deal with plagiarism must be the *intent* to plagiarize and the fact that intent is not always easy to prove might explain the very small number of students that are punished with expulsion from their universities (see section 2.3).

Top Tips 1

1. Always ensure that you are familiar with your institution's plagiarism policies and regulations, and be able to explain them in jargon-free terms to the students.
2. Strike an appropriate balance between 'encouragement' of the learning process and the potentially serious consequences if plagiarism is proven.
3. A worthwhile exercise is to spend some time in class (or interactively online) going through real examples of what does and does not constitute acceptable practice. A suggested method of doing this is contained in section 2.5.

2.1. The different types of plagiarism

Given the dramatic increase in its incidence, most universities around the world have made a point of including definitive statements on plagiarism in student handbooks and on university websites in the hope that no student standing accused of plagiarism can mount a defence on the grounds of their ignorance[i]. The fact remains, however, that even proceeding on the basis that all students are diligent enough to read the 'fine print' in university policy documents, the scope of plagiarism is such that it incorporates a range of offences not easily defined in the space of a few sentences. In short, there will be instances where the extent of plagiarism is very serious, others when it will be relatively minor, and times when it falls somewhere in between. As a consequence, a range of policy responses is required to match the gravity of the offence.

It is certainly important to send out a clear signal to the student body that plagiarism will not be tolerated, but it is also important to acknowledge the

possibility of genuine cases of unintentional plagiarism, and to be wary, therefore, of over-zealous policing of plagiarism. In any case, it is essential that the institution be capable of distinguishing between intentional and unintentional plagiarism.

Without wanting to over-generalise, plagiarists may be identified as one of the following three types:

- the lazy plagiarist;
- the cunning plagiarist;
- the accidental plagiarist.

The 'lazy' plagiarist is generally an academically weak and otherwise under-motivated student, the type who would happily take the work of someone else in its entirety, do little more than to change the name on the paper and claim it for their own. This type of student may use the 'cheat sites' or simply steal the work of others – maybe that belonging to a student who studied the subject in a previous year. For this type of plagiarist, if a ready-made answer to a question cannot be found electronically, it simply cannot be worth having. The development of an educated opinion, a lively inquiring mind, a creative impulse: these things are not worthy of consideration. As a student's e-mail signature once read: 'Clay's Conclusion: Creativity is great, but plagiarism is faster'.

For those student plagiarists who elect not to procure work from their colleagues or consume the services of the online paper mills, there is still an abundance of other point-and-click plagiarism opportunities. Plain, old-fashioned laziness is certainly a factor, but internet-inspired indolence has given rise to a more refined form of sloth. The 'cunning' plagiarist is more sophisticated than the lazy plagiarist and takes full advantage of these abundant opportunities: they are quite clear about what plagiarism is, but work hard to avoid detection. Content is cut-and-paste from a variety of sources on the Web (and possibly from other students' papers), with a view to manufacturing an answer. They may also attempt to cover their tracks through the provision of incomplete or inaccurate bibliographic details in their list of references, which make it more difficult to track their misdemeanours (Renard, 1999).

The most sophisticated lazy plagiarist is well versed on the existing plagiarism detection tools (see section 2.3 below) and knows how to avoid detection by, for example, changing every 7th word of the original text so that the automated plagiarism detection software does not pick up the offense[ii].

The 'accidental' plagiarist, by contrast, is not in the least bit devious. Their transgressions arise typically as a consequence of inexperience, poor study skills, local academic norms or some combination thereof. Such students typically insert slabs of unattributed text in their essays and, when challenged, will be either embarrassed by their sloppy referencing or genuinely surprised that they have been challenged at all, claiming ignorance of the system.

In many instances, it is international students who fall into this latter category, particularly those from East Asian countries. Apart from a lack of exposure to western academic norms when it comes to academic work, these students can sometimes experience difficulty in constructing a critically analytical essay out of cultural respect for those in authority. This is sometimes mistaken for poor writing ability and/or a lack of ethics when the reality might be somewhat different. In Confucian cultures, for example, conventional wisdom is that the best ideas are those of the ancients, and their philosophy and insights are so wide-ranging that to challenge those ideas would be interpreted as quite an audacious act. Instead, memorisation and recitation are valued. It follows that to challenge 'the truths' handed down by 'the sages' who author textbooks and write lecture notes would be counter-cultural for students of this tradition (Smith, 1999).

Not everyone accepts this view, of course, and a standard response is that it should be a case of 'when in Rome do as the Romans do', with students observing the cultural norms of the country in which they are studying rather than those of their home country. Without going into an in-depth discussion of the validity of this argument, it is probably fair to say that first-year students, in particular, might be extended some latitude, at least until they have had an opportunity to commence with the cultural transition and adjust to the different cultural norms.

Top Tips 2

4. Always be sensitive to cultural differences that may confuse students' understanding of the plagiarism concept, especially those who are new to your country's education system.

5. Encourage students to check with their tutor prior to submission as to whether they may have inadvertently broken (accepted) practice.

In any event, some allowances will have to be made where assignments must be written in a second or third language. This is not to condone wholesale plagiarism; simply to recognise that writing in a foreign language engenders a strong temptation to get linguistic assistance.

Finally, it is also important that the department has a unified position about how to deal with and communicate about plagiarism. On the one hand, the message about plagiarism will be assimilated much faster if all academics use a common language and apply a similar approach on how to deal with plagiarism cases. On the other hand, coordination among academics will help come up with efficient prevention strategies by for example applying a progressive approach to deal with plagiarism (this might include, for example, teaching students about plagiarism by setting an intermediate formative assessment before the summative assessment or allow first year students to view the Turnitin's Similarity Report before submitting the final version of their assessment – see section 2.3).

[i] Many universities now require students to sign 'student contracts' that include specific regulations on cheating, collusion and plagiarism. For an example see University of Leeds student contract web page http://students.leeds.ac.uk/studentcontract.

[ii] When academics set a Turnitin assignment (see section 2.3), they can set a threshold minimum numbers of words to be picked up by the similarity report. Setting a high limit (say 7 words) will exclude a large amount of sentences that are not of sufficient length from being considered in the similarity report making it much easier and faster to interpret the results.

2.2. The motivations for plagiarism

To some, the increasing incidence of plagiarism in the higher education sector (see next section) may be looked upon as perfectly acceptable behaviour. According to author and satirist Stewart Home, plagiarism 'saves time and effort, improves results, and shows considerable initiative on the part of the plagiarist' (cited in Duguid, 1996). This line of thinking is predicated upon the notion that there is nothing sinister about the liberal use of other people's ideas. To plagiarise is not to steal another's property, it is simply about the spread of information and knowledge.

Indeed, prior to the eighteenth-century European Enlightenment, plagiarism was useful in aiding the distribution of ideas and, in this sense, can be said to be an important part of western cultural heritage, up to that point in time. One might argue further that, with the new social conditions that have emerged with the widespread use of ICTs, it has once again become an inevitable part of contemporary culture, although for rather different reasons (Critical Art Ensemble, 1995). Allied to this is the increasingly results-driven education system, with its associated league tables, as well as the increasingly difficult labour market conditions for graduates, resulting from the UK's wider-access policy for higher education.

Taking a more sceptical view, if we accept that it is typically the academically weaker students who tend to engage in the various forms of plagiarism, it is unlikely that these individuals will, consciously or unconsciously, be part of any crusade to spread information and knowledge. On the other hand, as the statistics cited in the next section would tend to indicate, it cannot be just they who are indulging in unethical practice (unless the majority of students can be described as academically weak!). Why is it, then, that students are resorting to plagiarism in increasingly large numbers?

Irrespective of a student's ability, pressure to plagiarise can emerge because of a variety of influences. These include, for example:

- poor time management skills (a problem often exacerbated because of the increasing competition for students' time arising from the need to work part

time or care for children) and an inability to cope with workload (perhaps as a result of class timetables and the corresponding multiple assessment tasks, with submission deadlines often bunched around the same date);
- a lack of motivation to excel because of a perception that the academic responsible for the class has little enthusiasm for the subject (the students then expending what they consider to be a commensurate amount of effort);
- increased external pressure to succeed from parents or peers, or for financial reasons;
- an innate desire to take on and test the system (particularly if the punishment associated with detection is relatively minor);
- cultural difference in learning and presentation styles where, in some settings, it is considered normal custom and practice to quote the experts without citation (Joint Information Systems Committee, 2003).

This is by no means an exhaustive list of the factors that might be considered responsible for the frequency of plagiarism; suffice to say that it is an indicator of the complexity of the issue. Neither do these factors necessarily explain the increasing incidence of plagiarism. Indeed, many, if not all, of those reasons listed above were in existence prior to the dramatic increase in the number of reported cases of plagiarism. The key explanatory variable, it would seem, is the increasing availability of electronic text. It is this, coupled with any of the above motivations that has spawned the seemingly inexorable rise in student plagiarism.

Top Tips 3

6. Ensure that assessment construction minimises the ease with which plagiarism can be both difficult to resist by the student and difficult for staff to detect (see section 2.5).

7. Be flexible in allowing extensions to deadlines if you are convinced that the only alternative would be to receive a plagiarised submission.

8. Overall, consider co-ordinating the timing of assignments in conjunction with other subjects, with a view to avoiding 'peak loading'.

The spate of books on the subject, along with the various websites, media reports, conferences and symposia, is testimony to the amount of intellectual energy currently being dedicated to the topic of internet plagiarism. The major preoccupation is with both *detection* and *deterrence*: detection by resorting to 'fighting fire with fire' using various proprietary and freeware anti-plagiarism packages; deterrence through stressing the importance of education in ethics to ensure that students are not tempted to breach their university honour codes, and through the meting out of stiff penalties to offenders, to send a clear message that plagiarism is behaviour not to be tolerated in any circumstances.

2.3. A 'plagiarism epidemic'

If evidence is required of the alarming rise in the incidence of plagiarism, we just have to turn some recent reports in the media. A recent article in *The Times* (January 2, 2016) reported, in an investigation based on more than 100 freedom of information requests, that almost 50,000 students at British Universities were caught cheating over the previous three years. The article also reported a number of other important findings:

- Non-EU overseas students made a disproportionate number of the students caught cheating (Of the 70 universities that provided data from overseas students, those students were involved in 35% of all cheating cases but made up just 12% of the student body)
- The problem is not limited to undergraduate studies. Almost 20 PhD students (or equivalent) were disciplined for academic misconduct over the previous three-year period.
- 5 cases of impersonation were recorded at one university alone.
- Only about 1% of those found guilty of misconduct were dismissed because of cheating.
- "Freelance academics" charge anything from £10 to £20,000 for coursework answers, dissertations and even an '80,000-word PhD'

This media article led to a very quick response by the Quality Assurance Agency for Higher Education (QAA), the independent body that checks on standards and quality in UK higher education with several policy documents produced in quick succession. First, in February 2016 the QAA Viewpoint alerted universities to the issues of 'paper mills' (QAA (2016a)), a few months later, in August a full report on custom essay writing services was published on the issue (QAA (2016b)) and in October 2017 produce a comprehensive guidance document for HE providers (QAA (2017)).

A recent article by Rigby at al. (2015) developed the first empirical investigation of the decision to cheat by university students and found that risk preferring students, those working in a non-native language, and those believing they will attain a lower grade are willing to pay more for an essay and hence are more likely to plagiarize. Furthermore, and perhaps not surprisingly, they also found that the likelihood of a student purchasing an essay and the amount a student is willing to pay for those essays decline as the probability of detection and associated penalty increase. This result partly explains the high incidence of plagiarism found in *The Times* (2016) article. The fact that only 1% of the students caught cheating were expelled from their universities might lead students to believe that, in what concerns plagiarism, crime pays in the end.

The high number of reported cases of plagiarism detected by universities are only made possible by the widespread use of plagiarism detecting software tools, the most widely used of which is Turnitin.

Turnitin is a Web-based platform for management of assignments and feedback, with a built-in check for plagiarism and collusion. It compares each assignment

with its database of "+45 billion web pages, 337+ million student papers and 130+ million articles from academic books and publications"[i]. For that reason, it is a very effective and powerful tool to prevent collusion among students within the same university, the 'recycling' of parts or the totality of papers by students in different modules, students 'sharing' the same paper at different universities and the outright copy and paste plagiarism from materials available online.

Figure 1 below shows an example of an originality report.

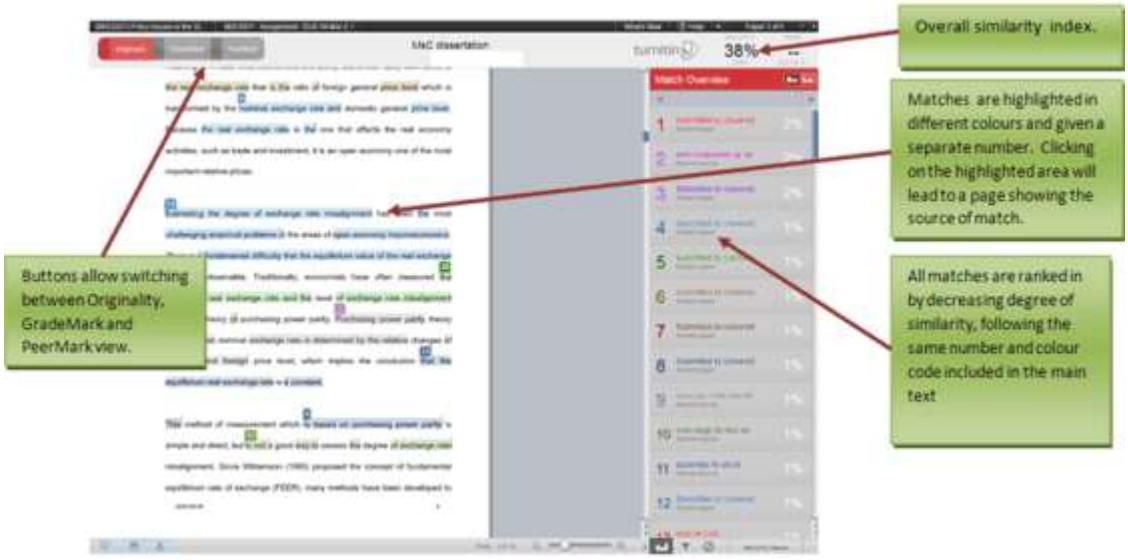

Figure 1: Example of originality report in Turnitin (click to expand)

Detecting plagiarism using Turnitin can be very time consuming and complex[ii]. A high similarity score does not immediately imply that plagiarism or collusion was committed as it can be the result of the sum of many similarity matches of small, commonly used expressions. Another complication is that the software can be manipulated by students if they are allowed to see their similarity reports and resubmit their work by, for example, changing the occasional word in a sentence to make the software filters ignore the similarity. Allowing students to see the originality report in their work prior to submission can be a very useful tool to teach students about plagiarism as well as safeguard academic integrity but this is not without its dangers.

Figure 2 shows an example of plagiarism in Turnitin. Although many small similarities with other work are found, which is to be expected, there is one match that accounts for a very large amount of similarity (38%) and most of this comes from entire paragraphs being copied and pasted directly into the assignment. Further investigation (as well as proof of the plagiarism) can easily be made by clicking on each match on the match overview panel, which will take you to the original source of the text. Sometimes that source is not publicly available (e.g. paper submitted by a student at another university) and in these cases the academic will need to ask for permission request to the author's instructor to see the original paper.

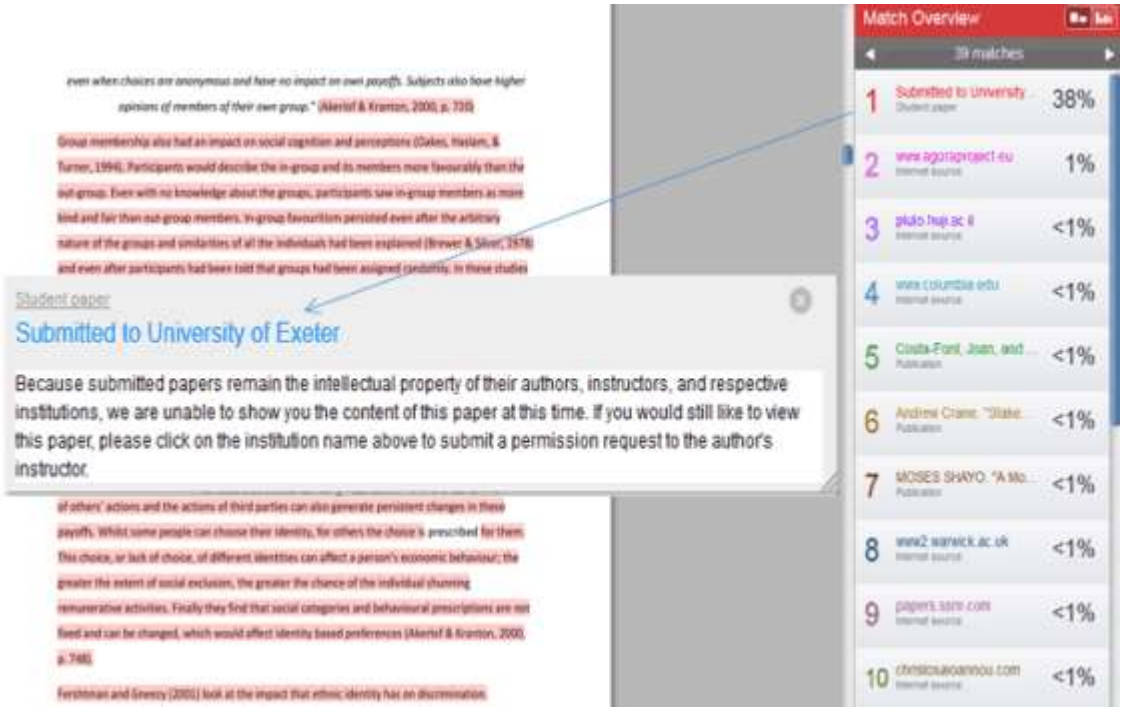

Figure 2: Example of plagiarism in Turnitin (click to expand)

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[i] Source: http://www.turnitinuk.com/en_gb/features/originalitycheck/content

[ii] Turnitin has recently introduced a new system, which they called 'Feedback Studio'. Although the layout changed slightly with the introduction of 'layers', the functionalities available remain the same.

2.4. The tip of the Iceberg? The 'Paper Mills' problem

Plagiarism detection, with software tools like Turnitin, is used widely at British universities and extremely useful in detecting what can be called 'type-1 plagiarism'[i]: the act of copying and pasting materials available online. These applications seem impotent, however, to detect Type-2 plagiarism or the use of bespoke essay-writing services or 'essay mills' – businesses that make up arguably one of the most successful internet industries after pornography and gambling. Indeed, as *The Economist* observed in the aftermath of the dotcom crash, these cheat sites are one of the few dotcom business models that continue to prosper (Anon., 2002).

Some sites rely on advertising revenue and supply services free-of-charge or facilitate exchange (students submitting a paper and getting one in return). In most cases, however, it is fee-for-service. Students can purchase pre-written or commissioned papers, and while the format varies slightly from one operator to another, customers can pay anywhere from "several hundred pounds for a single essay to £6,750 for a PhD dissertation" (Khomami (2017)).

The most professionally looking UK-based sites, like for example, oxbridgeessays.com or ivoryresearch.com, offer a very wide variety of products for students at every level of study.

Figure 3 below shows an example where clients can choose from different levels of study from A-Levels to Postgraduate studies (help with "PhD proposal, title creation or individual chapters" of a PhD dissertation are also available but require speaking to an 'academic consultant') and a drop down menu choice of specialized topics within each discipline.

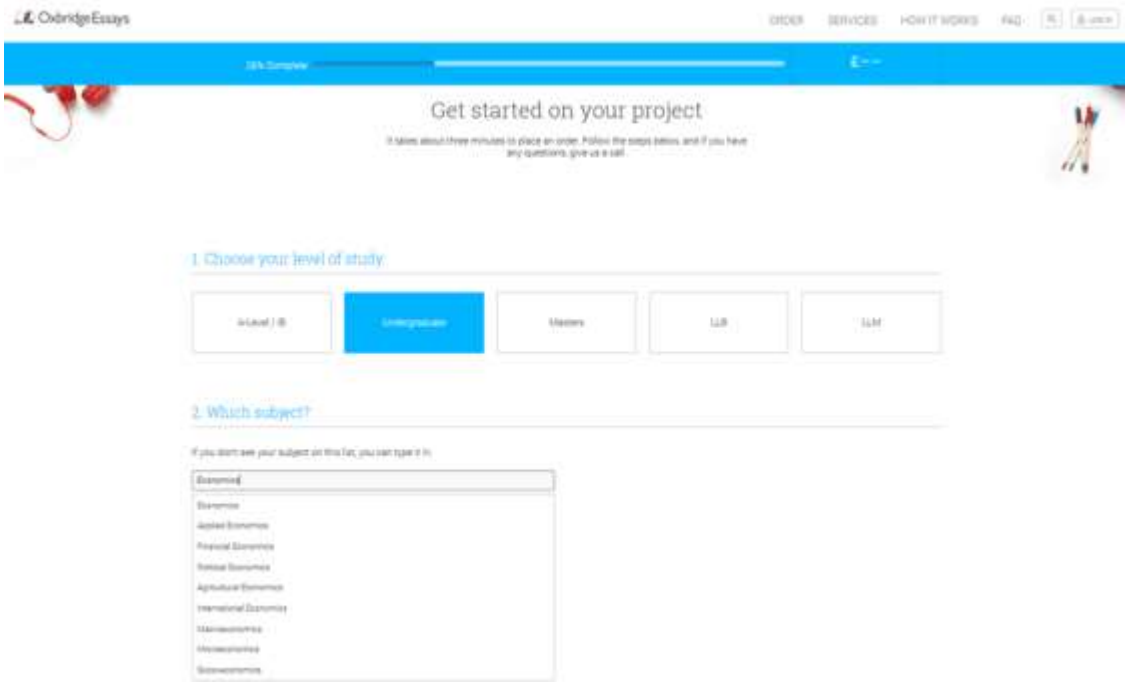

Figure 3: Booking a 'Project' (click to enlarge)

Although these type of companies invariably have a disclaimer that their products are "intended solely for the purpose of inspiring that client's own work through giving an example of model research, writing, expression and structuring of ideas" (OxbridgeEssays, terms and conditions), it is clear that the business model is directed at providing students with "100% original and plagiarism Free" papers.

Figure 4 shows the options available to clients when booking a project. The variety of types of products is amazingly large and clients can buy bespoke pieces of work that include not just essays and full dissertations but also presentations, dissertation proposal, literature reviews, critical reviews, among others.

Clients can even specify what grade boundary they are after (from 2:2 to 'Upper 1st'), chose the date of delivery in an airline-style booking site where prices change according to the date of delivery, have a 'money back guarantee' (e.g. UKessays.com) and generous discounts (e.g. BuyEssays.co.uk provided a 20% discount to all customers at the time of writing this chapter).

The example presented in Figure 4, shows the prices for a full undergraduate dissertation, for a 'standard 2:1 (60-64%) over a month period. Depending on the urgency prices over that period vary from £245 (3 days) to £160 (90 days). If the grade boundary is instead chosen to be 'Upper 1st (75%+)' the prices range from £525 (3 days) to £345 (90 days).

The providers link clients to writers that are recent graduates from the same or similar institutions or even a "network of some of the finest academic writers in the UK and beyond" (OxbridgeEssays.com, How it Works) and therefore are very familiar with the each university's requirements for assessment.

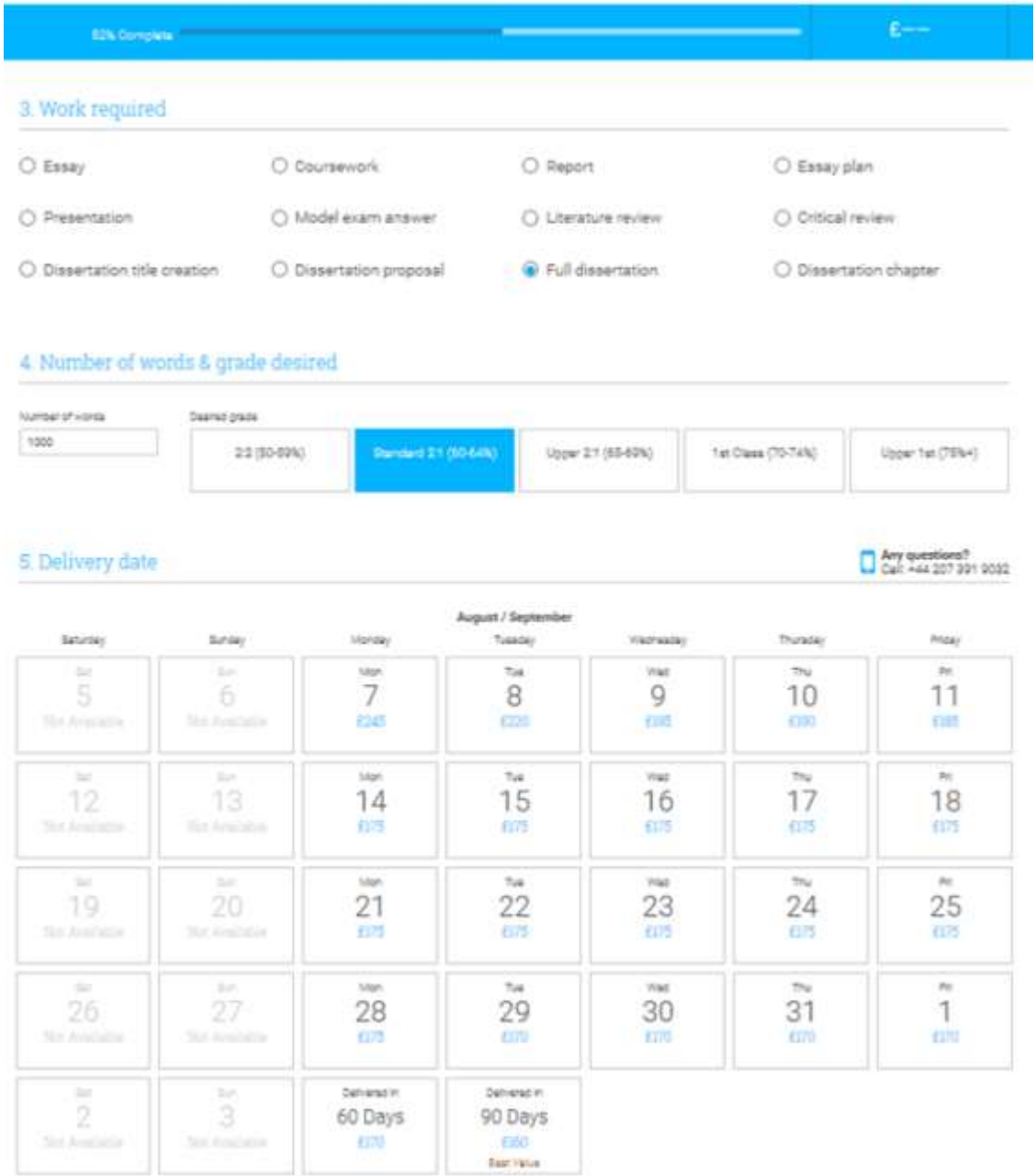

Figure 4: Choosing a delivery date and a classification (click to enlarge)

The service also typically includes ‘Upgrade Options’. Figure 5 shows an example where clients can ask for alterations (from a standard 10 days for an additional £16 to an unlimited alterations period for an additional £64), an ‘essay development plan’ that explains in detail “how the academic produced your model 'essay' with a clear breakdown of how you are able to further develop the work from their guidance.” A ‘revision guide’ is also available that provides “additional revision sheets summarising the topics and arguments covered within your delivered work.” all of which would, arguably, be invaluable if the client was asked to give a presentation or a viva.

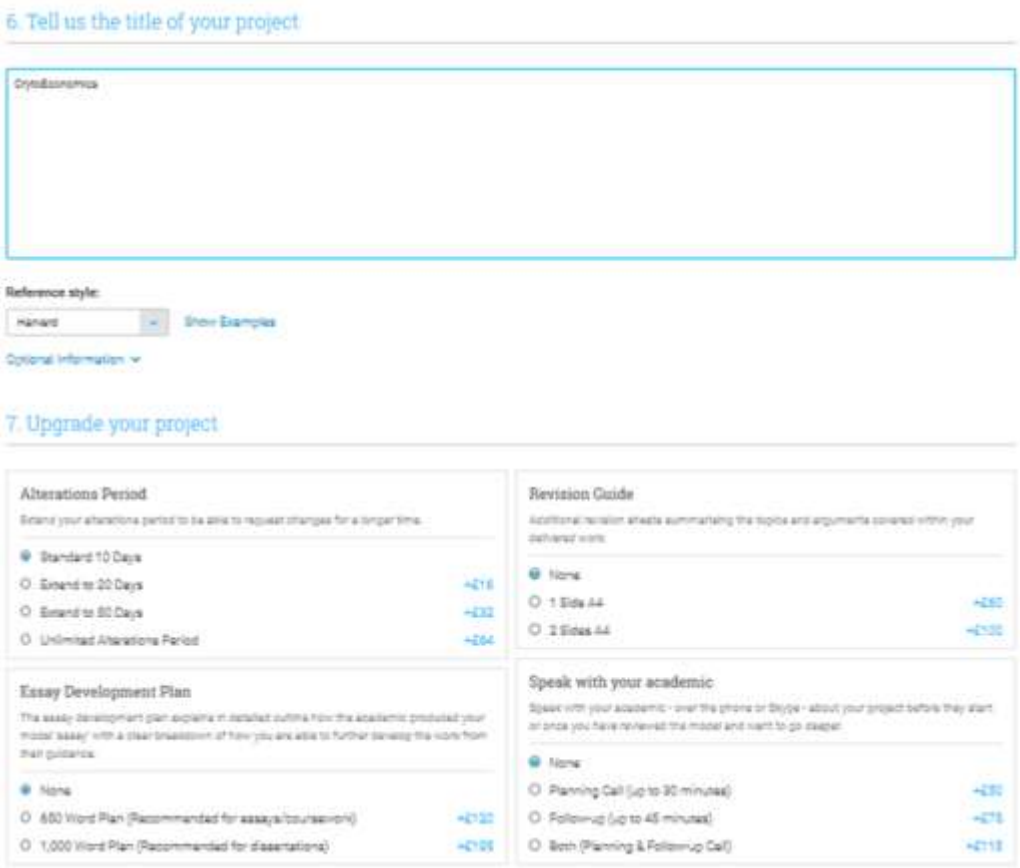

Figure 5: Some Upgrade Options (click to enlarge)

While accurate statistics are not always easy to obtain given the dynamism of the industry, cursory perusal of the websites of the leading companies would suggest that, taken together, these sites are likely to receive visitor numbers running into millions each week. StudyMode.com, for example, a company founded in 1999 boasts that it is “self-funded and expanding daily, (…) serves more than 2 billion pages per year to students all over the world.”

The growth in this industry is surprising given the lack of guarantees clients get. If a client finds herself out of pocket because the company fails to supply the order or gets a grade that is lower than the one she paid for, it will be hard to complain without exposing herself as a cheat.

"[O]nline forums are full of complaints about essays arriving peppered with spelling mistakes, arguments that don't match pre-approved propositions and – the most common grievance – results that don't match the promised grade." Potts (2012)

Potts (2012) reports one of those cases where a client did not receive her essay on time and was informed by the supplier that she could not get a refund but could claim a discount off the next purchase she made with them. The essay never arrived and she was £200 out of pocket.

Given these developments, it is not surprising that a large volume of literature has emerged in the last few years focusing on the subject of plagiarism in the higher education sector. The rise of 'paper mills' seems to be increasing plagiarism to truly epidemic proportions, raising serious concerns among universities and governments.

The UK universities minister Jo Johnson stated recently that "this form of cheating is unacceptable and pernicious. It not only undermines standards in our world-class universities, but devalues the hard-earned qualifications of those who don't cheat". He urged the sector to implement "strong policies and sanctions to address this important issue in the most robust way possible"[ii].

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[i] The terms type-1 and type-2 plagiarism were assigned to Geoffrey Alderman of the University of Buckingham in *The Times* (2016) article.

[ii] http://www.qaa.ac.uk/newsroom/cheating-in-higher-education-new-guidance-on-prevention

2.5. Deterring and preventing 'Type-2' plagiarism

Various strategies can be employed by academics to police plagiarism, ranging from simple Web search techniques used by individual lecturers, to the employment of easy-to-use freeware capable of tracking plagiarism between cohorts of students, as well as to quite elaborate systemic approaches involving the engagement of commercial plagiarism detection companies as described in section 2.4.

Detecting type-2 plagiarism, the production of bespoke essays by professional staff, is a much harder, time consuming task and very difficult to prove in most cases. As discussed above, 'paper mills' employ experienced professionals (in fact, some paper mills boast having established academics working for them) to produce tailored and completely original work which for that reason is not detectable via the plagiarism detection software. Academics might find themselves reading assignments that are out-of-character for a specific student (because the quality of work is higher than the typical grades the student gets, or the assignment uses

colloquialisms that are unlikely to be known of certain groups of students) but given that the academic has burden of proof, the punishment of this practice might not always be forthcoming.

This explains why in recent years, the attention seems to be turning to developing software applications that detect plagiarism through the use of stylometry – the application of the study of linguistic style to determine the authorship of (mostly written) works. Software applications that use stylometric analysis basically study measurable features of literary style, such as sentence length, vocabulary richness and use statistical tools to identify variations in the frequency of words, word lengths, word forms, that suggest different authorship and hence plagiarism. Although these products are still in a developing stage, academics are very hopeful that these applications will assist with the detection of completely plagiarized works, bought from *Paper Mills**[i]*.

Top Tips 4

9. Familiarise yourself with the various plagiarism detection software packages and develop an efficient rubric for checking your submissions.

10. Consider forming detection 'teams' with a view to providing an efficient division of labour and guidelines for best practice.

11. Remain open-minded at all times.

While most universities around the world rely on their publicly stated policies and procedures (including honour codes and student contracts) to act as a deterrent to any student contemplating plagiarism, their publication alone is unlikely to cut any sway with would-be plagiarists. Even universities that are committed to eradicate plagiarism must be aware that approaches that "focus on eradication rather than minimisation of plagiarism can be impractical, prohibitively expensive and even harmful to the learning environment" (QAA (2017)).

Given that chances of detection of type-2 plagiarism are painfully low (as evidenced by the extremely low rates of punishment – see section 2.3), the way to avoid type-2 plagiarism must be through prevention.

Prevention may be associated with the creation of an environment where students never feel motivated to plagiarise or where engaging in plagiarism becomes very costly and extremely difficult, making it a less attractive practice to engage on.

Top Tips 5

12. Create an explicit focus on *learning outcomes* – students need to see the point of what they are doing.

13. Design assessments that motivate students on the basis of the quality of their learning and the *generic skills* they acquire rather than the content they memorise.

14. Design assessments where the learning experience is truly *authentic*, suitably contextualised, completed within a suitably limited time period and as *specific to the university course unit* as possible.

15. Encourage students to role-play and 'suspend disbelief' in assignments, so that they develop a much greater empathy for the subject matter (Chancellor of the Exchequer, CEO, etc.).

16. Include the mandatory use of assignment cover sheets that incorporate signed declarations of originality.

17. With an assignment that is to be submitted electronically, use pop-up confirmations about the conditions that a student is agreeing to when they upload their assignment.

The ability to analyse problems critically is not in abundance among those who elect to plagiarise material from the internet or from their peers, and as the discussion in the sections above demonstrates, the policing of this kind of activity can be a time-consuming and expensive business.

Formal tuition in the art of critical thinking is certainly a way forward, but this will not be time well spent if, subsequently, students are not presented with adequate opportunity to *apply* this important generic skill. All too often, assignments and examination questions are set that encourage the reproduction of content knowledge rather than critical appreciation of that content knowledge. Generally speaking, this tends to be a reflection of module design that is driven primarily by content considerations and where assessment is very much of an afterthought, rather than the other way around. In short, to be effective, assessment must be *authentic*: it must mean something to the student, so it will engage them and add value to their skill set.

As scholars such as Ramsden (1992) have argued, the quality of students' understanding is intimately related to the quality of their engagement with learning tasks. Setting tasks that test their memories or their ability to reproduce content material is not particularly engaging, and this is precisely what many assessment items require – the same assessment items that, coincidentally, lend themselves very well to cutting-and-pasting techniques.

A pertinent question to ask is whether students are entirely to blame for the plagiarism problem that plagues our universities. The study conducted by Ashworth *et al.* (1997) would suggest not. They conclude that cheating might be looked upon as a symptom of some general malaise. They found that students felt alienated from teaching staff because of their demeanour and their lack of contact with students. Assessment tasks that fail to engage students are a symbol of this gap between students and lecturers, and in the absence of any basic commitment on the part of the student that the work they are doing is significant, there is no moral imperative to refrain from plagiarism or cheating.

Top Tips 6

18. Exercise a firm commitment to authentic assessments that have the effect of minimising the extent of assignment recycling, even to the point where every assessment item is unique.

19. Use a mixture of assessment methods and develop novel, employer-focused types of assessment (e.g. policy briefs, executive summaries, video presentations, etc).

20. Seek to encourage departmental co-ordination in a commitment to authentic assessment as a strategy to combat student plagiarism. In this way, students can see there is a synchronised departmental effort to change the way that learning is assessed, and that there is consistency of treatment when it comes to meting out penalties for plagiarism offences.

The point is that while one cannot 'turn a blind eye' to students' plagiarism, it would be fatuous to assume that it is the students who are at fault and the students alone. Could it be that students are cheating because they do not value the opportunity of learning in university classes? Is it conceivable that the pedagogy currently employed has not adjusted to contemporary circumstances? As one author has observed, 'we expect authentic writing from our students, yet we do not write authentic assignments for them' (Howard, 2002). It is worth considering why this might be so: one argument is that the ever-increasing pressure on academics to teach, research and administer reduces the time for creating imaginative and otherwise difficult-to-plagiarise (for example, individualised) assignments. As a consequence, there is much anecdotal evidence that academics are retreating back to the unseen, written examination as the *sole* method of assessing student performance in their courses.

As the literature on authentic assessment reveals, it is solidly based on constructivism, and acknowledges the learner as the chief architect of knowledge building (see, for example, Herrington and Herrington, 1998). It is a form of assessment that fosters understanding of learning processes in terms of real-life performance as opposed to a display of inert knowledge. The student is presented with real-world challenges that require them to apply their relevant skills and knowledge, rather than select from predetermined options, as is the case with multiple-choice tests, for example. Importantly, it is an approach that *engages* students because the task is something for which they will have an empathy, which, as the empirical evidence suggests, elicits deeper learning.

The key, therefore, is to set meaningful, situational questions relating to real-life, contemporary problems that engage students in the learning process. By making assignments as module-specific as possible - to prevent students from purchasing pre-written papers or paying outsiders to write answers and by the examiners making it clear (as a stated objective of the module unit) that they are looking to

reward evidence of depth of learning and sound critical analysis rather than recall of content knowledge - assignments are effectively cheat-proofed, although we must always be mindful of the increasing resource constraints placed upon academics.

Top Tips 7

21. Make it a requirement of assessment submissions that outlines and first drafts be submitted on specified dates in the lead-up to the final submission date. This means that the process of producing an assignment is evaluated as well as the final product (Carroll, 2002). This may not prevent some students copying from one another along the way, but it will thwart those individuals who look to produce the finished product while doing very little work themselves.

22. Require students to submit a reflective journal describing their approach to the task, the methodology adopted, the problems encountered and how they resolved these problems.

23. Hold random *viva voce* sessions that require students to defend and further explain, if necessary, what they have written. If this is clearly advertised to students in class and in course documentation, it will serve as an effective deterrent.

Something of a paradigm shift is likely to be required if the changes described above are to be readily embraced by the majority of teachers in the higher education sector. However, it is worth mentioning that the various ICTs, used effectively, may well assist in this endeavour. Indeed, one could make the point that if as much energy and ingenuity went into developing new and exciting online devices for the purposes of facilitating assessment as there have been devoted to online devices for the detection of plagiarism, then maybe there would be fewer obstacles to negotiate.

In summary, while there is clearly a need to allocate some resources to detection and deterrence, these are essentially reactionary strategies with low probability of success. The proactive measure is the prevention of plagiarism through innovative pedagogy, as this is more likely to produce lasting results. Such an approach provides students with an incentive to learn. The natural corollary to this is that there will be less incentive for students to resort to plagiarism.

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[i] Software applications that use stylometry to detect plagiarism include JGAAP, AICBT and Signature.

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Undergraduate Dissertations in Economics

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Contents

1. Introduction

A key aim of any honours degree programme in the UK is to encourage students to become independent learners. This is no easy task in an environment in which many students arrive from school or college with preconceived notions of what is meant by study, and an array of expectations about the support they will receive from academic staff, not to mention the feedback and interaction with staff that they can expect.

The Quality Assurance Agency (QAA) in August 2008 set out the *Frameworks for Higher Education Qualifications in England, Wales and Northern Ireland*, which contains the following descriptor for a Bachelor's degree with honours:

'Bachelor's degrees with honours are awarded to students who have demonstrated:

- a systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge, at least some of which is at or informed by, the forefront of defined aspects of a discipline
- an ability to deploy accurately established techniques of analysis and enquiry within a discipline
- conceptual understanding that enables the student:
    - to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline
    - to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline
- an appreciation of the uncertainty, ambiguity and limits of knowledge
- the ability to manage their own learning, and to make use of scholarly reviews and primary sources (e.g. refereed research articles and/or original materials appropriate to the discipline).'

(Source: http://www.qaa.ac.uk/en/Publications/Documents/Framework-Higher-Education-Qualifications-08.pdf)

In the context of an economics programme, where in many cases students can arrive at university with no prior knowledge of the discipline, it is ambitious to think that students will be able to use ideas and techniques 'at the forefront' of the discipline after only three years of study, especially if this is really to be the aim for *all* honours students. On many programmes, the dissertation has become the prime vehicle by which students find an opportunity to become independent learners and to confront current research. For many students, the dissertation is the culmination of their undergraduate careers, and a rewarding and satisfying experience that gives them the opportunity to undertake an in-depth study of a

topic that interests them. However, it can also become a traumatic and disillusioning venture for students who do not engage with the research, or who have a bad experience with some aspect of the dissertation process.

This chapter sets out to share good practice and provide guidance for co-ordinators, curriculum planners and supervisors, highlighting danger areas and providing discussion of some of the more contentious aspects of the dissertation process.

After a brief investigation of the current experience in the UK, this chapter is organised around the typical life-cycle of a dissertation, divided into a series of stages:

- laying the foundations
- topic selection
- early practicalities
- supervision
- progress monitoring
- data issues
- dissertation structure
- submission
- assessment
- academic integrity.

2. The UK experience

As background to this chapter, a brief email survey was undertaken to gather information about the role of the undergraduate dissertation in economics departments across the UK. A report on this survey may be found in Appendix 1.

From the survey it seems that dissertations are a part of the majority of Economics programmes in the UK. However, there are significant differences in the way in which the dissertation module is organised, and the way that students experience the dissertation.

A particular issue is whether *all* students should be required to complete a dissertation as part of their undergraduate programme. In some institutions, the dissertation is indeed compulsory for everyone, but elsewhere it is restricted to single honours students, or to those students who obtain an average of 60% or more in their second year. The QAA's descriptor quoted above suggests that all students should receive some exposure to research, but clearly joint honours students are likely to find this more challenging than the specialists, having acquired less in-depth familiarity with either of their chosen disciplines.

Where joint honours students are required to take the dissertation, it may be necessary to adjust the expectations in terms of content. For example, whilst a single honours student with some exposure to econometrics may be expected to undertake some empirical work, it would be unreasonable to expect a joint honours (e.g. Politics and Economics) student to have the same familiarity with econometric methods. It has been known for students to try to teach themselves econometrics, which can prove disastrous.

Whether the dissertation should be limited to the better students is a moot point. On the one hand, it could be argued that weaker students should have equal access to the dissertation option; it may even be that there are some students who may achieve a better result on the dissertation where they can immerse themselves in a topic and produce a polished piece of work, than they could produce under examination conditions or in a problem-set-oriented assessment. On the other hand, experience suggests that weaker students require more supervision, and are more likely to resort to practices that breach academic integrity guidelines.

For these reasons, it may be necessary (or desirable) to provide alternative ways of exposing joint honours and weaker students to research methods. This will be discussed later in section 4.

Where the dissertation is compulsory for all students, the organisation of the module causes concern. When there are large numbers of students requiring supervision, the load on individual staff members becomes heavy – especially given that some topic areas (and some staff members) tend to be more popular with

students than others. It may then be necessary to find some way of spreading the supervision load across available staff or accommodating differences through a workload management system. Spreading the load evenly may result in inconsistency in the supervision provided, which can be very difficult to monitor effectively.

Another major impact on the dissertation has been the rise of the internet, and the ease with which students are able to find material. This can lead to excessive reliance on sites such as Wikipedia, and makes it imperative to be able to monitor standards of academic integrity. Almost all of the survey respondents reported using TurnitinUK, whether as routine for all dissertations submitted, for a random sample or for suspect cases. The traditional remedy of holding vivas for all student dissertations becomes extremely costly when large numbers of students are involved (one institution reported that more than 500 dissertations are submitted in a typical year). Nonetheless, this practice appears to have survived in some economics departments.

3. The dissertation life-cycle

3.1 Laying the foundations

There is a sense in which the whole of learning and teaching in a programme can be seen as preparation for the dissertation, as it provides the opportunity for students to draw holistically upon the range of material that they have studied during their programme. However, the dissertation is a very different exercise from anything else that they will have been required to undertake and specific preparation is needed.

First, some training in research skills will need to be provided. This may or may not take place as part of a specific module within the programme that is devoted to preparation for the dissertation, perhaps in the penultimate year of study. This needs to include general discussion of research in economics, and the ways in which economists undertake research and scholarship. It is important to remember that this is likely to be a wholly new experience for most students, who may be well drilled in problem solving and mathematical exercises, but who may not have had much exposure to the practicalities of economic research.

The booklets by Greenlaw (2006) and Neugeboren (2005) may be useful references for students at this stage of the process, or they may wish to visit the "Doing a dissertation" tab of the Studying Economics website run by the Economics Network.

Included in this research training it is important to provide some guidance in library skills and the use of evidence in economics research. Being able to evaluate evidence, to weigh up the importance of a set of results and to be aware of the limitations of the evidence produced are challenging skills for students to develop.

There are different approaches to providing such research methods training. It may be that library staff will be able to provide sessions in library skills. It may be wise to incentivise students by awarding a small percentage of the dissertation marks for a library skills exercise. For example, students could be required to undertake an online literature search related to their chosen topic and produce a preliminary reading list. This has the added benefit for forcing them to start their research at an early stage of proceedings.

Depending on programme structure, some students may have had extensive exposure to statistical and econometric methods, so may be accustomed to handling data and interpreting results. However, there may still be a difference between running some regressions in response to a specific exercise during an econometrics module and devising a model to allow testing of a specific hypothesis.

Where students have not been exposed to econometrics, this will clearly affect the scope and nature of research that they can undertake. It may be that they are restricted to a theoretical approach or a literature review style of project, or that they need to find alternative ways of presenting evidence. Where there is a mixture of single and joint honours students it may well be that there are students working on similar topic areas, some of whom know some econometrics and others not. This can create particular pressures on the joint honours students, who may feel obliged to try to use techniques with which they are unfamiliar. This is almost always disastrous. It also becomes important that the skills base of students is taken into account during the assessment process, so that students without training in econometrics are not unduly penalised by markers.

It is increasingly crucial to provide clear guidance on academic integrity at an early juncture. Section 3.10 explores this issue in more depth.

Where there are large numbers of international students, support may need to be provided in academic writing. Indeed, such support may be necessary more generally, given that so many economics assessments are based on problem sets and exercises, rather than on extended continuous prose. There is some evidence that the writing skills of UK students may also need to be further developed in this context.

3.2 Topic selection

From a student perspective, finding a topic for the dissertation is a critical step. One of the key strengths of the dissertation is its capacity to engage the student by arousing interest and motivating through a sense of discovery. However, it can also be a stressful part of the process, especially for some weaker students who may not have strong ideas about topics that might inspire interest, and who may be daunted by the prospect of undertaking the task. Failure to find the right topic can be a recipe for a weak dissertation that does not fulfil the intended outcomes.

When the numbers of students looking for dissertation topics are relatively small, then it may be that students can be left to choose their own topics – probably subject to the availability of an appropriate supervisor or the submission of a coherent research proposal. With large numbers of students, this *laissez-faire* approach may not be feasible.

An alternative approach is to provide students with a list of topics from which they can choose. These topics may be closely circumscribed, or may simply offer a general topic area, leaving the student to focus on a specific research question within that topic area.

The advantage of providing very general topics is that that it leaves the responsibility of formulating a specific research question with the student. This is a

key part of research in economics, of course, so it is good (albeit challenging) for the student to have to think about how to go about it. It also has the benefit of giving the student ownership of the question to be investigated, which helps to provide motivation.

Top tips: dissertation topics

There are several ways in which students can find (or be allocated) the topic for their research.

Students find their own topic, and then look for a supervisor

This may work where the number of students is limited, but may be more difficult to manage when numbers increase. Some staff members are likely to be overwhelmed with requests, especially if they happen to have taught popular second year modules.

Students may also congregate around topics of recent interest – the financial crisis, the impact of migration, or the economics of Brexit…

Others may delay thinking about their topic until it is too late, or may choose topics that prove to be impracticable.

Staff declare topic areas in which they are prepared to supervise projects

This seems to work for a number of institutions. Topics here may be defined broadly – labour economics, development economics, or monetary economics. This may also produce bunching around some staff members.

A list of topic areas is provided

This entails listing key areas of economics – public economics, behavioural economics etc. Students are then allocated a supervisor, where possible a supervisor with a specific interest in that area. Bunching can be ameliorated by not guaranteeing that the allocated supervisor will be an expert in that field. After all, at undergraduate level, detailed knowledge of the topic area may not be crucial.

A list of topics is provided

More specific titles could be provided, rather than general areas. Some staff may prefer this, but others may not. Too specific a topic may attract no students at all (there are only so many undergraduates burning to undertake research into theoretical issues in econometrics).

For example, a topic such as ‘Child labour in less developed countries’ offers wide scope for tackling the issue in different ways and different contexts. A more

specific topic such as “Are household members altruistically linked? an examination based on the Mexican anti-poverty programme Progresa’ is much more prescriptive, and may deter students.

There will always be students with fixed ideas about what they wish to research, and these should be accommodated where possible and plausible.

Top Tip

Where there are large numbers of students, topic choice can be handled online.

Students can submit their preferences through a webpage, and asked to specify their top four choices and rank them. Students can then be allocated to topics and supervisors, with no guarantee that they will get their first choice – depending on whether certain topics are over-subscribed.

It is helpful for students if a selection of past dissertations is made available to current students to provide some guidance on what is expected of them. However, if the same topics appear for too many successive years, there may be the obvious danger of plagiarism. Even where this does not extend to actual copying, there is the danger that students will simply adopt the same dissertation structure as used by previous students rather than working through this part of the process on their own.

3.3 Some early practicalities

Legislation impinges on the dissertation process, and students may all be required to complete risk assessments before they start their research. The impetus from this comes from Health and Safety legislation in place since 1992, and many universities require such assessments for undergraduate and postgraduate students undertaking research. The need for this is perhaps more obvious where students are carrying out experiments in the physical sciences, but may also be important in the social sciences. There may also be a need to seek ethics approval, especially where research involves the use of human subjects, for example, where students intend to undertake surveys or to conduct experiments using human participants.

Given that most economics dissertations tend to be desk studies that do not involve the use of human subjects, the bureaucracy may be viewed as superfluous. Nonetheless, compliance with the law is essential. This may be especially important where economics as a discipline is part of a wider School of Social Sciences. Sociologists who decide to interview local drug dealers as part of their dissertation research clearly face rather different risks and ethical issues than an economist who decides to estimate a consumption function from macro data.

Sample forms can be viewed in Appendix 2. The ethics form is designed for a School of Social Sciences. The expectation is that the vast majority of economics projects will qualify to skip from question 1 to question 15, thus minimising the paperwork whilst still complying with the demands of the legislation.

Given the requirements of the Data Protection Act, it is also advisable to ask students to give permission for their completed dissertations to be made available within the university for succeeding generations of students. This then allows a database of previous dissertations to be mounted on an internal website or a Virtual Learning Environment (VLE) such as Blackboard or Moodle.

It is also important at the outset to be absolutely clear about some aspects of the dissertation. In particular, students seem to get very exercised about word length. In many UK undergraduate economics programmes, the dissertation counts as a double module in the final year – for example, 15 ECTS, or a quarter of the assessment for the year. Given the importance of this piece of work (especially where the final year carries a heavy weight), it is probably appropriate for the dissertation to carry a word length of 7,500 to 10,000 words. Notice that this may depend on institutional demands set by your School, Faculty or at University level.

Top Tips on the word limit:

- Be explicit from the start about what is included and not included in the word count. When students get near to submission time, the chances are that they will be hitting the limit, and will want to exclude as much as possible from the count. To remove ambiguity, it is wise to be clear.
- Provide a list of what can be omitted from the word count, for example:
    - Title page
    - Acknowledgements
    - Abstract
    - Table of contents
    - Bibliography
    - Figures (i.e. diagrams, maps)
    - Tables of data
- Prohibit the widespread use of appendices – otherwise, students will simply carve chunks of material out of the main text and stash it away at the back in the hope that it will not count. Make it clear that appendices will be part of the word count (perhaps allowing some appendices to be exempt, e.g. raw data, with the express permission of the supervisor).
- Then state that everything else counts. Students will still find questions to ask (what about footnotes?), but if you have been explicit you will be on reasonably firm ground – and you can point out that the rules are the same for everyone.
- In order to enforce the word limit, you will probably need to impose penalties for exceeding it. A sliding scale is probably best – say, 1

percentage point per 100 words (or part thereof) by which the dissertation exceeds the limit. This provides students with the incentive to learn to be selective and to avoid waffle in presenting their report. And it seems to work!

3.4 Supervision

The provision of good supervision is crucial to the success of the dissertation. In many institutions facing increasing student numbers, the amount of contact between staff and students on a one-to-one basis is in decline. Indeed, it may be that the supervision of the dissertation provides the single most important opportunity for students to interact on a personal basis with a member of the academic staff. Some students may be intimidated by this, but if the relationship works, it can be mutually rewarding as an educational experience.

As in many other areas of learning and teaching, it is important to manage student expectations of the supervision process. It is helpful for students to be told clearly what they can expect from their supervisor. This may be expressed in terms of an entitlement, rather than being left open-ended. Such an entitlement could be expressed in terms of a number of meetings that each student is entitled to have with their supervisor or it could be expressed in hours. Experience with operating such a system is that although some students may request assistance above their entitlement – and this need not be prohibited within the scheme – others may choose not to avail themselves of their full entitlement. In the context of encouraging students to become independent learners, it may not be desirable to insist that all students attend for a given number of sessions. It is this that makes the entitlement system an attractive way of specifying what is the normal expectation for supervisory contact.

Such an approach has the added benefit of helping to manage the supervisors' expectations of the process. Supervisors need to know what is expected of them in terms of reading drafts, marking, length and frequency of meetings, and so on. It is also crucial that both supervisors and students have the *same* expectations of what is involved. Being explicit about this is thus crucial for both groups.

Achieving consistency of supervision provision is one of the challenges, especially when large numbers of students are in need of supervision. Just as some students may need more help than others, it is also important to be aware that some supervisors may be more comfortable in the role than others, or more prepared (or able) to make themselves available.

It is also common for certain topic areas to be more popular than others – and for some supervisors to be more popular than others. If unregulated, this can lead to a situation in which some members of staff find that they have much heavier loads than their colleagues.

Some fair way of allocating supervisory responsibilities may thus be needed. One possibility is to ensure that supervisory loads are recognised as part of a workload management system, in which there is a trade-off between supervisory responsibilities and other forms of teaching contact. An alternative is to allocate loads evenly across available staff. This may require allocating students to topics that are not their first choice, or requiring supervisors to oversee topics of which they have little specialist knowledge. This needs to be monitored carefully to safeguard the student experience. However, at the undergraduate level, specialist knowledge of topic areas may be less crucial than at masters' or doctoral level.

There may be benefits from group supervision of students following similar topics, not only in terms of economies of scale, but also because the students may be able to learn from each other. Economies of scale may arise because much of the advice given to students will be common – the central importance of economic analysis, the need for a literature review, the interpretation of evidence, how to avoid plagiarism and so on.

Example

At my university, each supervisor is responsible for between six and ten students. It may be highly time-consuming to meet each supervisee separately on a one-to-one basis, but there are some issues that can be readily communicated in group sessions, perhaps even in combination with a colleague supervising in similar topic areas.

A first meeting could take place early in the year, or at the end of the penultimate year, when students have been allocated their topics and supervisors. This would be a preliminary briefing meeting, to answer questions and concerns, highlight some key relevant readings and data sources, and explain how the supervision will be conducted. Some preliminary explanation of how to structure a good dissertation is also provided, together with some discussion of what is meant by academic integrity.

At a second meeting each student could be asked to talk about their topic, outline their progress to date, identify their research question (if they have formulated it) and comment on any problem areas that they have encountered.

A third meeting could be held towards the end of the first term. By this time, students will have been required to submit an interim report, in which they sketch out their proposed research, including an explanation of their research question, and the methodology that they propose to use in order to investigate their question. This is an opportunity to provide feedback and progress to date, to suggest future directions and to identify potential problems.

A fourth meeting could be held towards the end of the second term. Before this meeting, you could invite each student to submit an extract from the first chapter, including their explanation of their research question. In the meeting, you could comment on writing styles and referencing, and provide an opportunity for questions. The importance of maintaining standards of academic integrity also needs to be stressed.

Students should also be encouraged to meet up on a one-to-one basis if they have questions that are specific to their own research.

In some institutions, this is taken one step further, through the provision of a whole module (normally in the second year) that deals with research methods. The economies of scale in doing this are even greater, of course, as one individual (or a relatively small number of staff) can provide the generic advice that all students need in approaching the dissertation. Such dedicated modules are not always popular with students, who may see the material as being fragmented and of little relevance to them at the time. In other words, they may need to be convinced that they really will need this material at a later stage. Such modules are not always popular with the staff either. They may not be appealing to teach, and also put pressure on the curriculum. When so much other material has to be covered in the second year, there may be a reluctance to use up a whole module on research methods that could have been used to provide more micro theory or econometrics.

3.5 Early progress monitoring and the dangers of the last minute rush

A frequent complaint about students undertaking undergraduate dissertations is that they leave everything until the last minute. The pressures of other coursework items and mid-term or mid-year examinations may encourage students to devote their time to these, as the dissertation seems less urgent.

There are various ways of trying to encourage students to start work on their research early, and not to rely on a late rush. It may be worth drawing an analogy in early discussions with them. Few students would think of arriving at an exam with only a few minutes to go, and thus finding they have no time to answer the questions. So, why should they think they can fritter away their dissertation time and start work on it when it is too late to do it justice?

However, as economists, we understand about incentives, and thus realise that exhortation alone will not suffice. We need to provide good incentives if we expect students to start work early.

One possibility is to require students to give a presentation of their intended research at an early stage of proceedings. This could be a presentation to their

peers with a member of academic staff present. It would even be possible to designate a discussant for each presentation or for a small percentage of the overall mark to be attached to it. However, as soon as numbers begin to grow, this option begins to become very costly in time and effort. Ensuring consistency in the assessment becomes problematic – although if it is a very small percentage of the overall mark, this may be less crucial. If the presentation becomes more than a small percentage, then the logistics of enabling appropriate external examining becomes a potential issue.

An alternative is to introduce an interim report or research proposal that has to be submitted at an early stage. Again, attaching a modest percentage of the overall marks to this report has good incentive effects, and provides an early check to identify students that are not engaging with the process, or who have unrealistic grandiose plans for solving the world's problems in 10,000 words. It is also a good opportunity to provide formal feedback – an important consideration when the paucity of feedback is a common criticism emerging from questionnaire surveys.

It may be helpful to ask students to submit draft material (or even chapters) to provide a framework for discussion in supervisory meetings – and to do so *before* the meeting takes place. There is nothing worse than having a student arrive to discuss their work clutching their precious draft, only to find that the time is mainly spent in the supervisor reading it, rather than being able to discuss it. It should be made clear that this is not for the purpose of proof-reading, which is not the supervisor's responsibility. It may be worth setting a timetable for such discussions at the beginning of the year – which then forces the student into a regular schedule of work. Of course, your institution's rules may prohibit the reading of draft material. You may also think that it is possible to go too far in helping the student, as this may militate against encouraging independent work and time management. However, it can make for more productive supervisory meetings – and anything that highlights that you are providing *feedback* may pay dividends in national student surveys.

3.6 Data issues

The other task that must be tackled at an early stage is data hunting. Students embarking on empirical work – probably for the first time – almost always have over-optimistic views of the data that are likely to be available. Perhaps a student has been to a course in development economics that has stressed the importance of human capital formation in stimulating improvements in agricultural productivity. An interesting project might be to examine the effect of primary schooling on agricultural productivity in rural Zanzibar. Or to examine the effect of overseas assistance on the provision of health care in Papua New Guinea. Panic then sets in when it transpires that, with only a few weeks remaining, there are no data to be found.

Again, this is partly a question of managing student expectations – and of getting students to hunt for their data as early as possible.

Of course, there is a time inconsistency problem here. We tell the students that they must look for data as soon as possible… but we also tell them that they should think about the underlying economics of their topic first, in order that they know what data they will require. Without this proviso, the danger of data-mining is high. Students told to look for data early may well see what they can find, run a few regressions and then see if they can find a theory that will match their results.

There is a lot of data readily available on the internet. This brings good and bad news. The good news is that there are more data accessible on a wide range of economic topics that students can readily obtain. This expands the range of topics on which they can undertake empirical work – and they are aided and abetted in this by the software at their disposal to enable them to produce lots of results. The bad news is that the scope for doing foolish things and getting nonsense results is also much expanded. The ease of use of today's software makes it very easy to produce results that go way beyond the competence and understanding of the students. Indeed, a key part of the supervisor's role may be to rein in the over-enthusiastic student to ensure that the work undertaken is appropriate for the topic being investigated, and the reasonable ambition of the student given knowledge and understanding of statistical and/or econometric methodology. This reining in has to done in a sensitive way, so as not to discourage or dishearten. A fine line to tread.

Top Tip

Provide web links to the most relevant data sources.

Providing web links to key recommended data sources is wise. This can be accomplished through a dedicated dissertation webpage or VLE. The links can then be tailored to the needs of a particular cohort of students. There is also a helpful section on the Economics Network website that provides links to freely available data.

One obvious situation in which this can be an issue is where a student has received no training in econometrics, but has heard of 'regression' and perceives that no dissertation is complete without it. There may be some bright students out there who can teach themselves regression along the way and produce sensible results. But for every one such student, there are likely to be countless others who will be unable to produce coherent results. For the econometrically untrained, more modest objectives need to be set for the analysis of empirical data. However, the collection of data, and the marshalling of evidence in support (or not) of an hypothesis, is a central part of research in economics. In some cases, students may sign up for an optional course in econometrics for which they are ill-prepared. This

has a doubly damaging impact, as they may fail the module as well as finding themselves no better off for the research.

Another pitfall is where a student with some econometric training collects data and runs some regressions, but is unable to produce results that are consistent with any known economic theory. Panic then sets in. Can economic theory really be so wrong? It takes confidence for a novice researcher to look at a set of seemingly meaningless results with equanimity. It may then be for the supervisor to reassure, and to point out how many possible explanations there are for seemingly contradictory results. Perhaps the data do not measure what the model demands. Perhaps a more sophisticated econometric methodology is required. Perhaps there are omitted variables. And so on. The student researcher may then need to be persuaded that it is perfectly OK to present weak results, so long as some awareness is shown that the analysis has limitations, and that there are many possible reasons for the seeming contradictions.

It is important to remind students of the key objective of the dissertation – namely, to showcase what they have assimilated during their degree programme. If they can show competence in applying economic analysis and (perhaps) econometric techniques in a topic area of their choice, then they are on their way to a reasonable mark. They will not be submitting their dissertation to *Econometrica*.

'The secret of happiness lay in limiting the aspirations.' Thomas Hardy in *The Woodlanders*.

3.7 Dissertation content and structure

Students who have spent most of their undergraduate careers solving problems and tackling exercises are likely to need specific help in constructing a coherent argument through continuous prose and appropriate structuring of material. Furthermore, the dissertation will require them to move beyond the descriptive to analysis and evaluation. These are also key skills that may only be developed through the dissertation in many economics undergraduate programmes.

There are several guides available providing advice to students on how to structure a report on a piece of economic research (e.g. Neugeboren (2005); Greenlaw (2006)).

A typical structure

Introduction	pose an interesting question or problem
Literature review	survey the literature on your topic
Methods/data	formulate your hypothesis and describe your data

Results	present your results with the help of graphs and charts
Discussion	critique your method and/or discuss any policy implications
Conclusions	summarise what you have done; pose questions for further research

From Neugeboren (2005)

Students need further guidance to keep an appropriate balance between the key components. The temptation is to use up too many words in the early sections in introducing the topic and describing the background. This is especially tempting in relation to some projects. For example, a student investigating a question in the context of a particular country may begin by describing the economic conditions of that country, so that the report comes to resemble something more appropriate for economic history or geography than economics. On the other hand, there may be a temptation to take some of the economic analysis for granted, thus missing the opportunity to demonstrate knowledge and understanding of economic analysis and thereby showcasing their skills to the examiner. This question of knowing what to include and what to omit is a tricky one, and an area in which supervisors will need to be ready to offer guidance. Another challenge is for students to be evaluative and analytic, going beyond description.

At the outset, students often find it intimidating to launch themselves on writing an 8,000 or 10,000 word report. It is important to find a way of overcoming this. One way is to encourage students to draw up a chapter plan at an early stage. This could be based on the general pattern set out above, with the students being asked to draft a few sentences describing the intended content of each chapter, and a target word count. This has the advantage of breaking the overall task into a sequence of shorter pieces of work, which may be less intimidating. Making some examples of previous dissertations available for students to consult may also be helpful, as they are able to see what can be achieved, as well as getting a feel for how to structure a long report.

3.8 Submission

Top Tip

Make sure there is no ambiguity about the deadline for submission and the penalties for missing it.

Another danger point comes at submission time. Be clear about the conditions under which an extension might be granted and how and whether this might be authorised. In addition, be clear about the conditions in which an extension will not be granted. For example, you might want to be explicit that extensions will not be granted for frivolous reasons or because ‘my computer crashed’. There are good

reasons for being strict about this. One of the skills that students derive from producing a dissertation is project management. Meeting deadlines will give students the opportunity to practise time management. A student who does not understand the need to keep back-up copies of files will have a rude awakening in the world of work. Furthermore, a student granted an extension is likely to find that there are knock-on effects in terms of exam preparation.

3.9 Assessment

Assessment is a crucial part of the dissertation process and entails a number of problematic issues.

It is important that students have a clear idea of what is expected of them in producing a dissertation. Unlike the problem sets and exercises that characterise much of assessment in economics, there cannot be a specific mark scheme for the dissertation. However, it is possible to provide a set of grade descriptors designed for the dissertation, showing the characteristics that markers will be looking for in allocating marks to the final product. This helps in forming student expectations and provides transparency. A sample set of descriptors is available in Appendix 3. These descriptors can be tailored to local requirements. Asking markers to highlight a copy of the descriptors for each student being assessed indicating how well they hve performed on each aspect is a good way of reaching comparability of standards across markers, and providing feedback to students afterwards.

There is no universal agreement that this approach is desirable. It has been argued that marking to descriptors enforces too much conformity and inhibits markers from examining with their own personal and professional judgement. However, this may be an argument for framing the descriptors in such a way that they are not overly prescriptive, but yet identify the intended outcomes on which the assessment of the dissertation should be based. When large numbers of students are involved, it may be that personal and professional judgement has to be harnessed in order to ensure equity in treatment.

Another way of trying to manage student expectations is through some element of peer- or self-assessment – not necessarily as part of the summative assessment. For example, students could be encouraged to evaluate a fellow student's research proposal or presentation. Alternatively, a self-assessment checklist could be required as part of the dissertation submission, itemising key aspects of the dissertation. A sample self-assessment form is available through the Appendices.

Students may also gain confidence in their work if some portion of the summative assessment is derived from interim pieces of work, such as the research proposal, a presentation or library skills project. This can also incentivise students to manage their time and receive feedback on how they are progressing.

Achieving consistency in assessment is challenging, especially where the number of dissertations to be marked is large so that marking has to be spread between a relatively large number of staff members. Consistency is also difficult because of the wide range of dissertation topics that is possible. The use of descriptors can help here, as they are cast in general terms that do not vary across topics. The danger is that some markers will be more diligent than others in giving marks based on the descriptors. At department level, this could be monitored by constructing a spreadsheet to compare mean marks (and the standard deviation) for each pair of markers. This may help to reassure external examiners that marking has been carefully undertaken — as well as ensuring equality of treatment for students.

Where the economics dissertation can be taken by both single honours students and those following joint honours, it is important for markers to be aware of what is reasonable for particular students to produce. A politics and economics student should not be penalised for avoiding econometric work, nor should a single honours economics student be penalised for lacking background in political science.

Top Tip

The nature of the dissertation is such that it is difficult to maintain anonymity in the marking, so this is one type of assessment where double-blind marking must be retained, rather than some form of sample moderation process.

One of the issues on which practice varies between universities is the question of whether the supervisor should or should not be one of the markers of the dissertation. Some argue that the supervisor should be excluded from the assessment process in order to ensure independence of the marking, whereas others argue that the supervisor is able to identify the extent to which the student had received assistance as part of the supervisory process. Consistency may be more likely where marking is organised to mix up the pairings of first and second markers.

3.10 Academic integrity

Given the ubiquity of the internet, it has become impossible to discuss undergraduate dissertations without also discussing the greater opportunities for student plagiarism. The internet provides students with access to a vast range of material, and anecdotal evidence suggests that many students arrive at university with at best a sketchy understanding of methods of scholarship and standards of academic integrity.

Inculcating a sense of what constitutes academic integrity at an early stage in the degree programme is critical. This approach – stressing that there are expected

standards for student work – is to be preferred to instructing students simply to 'avoid plagiarism'. The notion of avoiding plagiarism is almost tantamount to telling students not to get caught, whereas setting expected standards is a more positive tack to take.

The importance of academic integrity is reflected in the fact that there is a whole chapter in this Handbook by Jeremy Williams devoted to the topic. The detail of this discussion will not be repeated here, where the focus will be on academic integrity in the dissertation.

Jeremy Williams identifies three types of plagiarist. The 'lazy plagiarist' takes the work of another author and puts his or her own name to it, and may use a 'cheat' site in order to purchase a dissertation or part thereof. The 'cunning plagiarist' uses the work of another author or authors, but changes things sufficiently to avoid detection. 'Cut-and-paste' characterises this approach. The 'accidental plagiarist' does not even realise that they are plagiarising – for example, they may have taken notes on a journal article in the early stages of their research without realising that they were simply noting down the original author's words. They then construct their dissertation from those notes. In some cases, students from a Confucian tradition may believe that in reproducing the words of the experts they are paying them a compliment, and may find it culturally difficult to criticise or even amend what has been printed in a textbook. The use of anti-plagiarism software will throw up examples of all three types.

In the email survey of UK economics departments, most made use of TurnitinUK as a way of identifying whether plagiarism has taken place. The convenience of this is that a dissertation submitted via a VLE can be automatically screened for overlap with TurnitinUK's growing database. The disadvantage is that the output produced by the software requires very careful interpretation. The software produces a *Similarity Index (SI),* which quantifies the degree of overlap with material in the database. A high SI does not necessarily indicate plagiarism, but it does help to highlight which dissertation submissions are suspicious.

An important practical point to remember is that when students submit their dissertation they should not only be asked to sign a declaration stating that the work is their own, but also that they understand what is meant by academic integrity and that their dissertation will be checked by TurnitinUK.

Sample declaration for students to sign on submission:

I understand that by signing the declaration below, I have read and accepted the following statements:

- I have read and understood the University's Academic Integrity Statement for Students, including the information on practice to avoid given the

Statement and that in the attached submission I have worked within the expectations of this Statement.
- I am aware that failure to act in accordance with the Academic Integrity Statement for Students may lead to the imposition of penalties which, for the most serious cases, may include termination of the programme.

I consent to the University copying and distributing any or all of my work in any form and using third parties (who may be based outside the EU/EEA). This may include the use of anti-plagiarism software (e.g. TurnitinUK) to verify whether my work contains plagiarised material, and for quality assurance purposes.

Perhaps more valuable than its diagnostic properties is the deterrent value of TurnitinUK. The very fact that all dissertations are to be screened may encourage students to take care in their work. If this does not suffice, then a practical demonstration may be effective.

Encouraging good academic practice

Find a brief paper written by a member of staff in the department and submit it to TurnitinUK. Then hack the article about. Include some quotations (some with, some without quotation marks), paraphrase some passages, introduce some new material. Submit the revised version to TurnitinUK.

Arrange a session for all students writing a dissertation, and show them the TurnitinUK output on the amended version. Let them see what we see as examiners. Point out the key examples of bad practice that we can readily recognise.

This exercise can have a dramatic effect. In one academic year, I (as the School's Academic Integrity Officer) had to investigate 10 breaches of academic integrity in economics dissertations. Penalties were imposed in all cases. The following year, having demonstrated the examiner's eye view of the TurnitinUK output, not one single case emerged.

More difficult to detect is where students commission a third party to produced their dissertation for them – either to order, or off the peg from subscription websites. TurnitinUK may or may not identify these cases, although I have known one case where the dissertation that had been purchased was picked up because some paragraphs from it were used as an advert on the website, and were thus caught by TurnitinUK. The risks of being caught may be lower for this form of cheating – but the penalties are likely to be more severe.

An important part of the fight for academic integrity is to make sure that all supervisors are familiar with your university's procedures for dealing with breaches of academic integrity, and with how to interpret the TurnitinUK output.

This is a key part of ensuring consistency in supervision and equity of treatment across students. It is wise to make sure that the general principles of academic integrity are covered in joint sessions to all students, rather than this being left as part of the responsibility of the individual supervisor. Student handbooks also need to carry clear guidance on your institution's policies and procedures.

More discussion on academic integrity may be found in the Handbook chapter by Jeremy Williams.

4. An alternative to the dissertation?

If it is accepted that all honours students should be exposed to 'current research, or equivalent advanced scholarship, in the discipline…' (QAA), then can the dissertation be avoided?

It could be argued that if we provide *research-led teaching*, then this in itself ensures that students will fit the bill in terms of exposure to research. But what do we mean by 'research-led teaching'? Does it mean that academic staff are given the opportunity to teach in their specialist research areas? Is that enough? How do we ensure that students engage with this process? If we cannot be sure about the answer to these questions, then is the dissertation the only solution?

To some extent, a research-led approach can be embedded within the normal curriculum. Modules can be designed in such a way as to enhance the students' ability to develop critical and evaluative thinking skills and thereby support and promote independent learning. This approach can be reinforced by a research-led approach to assessment and may be most straightforward in econometric or other quantitative methods modules, where students can be required to find, analyse and interpret their own data. A similar approach can be adopted for other modules. A development economics module can require students to prepare a report on a particular country; students could be required to evaluate a recent report from the CMA. Such exercises can encourage and engender a sense of discovery and engage students in a reflective and self-critical process. There is much more discussion or undergraduate research in economics in KimMarie Goldrick's chapter in this Handbook.

An alternative approach would be to run a seminar or tutorial-based module, in which students are required to provide critical evaluation of recent research, probably through the vehicle of appropriate journal articles. This sort of exercise can also provide students with the opportunity to develop their presentation skills, and could be part of a module that also includes sessions on aspects of research in economics. Such presentations could be given in a quasi-conference setting, if the number of students permits.

5. Summary

A well-organised dissertation can be the most rewarding part of the student experience. However, this may require careful thought and planning if it is not to turn into a nightmare. Here are some key points to remember as the dissertation life-cycle unfolds:

- Think about how research training will be provided
- Ensure that students are guided towards a feasible topic
- Be aware of the legislative context
- Give early rules on word length
- Manage student and supervisor expectations of the supervisory process
- Look for a coherent way of allocating students to supervisors
- Set intermediate targets to prevent students leaving too much to the last minute
- Be aware of data issues
- Provide guidance in terms of how to structure a dissertation
- Offer clear guidelines for the assessment process, so that students know what is expected of them
- Be unambiguous in setting deadlines and the rules for extensions
- Explain academic integrity and monitor adherence

Students can benefit greatly from undertaking a dissertation. The process can capture their interest and give them confidence to engage in independent work. The finished product can be used to sell their abilities to potential employers, by showcasing their skills. Supervisors can add to the experience by making sure that students are aware of these benefits. Furthermore, students often enjoy their dissertation work.

References

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Neugeboren, R. (2005) *The Student's Guide to Writing Economics.* London: Routledge. ISBN 9780415701235

"Doing a dissertation" in the 'Studying economics' section of the Economics Network website.

If you Google 'dissertations in economics' you will find many websites that claim to provide help and guidance. Some of these will be helpful to students e.g. the guide by Paul Dudenhefer; other links take you to guides provided by various Universities for their students. However, care is needed here, as students may also find offers from tutors prepared to write their dissertations at a price...

Other chapters in the *Handbook for Economics Lecturers* augment this guide. In particular:

KimMarie McGoldrick, *Undergraduate Research in Economics*

Jeremy B. Williams, *Plagiarism: Deterrence, Detection and Prevention*

Appendices

1. The undergraduate dissertation in UG economics in the UK: A brief survey
2. Risk assessment form
3. Ethics checklist
4. Grade descriptors
5. Self-assessment form

Open Educational Resources in Economics

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Contents

1. Why open?

> "[O]penness can be argued to be at the very core of higher education in the 21st century. In its most positive interpretation it is the means by which higher education becomes more relevant to society, by opening up its knowledge and access to its services. It provides the means by which higher education adapts to the changed context of the digital world."
> -Martin Weller, "The Battle for Open"

1.1 Tales of deadweight loss

This chapter is about sharing educational resources and about the wealth of educational material for economics that is freely available. Before we look at the advantages of sharing, consider the wasted effort in the current system. Situations like these may be familiar:

- An economist in another institution has created a witty introduction to their field with recommended readings, but now they've retired and are not on email, and the references are starting to look dated. You could copy the list and apply some updates, but you do not own the copyright. Copyright applies automatically to an original work whether the author makes a copyright statement or not, and, for written works, does not expire until seventy years after the author's death.[1]
- A decade ago, a couple of academics created a site that gives an engaging and original overview of their field. However, the site uses an animated navigation widget that does not work with modern browsers, and the site's authors have moved on to other careers. Just copying their content to another site and linking its pages together without the widget would help that content reach a new audience. The authors might be okay with this, but haven't declared the conditions for reuse of the site. They have moved on to other careers and their contact details no longer work.
- A funded project created a site with a set of educational materials. Now that the funding stream has ended and the staff have moved to other roles, it is no one's job to keep the site running. When the domain name elapses, the site will disappear although the material, with some tweaks, could still be useful.

We could do things differently. We could see copyright restrictions and technical barriers, that make sense in the commercial realm, as restricting educational resources from their full potential. When we create work, we could declare our intentions for it up front, so people do not have to take time asking us. We could work to free up education from some of these barriers while maintaining quality and making sure that creators of materials are properly credited.

This "opening up" of content can be done at any scale. The term "Open Educational Resources" can encompass institutional projects to put all course materials online by default, or it can refer to someone sharing a photograph on a site such as Flickr, with permission for other people to use it in teaching (Weller (2010)).[2]

1.2 Benefits of openness

The benefits to learners, teaching staff, and universities of releasing open educational resources have been widely studied.[3] For the purposes of this chapter, they can be grouped under three main headings:

- *Showcasing:* open course materials are encountered outside academia, contributing to a better-informed public, especially to better-informed prospective students.
- *Productivity improvements:* things that we do anyway can be done more easily, to a higher standard and more sustainably.
- *Transformation:* a changed environment of educational resources enables (some would say *requires*) new approaches to teaching.

1.2.1 Showcasing

The free availability of education resources means prospective students are potentially better-informed about university subjects and about individual courses. Insofar as they take this opportunity, this should result in better enrolment choices and, down the line, greater satisfaction. The Open University has made a particular success of marketing courses by releasing open resources, generating thousands of new student enrolments (Weller (2010)).

The platforms considered later in this chapter, such as YouTube and iTunesU, are marketplaces of ideas in which market share produces tangible gains. Some institutions are highly visible on these platforms, but many are not. Those who make themselves visible by sharing good materials in a subject, as the Open University have done for many subjects including economics, create an association between that subject and their institution, especially among people who have not yet thought about formally studying the subject. Institutions that choose not to engage are, in effect, choosing to be less well-known.

A corollary of this benefit is better management of intellectual property. A formal process for releasing material openly online, including free licences, makes clear the rights of the university, the staff member, and third parties. If the staff member moves to another institution, they can continue to use the materials they've created even if the institution owns their copyright. Depositing materials in a public online archive makes it easy to show primacy if those materials are copied by someone else.

Top Tip:

If you are collaborating to create educational or reference materials, take a group decision *right at the start* about intellectual property. Will this be an open resource that people can adapt, or will you keep all copyright protections, with risks for sustainability? Licences are discussed in Section 4.

1.2.2 Productivity

Each course is different, and each lecturer is different. Any course will mix core concepts with the lecturers' own ideas and examples. Open sharing is an opportunity to reduce duplicated effort in producing diagrams and graphs that are used in many courses. It is also an opportunity to specialise and trade, spending more time on what is distinctive to your own course and your own style of teaching.

As educational materials become more of a shared, global resource, individual teaching staff have more opportunity to reach a global audience, whether by sharing their lectures on YouTube, or creating text or interactive tutorials. A star lecturer would previously have audiences in the hundreds. Now, they can have audiences of hundreds of thousands, via lecture capture and video sharing sites such as YouTube.

From the students' perspective, shared resources give them a much broader set of explanations to draw on for any given topic, so they have more ways forward if the textbook's or lecturer's explanation does not work for them.

In this context, shared learning resources does not mean greater intellectual uniformity. The open approach is about sharing and remixing, removing duplicated effort in production of "core" materials, so it actually favours intellectual diversity. For instance a standard set of materials explaining the axioms of rational choice theory could be annotated with explanations of why the axioms are implausible as descriptions of individual human choices. A detailed diagram of an economic model could be used in different educational contexts and educational levels, depending on how it is presented and annotated.

The quality of resources is naturally going to be more important to learners and educators than their licence, but ease of access is also important to them, especially for learners whose study involve multiple spaces and devices; a laptop at home, a mobile device on the bus, and other devices in a department or library.

The Finance and Economics Experimental Laboratory at Exeter (FEELE) lab used Wikiversity (one of Wikipedia's sister sites) to document a range of Economics Classroom Experiments in 2007 and 2008. The Wikiversity community have recognised the quality of the material, badging the collection as a Featured Resource. They have taken care of keeping the software up to date, fixing vandalism and correcting minor errors. The open platform means that this material can be shared more sustainably than if it were on its own dedicated server.

Some of the open resources considered later in this chapter are remixable textbooks. Roshan Khattry, who introduced an open textbook at Spokane College in the US, found that adapting it to the course took a lot of work, but gave more autonomy to the course leader. Whereas a failing of a traditional textbook would have to be raised and discussed in a committee, adapting the open textbook is something he can do straight away.[4]

1.2.3 Transformation

The OER Research Hub is a long-term project to evaluate claims about OERs. In a report they published in 2014, they find strong evidence that "OER use and exposure

leads to reflection on practice by educators. It causes them to incorporate a wider range of content, to consider different teaching approaches and to reflect upon their role as educator."[5] One driver of transformation is the change in teaching practice as staff are exposed to a greater variety of ways of explaining economic concepts. Another driver is the changed expectations of students, who have seen some of this variety online.

One aspect of changed pedagogy is the flipped classroom, where students watch video tutorials, and what was lecture time is used for other activities such as problem solving, case studies, or debates. Shirky (2005) observes, "We ask students to read the best works we can find, whoever produced them and where, but we only ask them to listen to the best lecture a local employee can produce that morning."[6] Flipping is discussed in the Lectures chapter of this handbook.

Online access to the best lecturers or best animations will mean that students are better informed about economics and about specific concepts, but will also raise student expectations about their experience of university. It will mean lecturers spend less time repeating the standard presentation of the standard concepts, and more time finding their own memorable mark on the topic, whether in examples or delivery.

The advent of drum machines and similar music technology prompted a wave of interest in James Brown records whose drummers did a lot more than just keep the beat. While the technology undercut the demand for mediocre drummers, it created a premium for that hard-to-capture soulful quality. As online resources and communities make explanations of economic topics more freely available, institutions and instructors need to discover and emphasise their own distinctive offering.

Another way openness drives transformation is that students need to be more involved in the selection and evaluation of resources. No matter what is on the reading list provided by the lecturer, the ease and immediacy of Google and similar tools mean that students will turn them for help understanding difficult concepts. In effect there is a "shadow reading list" of material that students are finding online, which will be of varying quality. So critically evaluating resources for their credibility and relevance to the course needs to be no longer the preserve of the course leader but done collaboratively between learners and staff. The skill of critical evaluation needs to be introduced early on in the course and develop in parallel with understanding of the subject.

These examples illustrate that by responding to the way open resources have transformed the online world, courses become more student-centred: this is how open educational resources lead eventually to open educational practice.[7]

It is not obvious on first inspection, but some of Wikipedia's articles on economic topics were written by university students in exchange for credit. A Rice University module on Poverty, Justice and Human Capabilities has substantially improved many articles over the years, among them *Water scarcity*, *Illegal drug trade*, *Food security*, *Microfinance*, and *Economy of Nicaragua*. As well as improving their chosen articles, following the site's guidelines, students had to review each other's work and respond to feedback and review from the Wikipedia community.

Although there is a stage fright to overcome about writing in the open, the student authors are rewarded with a very wide readership: the five articles mentioned get well

over a million hits per year between them. This sort of activity illustrates that open education is are not just about free supplements or alternatives to standard textbooks, but more active and creative ways for students to engage with resources.

Footnotes

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2. Open education and other open movements

There are movements towards openness in education, in research, in public services, in heritage organisations such as museums, and in creative fields such as photography and music. These different movements support each other: an educator creating slides can draw on freely available photographs from archives, or figures from open-access research papers. Hence it is worth taking a quick overview of five kinds of "open" and the links between them.

All the open definitions centre on the rights of users: the right to access and use something, adapt it, and republish the thing or its adapted versions while appropriately crediting its original authors. Often these are phrased as freedoms, and sometimes the adjective "free" is used rather than "open" (as in "Free Software movement" or "Wikipedia, the free encyclopedia") but the ambiguity of the word "free" can be confusing. This chapter will use "open".

Contents

2.1 Open Education

The Cape Town Open Education Declaration (2007) asks all educators to release their resources openly, arguing that this "will help teachers excel in their work and provide new opportunities for visibility and global impact. They will accelerate innovation in teaching. They will give more control over learning to the learners themselves."

"Open Education" encompasses more than just whether resources for learning are openly and freely accessible. The Cape Town definition includes innovative approaches to assessment and collaborative learning. The term Open Educational Practices (OEPs) captures this idea that open education is not just about resources, but about the context and practice of learning.

The open education movement has evolved in multiple, even contradictory ways over the past decade. One outcome of this evolution is a large amount of educational material freely accessible online, often driven by charities and other funding bodies. We look at some of this in detail in the next chapter.

Another outcome is the growth of online courses open to public enrolment. The term Massive Open Online Course (MOOC) has become fashionable, although it is almost always a misnomer.[1]

Some courses using the MOOC label are massive in the sense of attempting to build a network of interactions between learners, encouraging them to respond to the course

material, and each other, in varying forms across multiple online platforms. A different kind of MOOC has become more common: a kind of Virtual Learning Environment with public enrolment, connecting a large number of people to video lectures, quizzes or worksheets, and discussion forums. Often these are supported by a commercial start-up company in partnership with a university. So there are MOOCs that involve some abdication of status by the course leader in the service of a distinctively online, distributed context for learning,[2] while others bring a more didactic form of teaching to a mass audience, building on and reinforcing the star status of the best-known lecturers.

While they were initially promoted as a challenge to the fundamental business model of universities, enthusiasm (and fear) for MOOCs has waned and they are now more likely to be seen as a marketing option; not sustainable in themselves, but viable as a way to publicise conventional courses and institutions.[3] One way the MOOC label is misleading is that MOOCs do not usually lead to substantial sharing of resources on the open internet, although they offer learning *experiences* rather than mere access to resources.

Widely different positions on a spectrum of open education are illustrated by visiting MIT OpenCourseWare (an open archive of educational resources) and FutureLearn (a UK-based MOOC platform). OpenCourseWare makes complete sets of course material freely accessible. Its long-term nature means that a large amount of material is available, including a lot that is out of date. By contrast, FutureLearn is very time-specific and frequently changing. At the time of writing it offers several opportunities to sign up for economics-related courses running in the near future, but no chance to look over what staff or learners produced in previous courses.

The people best-placed to benefit from a mass online course are usually those with the subject background and intellectual discipline gained from already having a degree. So while MOOCs were initially promoted as democratising the world of education and promoting equality, their greatest benefits have gone to those who are already well provided-for.[4]

Alongside the changes within higher education there have been other developments bringing education to the masses, less remarked-upon because they are happening in plain sight. Mainstream online communities are increasingly being used for learning activities. YouTube videos about mathematical and scientific subjects get a large audience: it is not hard to find videos on economic topics that have half a million views. Communities where people share and remix images, such as Flickr and Wikimedia, have created tens of millions of images with a educational purpose. The barrier between formal learning “in academia” and informal learning has eroded as more university courses make use of these platforms.

Comment and discussion features on sites like YouTube can bring out the most ill-informed opinions but, when the will is there, online communities can support a conversation that is respectful and substantive while still involving large numbers of people. The discussion site Reddit has Ask Me Anything (AMA) events where academic experts answer questions that have been voted on by the community. Economists taking this opportunity include macroeconomist Brad DeLong, Marxist Richard D Wolff and

libertarian Bryan Caplan. Online discussions can also bring campus-based students into contact with external experts such as entrepreneurs.

Blogging is another way an academic expert can build up a set of resources through an ongoing dialogue; posting their own observations or commentary on other sources and generating responses from the public.

2.2 Open Access

The open access movement presses for papers and other outputs of research to be available to the public without restriction. In the language of the Budapest Open Access Declaration (2002), this level of access will "accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, [and] make this literature as useful as it can be".

On the recommendation of the UK Government's 2012 Finch Report, Research Councils UK and the Higher Education Funding Council for England have taken up policies that encourage publicly-funded research to be published openly under licences that permit adaptation and reuse.[5]

One link between open access and open education is that if more research is freely available online, students and independent learners can consult it through home and mobile networks as easily as on-campus. This is one reason why student voices are prominent among those calling for open access, such as the Right to Research Coalition.

Another link is that if research publications can be adapted for other purposes, they can be adapted into educational materials. For example, the figures from an open access research paper could be used in educational slides or summaries.

2.3 Open Data

Data that are published are not necessarily open. A data table in a PDF document is not directly linkable and it is not guaranteed that applications will be able to extract it and process it. Even data that are easily accessible can still have legal restrictions. Open data is defined by having no technical or legal restrictions on its reuse. The Panton Principles summarise the Open Data movement's goal that "data related to published science should be explicitly placed in the public domain."

Open data are increasingly seen as essential infrastructure for business and research, including by the World Bank and by the G8 countries, who have committed to making a lot of their public-sector data openly available. In the UK, these are published on the Data.gov.uk portal.

The Data.gov portal has a search option for data that have minimal restrictions on

One open data project that supports education is Wikidata, a sister project of Wikipedia. This human- and machine-readable database makes

it possible for programmers to create interactive objects such as maps of economists' birthplaces.

2.4 Open Source Software

When software is open source, its underlying code is published, rather than the confidential property of the authors. Users can study what the code is doing, which is useful when the code uses private information (such as a web browser) or when it is crucial to research. The designation "free software" implies that users can also alter and redistribute the code. Open source software is ubiquitous: the Internet would not function without it, nor would Android phones or Apple devices. Services like Github enable public sharing of code along with version-tracking and collaboration.

Open source and open data connect to the reliability of research. It is one thing to read that an analysis of a data set gives a particular result; another to have access to the data and code needed to replicate the analysis. Students could even conduct a replication as an assignment and share their results, contributing to open education. That is the idea behind ReplicationWiki, a project hosted by the University of Göttingen to encourage replications of econometric research. ReplicationWiki includes a database of published studies that have not been replicated, and allows users to record successful or failed replications as well as difficulties getting hold of the raw data.

2.5 Open Culture

Any kind of creative work, including images, music, or video, can be freely reusable or have all rights reserved. By default, copying requires the permission of the copyright owner. Since Adam Smith's and Thomas Malthus' works are out of copyright, there are editions of *Wealth of Nations* or *Essay on the Principle of Population* that you can distribute freely without permission, even an altered version with annotations. Just grab the text from the History of Economic Thought archive or Wikisource.

Copyright applies automatically to an original creative work, and normally elapses seventy years after the creator's death (though there are several exceptions, such as a shorter term for and broadcasts and sound recordings).[6] If default copyright protections are too restrictive — for example if something is best used by being shared widely — the creators or owners can use an open licence to encourage reuse. In the UK, new government publications (for example from the Treasury) by default have the permissive Open Government Licence. No permission is needed to adapt them for educational use or other purposes, so long as you follow the terms of that licence, which include citing the source.

Open culture supports open education in that, if you are looking to create freely reusable educational materials, the source images or other content need to be freely reusable. Even if your own materials are not open, it's an advantage if you can use a variety of images and other source materials, knowing there is no requirement to pay royalties or obtain permission from the owner. Later on in this handbook chapter we will look at finding freely reusable images, video, and audio.

2.6 Top tips: correcting common misconceptions about the commons

- Working in the open does not allow other people to misrepresent your work. The rights to copy and alter a creative work are just one set of intellectual property rights: *moral* rights, such as the right to object to derogatory treatment or to object to false attribution, are a separate area, and are not sacrificed by adopting an open licence. So when you allow your work to be copied, you are not giving others permission to pass off your work as their own, nor to claim their work as yours.
- Open is not the same as Creative Commons. Making research outputs or educational materials openly remixable often involves reserving some rights via a CC licence, instead of the default "all rights reserved", However, not all CC licences are appropriate, and CC licences themselves do not necessarily mean open education. There are several varieties of Creative Commons licence and some of them forbid any alteration to the material. Certain formats such as PDF are hard to alter: opening up that content involves not just a liberal licence, but sharing the Word document or LaTeX source. Open is better thought of as an attitude towards collaboration and reuse, facilitated by CC licences amongst other tools.

Footnotes

[1] David Wiley (1 July 2012) "The MOOC misnomer"

[2] K. Masters. "A Brief Guide To Understanding MOOCs". *The Internet Journal of Medical Education*. 2011 Volume 1 Number 2. DOI: 10.5580/1f21

[3] Steve Kolowich (5 February 2015) "The MOOC Hype Fades, in 3 Charts" *The Chronicle of Higher Education*

Ioana Literat (2015) "Implications of massive open online courses for higher education: mitigating or reifying educational inequities?", *Higher Education Research & Development*, 34:6, 1164-1177, DOI: 10.1080/07294360.2015.1024624

[4] Ioana Literat (2015) op. cit.

[5] Higher Education Funding Council for England (July 2015) "What is Open Access?" In *Policy Guide: Open Access Research*

[6] The National Archives (2013) "Copyright and related rights"

3. Finding and sharing open resources for economics

The tools for finding and sharing open resources include tailored collections of material, specialist educational databases, and general web search engines. Some tools are dedicated to open educational resources, while others combine open resources with other categories.

With any tool for finding material, there is a tradeoff. A general sharing site such as YouTube will host anyone and everyone's opinion on economic topics, from conspiracy theorists to Nobel laureates. An institutional showcase will have higher overall quality but is less likely to have exactly what you want. Lacking the time to post your material to every possible forum, you face that same trade-off when sharing materials: whether to put things on mass-audience sites where most people are looking for them, or on specialist sites where they will be highlighted.

One starting point is the Economics Network links database which is regularly updated with educational resources across dozens of economic topics. Resources with open licences appear higher up on the page. Merlot is a US-based database which links to more than a thousand educational resources for economics, with options for users to comment and review.

3.1 Economics projects

Among the many publicly-funded projects hosting open educational resources, some are specific to economics, or to the social sciences. Although the official funding period for these projects is over, it is still possible to add your own materials to these showcases.

TRUE

Teaching Resources for Undergraduate Economics is a series of sub-sites hosted by the Economics Network, sharing resources for second and third year economics modules under a Creative Commons NonCommercial Attribution licence. Each has been set up by an academic subject specialist, and it is still possible to submit material of any kind to showcase on the site.

DeSTRESS

DeSTRESS is a collection of reusable resources for contextualising statistics in social sciences. It includes twenty professionally-produced videos hosted by Ken Heather of the University of Portsmouth, along with handouts, interactive graphs and other types of resource. The videos can be watched on YouTube or downloaded directly for offline use.

METAL

A forerunner of DeSTRESS, the METAL project consists of various resources to help teach mathematical concepts in a setting of real-world economics decisions. They include a set of 73 videos, shorter than the DeSTRESS videos, presented by Ken Heather, with worked examples. The materials have a variety of licences.

3.2 Institutional collections

Some institutions run their own repositories of freely reusable materials as a way to drive interest in their courses and to support open education. A few of them have substantial amounts of material relevant to economics.

MIT OpenCourseWare started in 2001 and has been very influential in the open education movement. Thousands of courses—including dozens in Economics—are represented in some form: sometimes just a reading list, sometimes a complete set of course materials.

The University of Nottingham's repository, U-Now, has a variety of materials including slides and audio podcasts. The Open University has OpenLearn, which is strong in introductory material for economics and statistics.

3.3 Open textbook collections

OpenStax

OpenStax is a charity, connected to Rice University, which is creating a set of peer-reviewed open textbooks, including one in Economics. All their material has a very liberal licence so readers can do practically anything they like with the material as long as they attribute the source. You can browse community-created remixes which provide free alternatives to specific editions of commercial textbooks. OpenStax are partners in the UK Open Textbook Project which is adapting textbooks for the UK and building a network of adopters.

CORE

CORE is based at University College, London, and backed by a consortium of universities in the UK and internationally. Its funders include HM Treasury. It has created an e-book and related resources to support a distinctively post-crash module in economics, with topical illustrations of central ideas, examples driven by data, and broader theoretical perspectives than standard modules. The licence is Creative

Commons Attribution-NonCommercial-NoDerivatives so it is possible to copy content to other platforms for educational use.

Saylor

Saylor Academy is another charity offering sets of course materials to cover core modules in Economics and other subjects. A lot of their content consists of links to materials elsewhere online, such as Khan Academy videos. Some of these modules are under active development; those that are not are in a dedicated "legacy" area of the site.

School of data

This is an unusual charitable project, providing not a conventional textbook but dozens of online modules aiming to help learners work with data, including "How is aid data used in the media?" They encourage copying and adaptation of their materials.

Boundless

Boundless is a company offering textbooks and related materials under a licence that allows copying and adaptation. There are intrusive adverts scattered through the content for unregistered users. For those who want to pay, the site offers a learning management system.

Wikibooks

This is a sister-site of Wikipedia, using the same collaborative process to create open textbooks. The economics section of Wikibooks is mostly a graveyard of skeletal books that were started off with good intentions but abandoned. On the other hand, the platform allows interesting projects, including those in which students create their own textbook. The Bestiary of Behavioral Economics, created by students in 2012, is an example.

3.4 Media sharing sites

Most people looking for an economics video will go to a video site and search for "economics" rather than the other way round. Image-sharing and video-sharing sites are among the first places that anyone looks. This section looks at some of the most popular

sites, in each case describing what it does, a key strength and key weakness, and examples relevant to economics.

YouTube

Although there are competitor sites, YouTube is where most video gets uploaded and watched. It is open to anyone with an opinion, so although there is a large amount of academic material, it is surrounded by political rants and conspiracy theories. A lot of YouTube's educational content in economics is listed in the Economics Network's Video and Audio index, but even this is just the tip of the iceberg.

YouTube's strengths are that its videos can be embedded in other sites, and that viewers with an account can subscribe to channels they are interested in and be notified of new videos. You can organise videos—your own or other people's—into playlists which have their own link; for example the sequence of videos associated with a particular course.

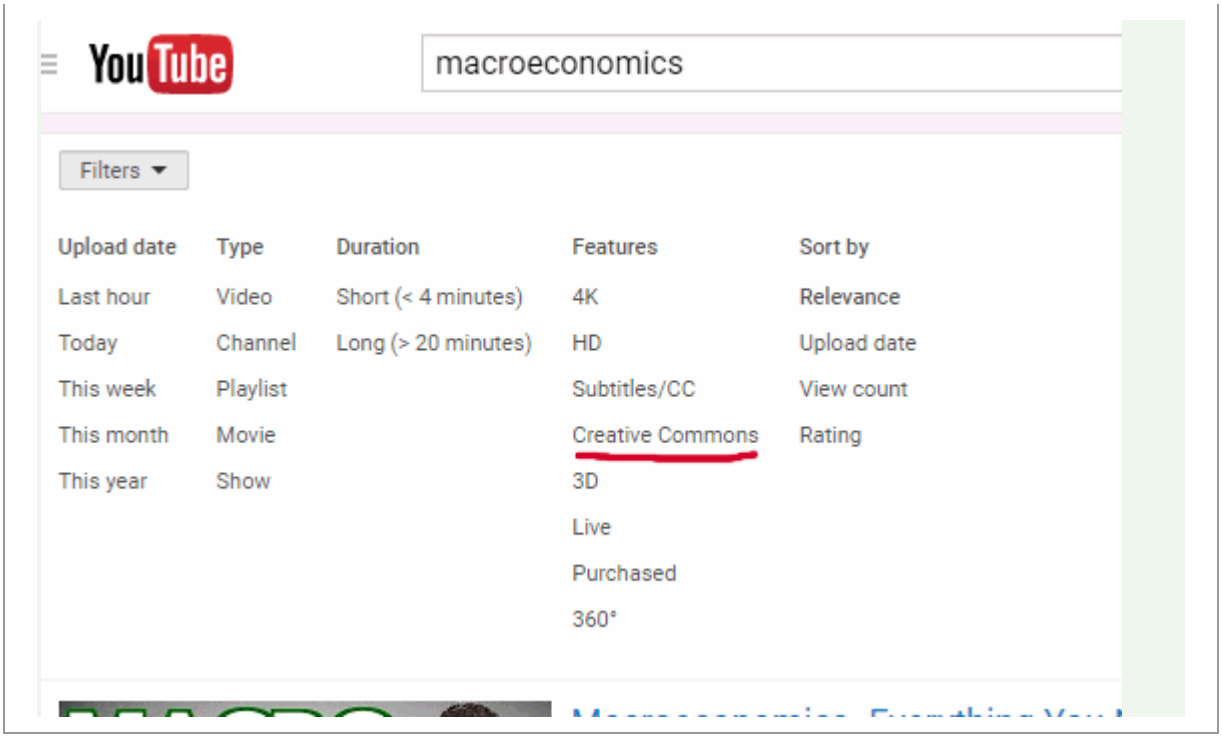
Contributors benefit from extensive analytics, showing how many people viewed each video, how much time they spent watching and how they responded. The comments sections of YouTube are notoriously infantile, but video owners can set it so that comments have to be approved before being publicly visible. In 2010, the Open University reported that their most popular YouTube videos were getting more views than television broadcasts on BBC4 or even BBC2.[1]

When uploading a video, you can choose either the Standard YouTube Licence (which effectively reserves all rights, but lets YouTube host and distribute the video) or a Creative Commons Attribution-only (CC-BY) licence. YouTube has a built-in video editor that allows users to create videos from existing, suitably licensed YouTube videos, and which automatically credits and links the source videos. If your videos have another CC licence, you can specify it in the description. Almost all the video lectures shared by the University of Utah Economics Department have the attribution-only licence.

- Strength: Huge volume of material, easily bookmarked or integrated with other materials and clearly labelled with what is fully copyrighted and what is freely reusable.
- Weakness: Comments and "related" videos can drag viewers into conspiracy theories and other junk.

Top tip:

Once you do a search in YouTube, click "Filters" to bring up a menu of ways to customise the search. You can restrict the search to videos shorter than 4 minutes, videos uploaded in the past year, or freely remixable videos, among other options.



Wikimedia Commons

This is a media repository hosted by the same charity behind Wikipedia, and maintained by a similar volunteer community. The name reflects that all the files here (mainly photographs and diagrams, but also some video and audio clips) are freely reusable by anyone for any purpose. Each file comes with different download options and, when you scroll down, the conditions for reuse, which vary.

Almost all of the images that illustrate Wikipedia and Wikiversity are hosted on Commons, and the site's purpose is to help resources created on these and other education or reference sites. For this reason, Commons is solely for images with educational or research value, although that is interpreted very broadly. This means the site avoids the huge numbers of holiday snaps and "selfies" that pour onto other image-sharing sites. A lot of the images here have come from museums, libraries and archives, or even from figures in open access research papers. The site is multilingual so, on searching for a particular diagram, you might find the exact type you want, but labelled in the wrong language.

If an image was generated by a piece of code, it is possible to include the code along with the image, including links to data sources. The Wikipedia article on TED Spread is illustrated with a graph generated from official data with some R code. The code, data, and link to the data source are shared along with the image on Commons, allowing others to update the graph.

For a site that aims to support education, it is frustrating that Commons does not support office file formats, including slide shows or spreadsheets, because it is hard to protect them from viruses. Slides and documents do get shared on Commons in the form of PDFs, but this discourages remixing and repurposing. Graphs can be shared as vector diagrams in the SVG (Scalable Vector Graphics) format which is editable in desktop publishing software but not in Microsoft Office.

- Strength: Everything here has both an educational purpose and a licence allowing free reuse by anyone.
- Weakness: A confusing interface compared to commercial sites

Top Tip:

The icons above each image give instructions for reuse in various contexts (online, in print etc.). Below the image are links to download in different resolutions. For an image to use in a Powerpoint, downloading an 800-pixel-tall version will be more efficient than a 3000-pixel-tall version.

Flickr

To get a picture of an identifiable thing, not necessarily with an educational purpose, Flickr's truly enormous database of images is very likely to be helpful. Some cultural institutions such as the British Library or the Smithsonian share image collections here so, as with Commons, you can stumble on images of genuine historical interest.

From an uploader's perspective, Flickr has a very nice interface for adding and tagging files with description, location and other information. As with other services in this section (see Slideshare and Soundcloud below) there is a subscription version, but the free version gives you all the functions you practically need unless you are sharing a lot of content.

When I wanted images of the City of London and central Nairobi, and restricted the search to images I could use in a presentation without asking permission, Flickr obliged with these:

The Square Mile by Michael Garnett via Flickr, CC-BY-NC

Central Nairobi by Ninara via Flickr, CC-BY

- Strength: A huge number of images for every conceivable purpose
- Weakness: It can be difficult to find suitable content for academic use amongst all that.

Top Tips:

- When you search on Flickr, the licence search options are in the top left of the screen, allowing you to only search for images that you can reproduce or modify. There are hundreds of millions of images on Flickr, so even a restricted search makes use of a large database.
- Beware that, intentionally or not, Flickr has a lot of incorrect licences. Someone might copy a page from *The Economist* and tag that image with a licence that allows free reuse, but the copyright in that image still resides with *The Economist*.

iTunesU

This is a service run by Apple that makes educational materials — including audio, video, and documents such as text transcripts — freely available through iTunes software. Whereas a site like YouTube lets anyone upload material, iTunesU has sharing agreements that cover a whole university, so you need to be in one of the partner institutions.

iTunesU content, like iTunes software itself, is free of charge to download, but not necessarily open in the sense of freely reusable: the licence is chosen by the institution.[2] Although iTunes works on a variety of platforms including iPads and desktop computers, there are users who cannot access it, so it is sensible to give an alternative route to the material. For example, the University of Oxford's audio programmes are released on the university's site as well as iTunes.

- Strength: convenience for end user, and a potentially very large audience for academic lectures.
- Weakness: a closed system that excludes a lot of users

60-Second Adventures in Economics is a series of short videos from the Open University, narrated by the comedian David Mitchell. It is available through iTunesU as both video and text transcripts, but also shared on YouTube. Imperial College Business School has audio programmes on a variety of economic topics, available both through iTunes and a direct download.

Top Tip:

You can make a web link to a resource in iTunesU, but the reader will have to have iTunes software on their computer to follow the link. Left-click on the download button and select "Copy link" from the menu that appears.

SlideShare

This site is mainly focused on presentation slides, but other document types are shared here as well. It gives a convenient way to turn a Powerpoint file into an interactive web page which can be shared and linked. SlideShare displays all the text from the

presentation to make it accessible to search engines. There is also a download link for the presentation file, if the uploader has allowed it.

The web presentation treats the slideshow mostly as a succession of still images, so if your presentation uses complicated animation, it won't be visible in the online version. However, YouTube videos can be incorporated into the slides.

- Strength: focused on one type of resource and with an active contributor community
- Weakness: university-level material on economics and business is mixed in with much more from other educational levels, or presentations from businesses

Stephen Kinsella of the University of Limerick, Ireland, shares more than 150 presentations on SlideShare. The Office for National Statistics also has an official presence with short summaries of newly released statistics and presentations from its research events.

Soundcloud

This site is for sharing all kinds of audio, including lectures or academic discussions. As with YouTube, any user can subscribe to the channels they are interested in, and assemble tracks into customised playlists which can be bookmarked and shared. End users can listen via the web or via a free app on a mobile device.

A distinctive feature is that comments can attach to a particular point in the timeline, so you can see what they are reacting to.

- Strength: Great for subscribing and bookmarking audio from events and news sources.
- Weakness: Principally a music site with a relatively small proportion of academic content

The Economist, the International Monetary Fund, and the London School of Economics are among those with a SoundCloud presence. There are also archived recordings of past events including the Festival of Economics in Bristol and the Warwick Economics Summer School.

Footnotes

[1] Mick Norman (2010) "The Economy of Free – Andrew Law, Director Multi-Platform Broadcasting, The Open University" University of Kent Unit for the Enhancement of Learning and Teaching

[2] Terese Bird (2011) "YouTube and iTunes U for Beyond-Text Open Educational Resources" Seminar presentation

4. Releasing your own resources

The open approach can be summed up in three points:

1. Whenever you share materials, **state your intentions**
2. **Be bold** in adapting material and allowing your material to be adapted
3. **Give credit** where credit is due

Contents

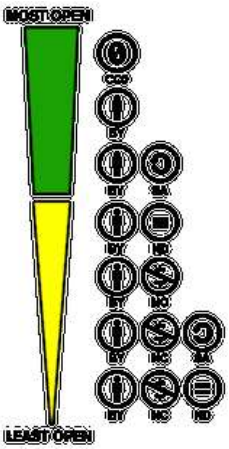
4.1 State your intentions

Every reader is a potential remixer, so make your intentions clear when putting anything online, from a photograph to an online textbook. Unless the licence is specified by your work contract, you have some freedom of choice in how you license your work. Do you want the reader to be able to make their own copies, update it, combine it with other materials, or do you forbid use without your advance permission? If you want reserve all rights, say so.

Use a standard licence. Resist the temptation to put "for educational use only" or your own wording. These are not legally pinned-down. The Creative Commons licences have been worked on by legal experts in the UK and internationally, in consultation with educators and other users. Sharing ought to be straightforward for creators and users, and any ambiguity works against this.

There are seven variations of Creative Commons, with different combinations of clauses such as Attribution required (BY), Share-Alike (SA), and Non-Commercial (NC). With the default "all rights reserved", this gives eight total choices.[1] Arguably this is already too complicated: more options only make it more confusing.

When uploading media to Flickr, YouTube, or Wikimedia Commons, you choose a licence as part of the upload process. On other platforms, selecting a licence just takes a little more thought.



Creative Commons licences from least to most restrictive. Image credit: Creative Commons CC-BY

The official page for each Creative Commons licence explains how to attach that licence to your work. It can be as simple as including a single sentence, ideally with a web link. For extra clarity, and for resources that might be used offline, repeat the licence text.


Statistics for Geography and Environmental Science: an introduction in R

Richard Harris

http://www.social-statistics.org

August 2011

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Notice — For any reuse or distribution, you must make clear to others the licence terms of this work.

Geographer Rich Harris of the University of Bristol has released his "Statistics for Geography and Environmental Science: an introduction in R" as a set of open resources. The first page of the Word document is a lay summary of the material's Attribution-NonCommercial ShareAlike licence, copied from the Creative Commons site.

A couple of considerations to be aware of:

- Creative Commons licences do not necessarily cover software, so if you distribute code you may need to declare a separate licence for that. For example, for the DeSTRESS interactive graphs, the text has a Creative Commons Attribution-ShareAlike licence while the code has an MIT licence. With software as with anything else, there are many established licences, so it is clearer to adopt one of these rather than coming up with your own wording.
- If you share slides or documents based on an institutional template, these might include the logo of your institution or department. These logos are not themselves freely reusable, so it is normal to point that out in small print: see the TRUE project sidebar for an example.

Performer's rights

Performer's rights are a separate category of rights from copyright, and a lecture counts as a performance: there are rights associated with it, separate from the copyright in the presentation materials. The performer's rights exist whether or not the presentation is in private, and whether or not there is an audience.

Universities are increasingly wording employment contracts so that they automatically have permission from lecturers to share footage of performances done in work time. When this is not the case, you may have to declare in writing that you are happy for recordings of your performance to be public.

If you are sharing a video of someone else, such as a guest lecturer or conference speaker, you need their (ideally written) permission, including a mention of performer's rights as well as rights in their presentation materials.[2]

4.2 Be bold and choose a liberal licence

Before we had a global digital information network, spreading information to the widest possible audience was costly. Now, global access is the easiest option and restricting information to a limited audience is costly. So it is not access to information that needs to be justified, but barriers to the flow of information.

It is almost impossible to anticipate the uses people will find for your work, and that this is a good thing. Putting a "No Derivatives" clause implies that the work is the best it could ever be for its purpose; that no tweaks anyone could make would improve it. In the case of educational material, it assumes that no one would have a need to update key facts. "No Derivatives" might be appropriate for something like a legal contract where even a small change of wording might render it useless, but not an educational resource which will need to be updated to remain useful.

Avoiding exploitation

How can we prevent exploitation of our work for commercial gain, while supporting those who use it for legitimate educational purposes? Creative Commons licences can have a "Non-commercial" clause which may seem an obvious solution. However, the clause has been notoriously hard to define in practice. When universities charge tuition fees and much research is published in subscription journals, education and research could be argued to be commercial activities. Educational use of material might involve posting it on YouTube or on a public blog, which would involve use of a commercial tool.

As Wild and Wilson (2013) write: "When choosing a CC BY-NC licence you might think that you only prevent use within the for-profit sector. This is not entirely true: you may actually prevent use within the public and non-profit sectors as well."[3] Some of the most high-profile platforms for educational material actually forbid non-commercial clauses, for example Wikimedia Commons.

The Non-Commercial clause may not be the ideal way to prevent exploitation, but there are alternatives. One way is to release material in a public showcase: charging for something that people can get easily at no charge is a terrible business model. The ShareAlike clause, requiring any altered versions to have the same licence as the original, is a further layer of protection. It prevents anyone from making a derivative version of your work, and then placing that version under restrictive copyright.

The above examples assume that people obey copyright law, but outright plagiarism (ignoring copyright law) is a possibility. However, this is a risk that comes with putting material online *in any form*, whether openly licenced or not.

4.3 Give credit where credit is due

When you download and use Creative Commons-licensed materials you are implicitly accepting a legal contract, so take seriously the requirements of the licence. You are usually required to attribute the author in the manner they specify, so for example you might be required to link to their web site. Often you are required to specify the licence, and it is a good idea to do that anyway.

Again, since every reader is potentially a remixer, somebody who sees an image in your presentation might want to use the same image in their own works. This is another reason to give an explicit path to that source. So credit the author, the licence, and the site where you found the item, like the examples in Section 3, not just "found via Google" or "found on Wikipedia".

Top tip:

If you use Creative Commons-licensed images in lecture slides, you can credit the source images in the foot of each slide *or* in a slide at the end.

Footnotes

[1] P2PU have a short online module to explain the different types of CC licence.

[2] "Recording lectures: legal considerations", a Jisc guide

"Recording lectures and participants' legal rights – what you should know" University of Manchester

[3] Joanna Wild & Rowan Wilson (2013) "CC-By: what does it mean for scholarly articles?" Open Access Oxford

5. Conclusion

The Budapest Declaration on Open Access promised that open access would "lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge". The Paris Declaration on Open Educational Resources said that open educational resources would "Improve both cost-efficiency and quality of teaching and learning outcomes". In one sense the promised revolution has not materialised: the impact so far within formal education may seem small. However, openness has transformed the online world that we all inhabit, whether as students, staff, or members of the public.[1] Some of the most popular sites on the internet are open educational resources, and together they share hundreds of millions of images, articles and other files for educational use.

Students come to university already familiar with Khan Academy, with Wikipedia, with iTunes and other openly available sources. Their choice of degree may well have been shaped by video clips and other materials found online. Openly available materials do not replace the university experience, but they can complement it, as supplements to diversify the presentation of an idea, or as building blocks to be repurposed in making new materials. They are a commons that anyone can draw on, and which professional educators are best placed to make innovative use of.

Footnotes

[1] Weller, M. 2014. *Battle for Open: How openness won and why it doesn't feel like victory*. London: Ubiquity Press. DOI: 10.5334/bam

Further reading

Association for Learning Technology Open Education Resources Special Interest Group (ALT OER SIG). This is a community, mainly based in UK higher education but with international contributions. It is one of the focal points for discussion of open practice in education — not just open educational resources — and you can follow or join in the discussion via its open mailing list, webinars, and community blog.

Open Education Handbook (2014), created as a project of the Education Working Group of the Open Knowledge Foundation, this aims to cover the area of open education quite comprehensively, with 47 sections each with links and pointers. This edition is hosted by Wikibooks, so if you see something you want to update, go ahead and click “Edit”.

Jisc guide to Open Educational Resources (revised version 2014) a guide for "senior managers, learning technologists, technical staff and educators interested in releasing OERs to the education community." and as such has an emphasis on institutional strategy.

Open Education: Fundamentals and Approaches (2017) a set of course materials for teaching staff, with five modules addressing different aspects of open education, created by a European project with partners including Coventry University.

Guide to Blogging in Economics

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Contents

1. Introduction

" 'I certainly have not found a comparable way to get my ideas out. It allows me to have a voice I would not otherwise get,' Mr [Brad] Setser says. Blogs have enabled economists to turn their microphones into megaphones." -"The invisible hand on the keyboard", *The Economist*, 3 August 2006

A blog is, in essence, an online diary-style website. Simple software enables writers to create short articles in a form, and publish at the press of a button. It is a quick-and-easy way to publish on the web without having to be a web geek. The articles appear on the site in chronological order, with the most recent at the top of the page. As time goes on, they are automatically archived by date and by topic.

What is the case for blogging among the economics community? One of the best known blogging economists, Brad DeLong of the University of California at Berkeley, says that blogging gives him access to an "invisible college" of people who will react to his opinions, point him to more interesting things, help him to raise the level of debate on economic issues and bring it to a mass audience. He neatly sums up blogging as "turbo charging of the public sphere of information and debate", which he hopes will make him smarter and more productive.

Blogs do this by being interactive. This takes many forms including: providing links to other websites, papers or blogs; allowing readers to comment on articles; producing a network of links, relationships and interactions across the web.

"Academically a blogpost boosts citations for the core article itself. It advertises your journal article in ways that can get it far more widely read than just pushing the article out into the ether to sink or swim on its own. A post reaches other researchers in your discipline. And because it's accessibly written, it travels well, goes overseas, gets re-tweeted and re-liked," writes Patrick Dunleavy of the LSE.

FT columnist Giles Wilkes reflects on various failings of the economics "blog-o-sphere", but still praises it for an unmatched insight into what the great minds of the day are thinking about.

"[I]ts ungated to-and-fro lets a reader eavesdrop on schools of academic thought in furious argument, rather than just be subject to whatever lecture a professor wishes to deliver. No one learns merely by reading conclusions. It is in the space between rival positions that insight sprouts up, from the synthesis of clashing thoughts."

Blogs have been around since the late 1990s according to blog pioneer Rebecca Blood, but took a while to go mainstream. In the US Presidential election of 2004 they began to be used as a major source of online news. Blogs behave in accordance with a power law whereby a small number of blogs enjoy a large

amount of influence, but a "long tail" of lower-ranked blogs collectively have a huge readership.

This guide has some useful pointers for newcomers to the world of blogging. It will start with the assumption that you have something to say; something that can be digested into a short article. It might be an update about your own research, or a reaction to current events. It could be a summary or critique of a paper or a book that you've been reading. It might be in a polished style, or a note-form list of things you've been reading or thinking about.

In the rest of this guide we will look at how to get this message out to an audience of fellow economists and lay people. We will explain different blogging platforms, but grisly technical detail will be unnecessary. Finally we will focus on specific uses of blogs in economics and some case studies of how they are used in teaching.

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- "Blog" / Wikipedia
- Blogs / from The Economist
- Power Laws, Weblogs and Inequality / Clay Shirky, 2003
- The Internet and Campaign 2004 / Pew Internet Research Center
- The Invisible College / J. Bradford DeLong, 2006
- How I learnt to love the economic blogosphere / Giles Wilkes, 2016
- State of the Blogosphere, 2008 / Technorati.com
- Weblogs a history and perspective / Rebecca Blood, 2000

2. Shared blogging platforms

Let's say you want to get your views out without setting up a blog. Perhaps you don't ever intend to run your own blog. Alternatively, you might consider starting a blog, but want to dip your toe in the water first, seeing how an audience reacts. There are various ways to get your essay to an existing audience.

Guest posts on an existing blog

When somebody has an established blog, they need a regular stream of new and interesting posts to maintain their audience. So it's an attractive option to host relevant one-off posts by guest authors. Some blogs welcome guest posts: others only publish the designated author or group of authors. It's entirely up to the blog owner.

So, you *might* be welcome as a guest author on someone's blog, but scattershot, unsolicited offers to write will get lost amongst the spam. Instead, follow your favourite blogs, offer constructive comments, and get to know what topics the blog owners are interested in and if they ever host guest posts. Get your name known to the owner(s) before contacting them to suggest the specific topic or perspective you could write about.

Be prepared for the response "I don't want to post that on my blog, but if you post it elsewhere, I'll link to it and discuss it." In this case, consider one of the publishing options below or in the next section.

The Conversation

Global Economy topic index of The Conversation

The Conversation is run by a consortium of universities and its aim is captured in the slogan "Academic rigour, journalistic flair". It provides commentary on all sorts of topical issues, written by qualified academic experts but for a lay audience. Articles might be topical in the sense of reacting to news such as a Budget

statement, or in the sense of giving an "explainer" in advance of the event to set out its context.

You can register as a contributor, declaring your academic post and qualifications, through a form on the site.

If your university is part of the consortium, your press office may already be in touch with The Conversation, promoting the expertise of the university's staff. It can be a good idea to make yourself known to the press office, telling them the issue you'd be interested in writing about if the opportunity arises. Bear in mind that the site's topical focus means you may have to write a piece at short notice.

The Conversation has a Creative Commons Attribution NoDerivatives licence, so posts from the site can be reused, unaltered, elsewhere. For example, if newspapers want an opinion column on a topical issue, they can copy from The Conversation, but must attribute the author.

Some economics posts on The Conversation:

- "NHS outpaces the UK economy in productivity gains" by Andrew Street and Katja Grasic
- "Explainer: how does the weather affect the economy?" by Geraint Johnes
- "There hasn't been any austerity in the UK – and that might explain the upturn" by W. David McCausland

Medium.com

Medium is a platform on which people can submit, share and comment on essays, and where readers can tailor the kind of essays that are visible to them. Think of it as like Twitter but with essay-length posts. In fact, if you have a Twitter account, you can use it to log in to Medium.

As well as a distinctive, readable, look, Medium has popularised some novel ways to interact. Readers can comment on specific places in the text, not just at the foot of the page. They can also bookmark and share highlighted quotes from the text. At the time of writing, the site is free and without adverts. It remains to be seen what will change as they come under pressure to monetise.

Authors have a variety of licensing options on Medium. The site does not claim any rights to users' posts, and it is possible to select a Creative Commons licence which allows reuse on other sites and publications.

Some economics posts on Medium:

- "Thoughts on 'Teaching Economics after the Crash'" by Karl Whelan

- "Why The 3 Men Who Violently Robbed Me Are Bad At Economics" by Ezra Winter
- "Self-Driving Trucks Are Going to Hit Us Like a Human-Driven Truck" by Scott Santens

Economics in Action

To complete this section, a word from our sponsors. The Economics Network's site for prospective students, Why Study Economics?, runs a blog showing real-world illustrations of economic concepts. It welcomes guest posts from academics who want to raise interest in the modules they teach. Authors of relevant books have contributed passages from the book or e-mail interviews as blog posts. Contact econ-network@bristol.ac.uk to suggest a post.

If that's not enough...

In this section, we've looked at existing platforms to get your ideas out to a wide audience. Perhaps you would prefer something more strongly connected to your own name (or your project's name); part of your official web presence rather than your text on someone else's site. Or perhaps you have a specific need such as a course blog that only your students can comment on. If so, read the next section about setting up your own blog.

3. Options for your own blog

Once you have decided to start your own blog, you need to ask yourself:

- Do you have technical support available, or do you want maximum ease?
- Do you want a customised design, or are you happy to choose from some templates?
- Is an ordinary blog enough, or do you have specific needs such as a multi-author or password-protected blog?

Your answers affect whether it will be better to use a commercial service, your own server, or an institutional platform.

1. Hosted solutions

Hosted software is where a company has set up blogging software for you on the Internet, enabling you to sign up for an account, log in to the system, and start blogging straight away. There is a large range of hosted solutions out there, which vary greatly in terms of quality, features and whether you wish to pay for them.

The key advantage of a hosted solution is that you do not need any technical skills or intervention to start blogging. This means that you can get writing immediately and it is a good way to introduce yourself to how blogs work and the mechanics of posting articles and receiving comments.

You will be restricted in terms of the look and feel of the blog - usually in the form of templates provided by the company. You may also be restricted in terms of the functionality a particular blogging software package may provide - whether you can add multiple authors, assign categories to posts or set up more than one blog.

Three of the most popular hosted blogging solutions are:

Blogger/ Blogspot

Simon Wren-Lewis' blog, as of March 2016: created in Blogger with a standard template.

Blogger is free and owned by Google - all you need to get started is a valid email address and to register at their website. Perhaps confusingly, Blogger is the

software but Blogspot is the hosting service, so Blogger sites usually have .blogspot.com in their web address.

Greg Mankiw's (Harvard University) student-focused blog, and Conversable Economist by Timothy Taylor, editor of the *Journal of Economic Perspectives,* use Blogger.

WordPress.com

A hosted version of the open source WordPress blogging software (see below), that is free to use and surprisingly rich in features, but some extra features like using your own design template or getting a personalised web address can be paid for.

The Everyday Economist by Josh Hendrickson (of the University of Mississippi) and the Real World Economics Review use WordPress.com

Typepad

Typepad has a range of pay-monthly options, with the cheapest offering one blog produced by a single author, ranging to a package offering an unlimited number of blogs and unlimited storage.

Economist's View by Mark Thoma of the University of Oregon and Bradford DeLong's (University of California, Berkeley) personal blog are hosted on Typepad.

2. Institutional options

Your institution may already provide a blogging platform. Virtual Learning Environments (VLEs) such as Blackboard or Moodle usually come with a blogging module already built in. This has the advantage of being integrated with a system you and your students may already be familiar with, but the functionality is usually less impressive than dedicated blogging software.

Another possibility is that your institution offers its own blogging platform. This is not widespread in the UK, but the University of Warwick and University of Nottingham are among those with their own platform. It may be worth asking your library, computing or information service whether they have a recommended blogging product they support.

3. Installed software

The Freakonomics blog, as of March 2016: a heavily-customised design using Wordpress software.

The above options will let you set up a blog in minutes, quite easily and for free, depending on the account you choose. If you're happy with that, skip the rest of this section. However, maybe you want not just a *choice* of designs but total control of the design. Perhaps you don't want adverts on your blog, which commercial services might show. Perhaps you *do* want adverts, but for your products or for the revenue to come to you. Maybe you want the blog to be integrated with other software. If so, you should consider installing blog software on a server you run, or rent through a commercial web-hosting service.

This will require blogging software (which you can get at no charge), access to a web server on which to host it, and access to the technical skills to configure and manage it all. Once the blog is designed and configured, there is very little ongoing work required, but it is not zero: there will be occasional updates and security fixes to apply.

The intricacies of web server maintenance and the various technical skills needed to run them are outside the scope of this guide, but you could consult within your institution as to what support is available, or look for web hosting companies that include blog software as part of their package.

The present market leader is:

WordPress

WordPress is an open source blogging platform. It is freely available and has a dedicated community of developers working on new features that can be easily integrated into the software, via plugins or widgets that add extra functionality. The design of the blog can be changed at the click of the mouse, thanks to a library of downloadable themes.

Marginal Revolution by Tyler Cowen and Alex Tabbarok and The Enlightened Economist featuring book reviews by Diane Coyle of the University of Manchester use WordPress.

The site FirstSiteGuide has a more detailed overview of features of the Wordpress software and what's involved, along with other introductory guides to creating your own blog.

Top Tip

There are many plugins available for Wordpress. You don't strictly *need* any: just the Wordpress software is good enough to go. However, two plugins that we recommend are Akismet and Jetpack. They provide incredibly useful services, including spam detection and "social" links (to help readers share your posts), for free.

4. Writing and managing content

Whichever platform you choose, most blogs will have a similar set of features. This part of the guide will tell you about the mechanics of blogging, i.e. how to blog, and some pointers on what you might like to write, i.e. what to blog.

How to Blog

Like many niche activities, blogging has its own terminology, which may seem off putting to those new to it. A typical blog will have some or all of the following characteristics:

Posts and pages

You may have options to "Create a new post" and "Create a new page". Both are kinds of web page. *Posts* are tied to a particular *date*: these are the main content of your blog. Over time, they will automatically move from your front page to your archive. *Pages* are more conventional: they will usually have their own buttons in the blog's layout. "About me", "My research", or "My teaching" would go in pages.

Categories and tags

Categories enable posts to be organised by subjects (or tags) and help readers to find information about a specific topic quickly and easily. Individual posts can be assigned into several categories, often just by ticking a box when writing them.

To bookmark Bradford DeLong's February 2016 post on Obamacare, the link is http://www.bradford-delong.com/2016/02/obamacare-how-is-it-doing.html . Small print at the foot of that post reveals that it has a number of categories, including Political economy. The link for this category is http://www.bradford-delong.com/political_economy/ . Rather than a specific piece of text, this bookmark will take the reader to whatever DeLong has recently written on the topic of Political economy.

As you create a blog, create categories for the main topics you write about, and apply at least one category to each post (posts can have multiple categories).

Top Tip

If a blog post is intended for students on a particular course, use the course code as a category. Then the link for that category will always lead to the latest announcement for that course.

Comments and trackbacks

Most blogging software allows readers to comment on posts. Readers can suggest corrections, clarify information or simply add their opinion on the post. Comments are normally time-stamped and include the author's name and other details. Another useful feature is that they can also be threaded allowing readers to comment on comments.

When you publish a blog post that links to a post on someone else's blog, your software will automatically send a notification which can appear as a comment on that blog, with a link back to the new post on your blog. This automated message is called a *trackback*.

Blogroll

Posts and pages, like other web pages, can contain links. You can also have a list of links as part of the blog design, so it appears on every page and post. This is called a *blogroll* and it usually directs a reader to interesting links that relate to the theme of the blog. As you find blogs you are interested in, add them to the blogroll for your own and your readers' benefit.

Archives

Archives are chronological collections of posts, enabling a reader to go back through time and see past posts. They can be arranged by day, week or month, depending on how frequently the site is updated. This is taken care of by the software.

Having a diary of your intellectual activity can be useful if you are involved in a long-term activity, such as doing doctoral research. Going back a few years on your own blog to see what you were learning about or excited about on a particular date, you might be pleasantly surprised at how far you've progressed, or be reminded of an idea that you didn't follow up on.

What to Blog

Blogging, like other forms of online communication (e.g. email) has its own set of social conventions. It's important to be aware of the following when writing or commenting on blogs:

Think about your audience

Potentially anything you post can read by a global audience. And a post might be archived or cached and therefore impossible to remove. Think carefully about posting contentious or provocative material, it may spark a rise in readership, but it could make you unpopular online.

Clear communication

The audience are aware that they are reading something quickly written and published, rather than a proper, reviewed paper. So it's okay to be brief and informal. On the other hand, non-standard abbreviations and too much jargon can put an audience off. Remember that any post might be the first that a reader encounters, so if you are using obscure terminology or extending a prior debate, provide links for context. If there are some technical terms that you use a lot, you might use a page (see above) to create a short glossary.

Credit sources and respect copyright

Avoid quoting large extracts from a source without the consent of the copyright holder. Credit original authors appropriately: include a link, sometimes called a HatTip, to other bloggers if you are discussing their views.

Correct mistakes and post updates

Mistakes are inevitable. You might discover them yourself or readers may highlight them. Correcting them adds credibility to your blog and makes it look more professional. If possible, leave the original entry intact and make corrections by adding extra material. Retrospectively deleting text from a blog entry is frowned on, as this may make some of the comments users have posted to your initial article look out of place. Consider using strikeout formatting (~~like this~~) to show edits.

Identify yourself and be available

Try and ensure that your readers can contact you if necessary. If you do post comments on other blogs, it's good practice to identify yourself and provide information about how you can be contacted (usually an email address).

Unattributed comments might be considered as spam. If you don't want a comment to be attributed to you then you should consider whether you really want to make it.

References

- Giant blogging terms glossary / Quick Online Tips
- How to be heard / Stephen Downes
- List of blogging terms / Wikipedia

5. Getting the message out

So you've published your thoughts online, using one of the methods from Section 2 or Section 3. If you have a limited audience such as a class of students, just give them the link. Perhaps, though, you want to get your message out as widely as possible. If you're not already a famous blogger, you'll need to do some promotion. Fortunately, you likely already have the necessary tools.

Using online profiles

Your institutional profile, course pages, and profiles on sites such as IDEAS, Academia.edu or Researchgate.net can all be used to link to your blog.

Using other blogs

Comments on a post on the Marginal Revolution blog.

Even if your blog is brand new, there is a ready-made audience for it: the people who are already reading other academic blogs on the same topic. They just need to be pointed to your blog via suitable links.

In the previous section we mentioned trackbacks; automatic notifications that appear on the blogs you link to. When you write your post, look for related posts on the blogs you are interested in, and mention them. If those blogs have trackbacks enabled, they will link back to your blog post.

When you comment on someone's blog, you can suggest a link that will appear with the comment. So taking part actively and constructively in the discussion on another blog can direct readers to your own. Parallel to our advice about guest posts in Section 2, the more your comment connects with the intellectual content of the post, the better. Vacuous comments like "I really like this blog; come and check out mine" smell like spam, and will be ignored or deleted.

It may seem paradoxical, but allowing people to republish your posts is one easy way to get links and visitors to your blog. If your post is interesting enough, other blogs might want to reproduce it with a credit line that links back to the original, so readers get a taster of your writing and a link to find more. Many of the posts on the Impact Blog at the LSE, for example, were originally posted on the author's individual blogs. The easiest way to enable re-publication, while keeping the right to be credited and linked, is to explicitly give your blog a Creative Commons licence.

Using email lists

Mailing lists can annoy all of us, if they get bogged down in long discussion threads that only a few participants are interested in. If the discussion does not need to be private, it can be better to have it in blog comments. That way, the mailing list subscribers just get a link to the discussion and they choose whether or not to visit, rather than having all the messages pushed into their inbox.

Hence it can be a welcome move to head off a bloated email discussion by posting an announcement such as "I've set out my thoughts on this issue on my blog. Comments are open and I welcome responses." Alternatively, "There are a lot of interesting points of view here. I've tried to summarise the different perspectives in a blog post, and I welcome comments if there are points I've missed."

Remember that if you want to quote emails you need to get the author's permission, but people usually respond well to the suggestion that their thoughts deserve a more permanent home and a wider audience.

Using events

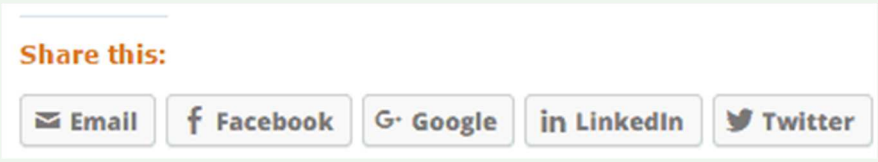
When you're returning from a conference and buzzing with new ideas, you probably want to capture a summary that will be easily findable in future. A blog post is ideal: categories and the archive (see the previous section) make it easy to find your report from a specific conference, and people interested in the conference (whether they managed to attend or not) will welcome your perspective.

Draw the attention of the blog post to the conference organisers, and to speakers that you mention. They will usually welcome a quick, thoughtful reaction and will share it with their audiences.

Using social media

Micro-blog site Twitter lets its users post messages of up to 140 characters, and to customise which other users are visible. The 140-character limit is not conducive to deep discussion, but it is enough for the title of your latest blog post and its web link. One purpose of Twitter among academics is to get notifications of new blog posts, papers, or events.

Top tip



Make sure *social sharing buttons* are enabled on your blog. They make it very easy for readers to share a blog post with their contacts.

If you're already struggling to find the time for blogging, you might not be keen on setting up an account on yet another platform and building up a following. Fortunately, your blog can do your tweeting for you.

Somewhere on your blog is what's called your "feed URL": a web link to a machine-readable version of the most recent posts on the blog. Set up an account on Twitter, create a profile description to identify who you are, then put the Twitter details and feed URL into the free service Twitterfeed. This site will regularly check your blog and, if it finds a new post, will send out a tweet with that post's title and link.

Now you have a Twitter account, post its link on your blog and other profiles, so your readers who use Twitter can subscribe for notifications whenever you write a new post.

6. Risks

In the early years of the 21st century, blogging was seen as a risky proposition that, at best, would take away from the time you spend on your research and teaching. Since then, universities and scholarly societies have taken on blogs and social media more generally as a way to engage all sorts of audiences.

Regular blogging does not seem to have hurt the careers of Paul Krugman or Yanis Varoufakis. It has not apparently diminished the influence of Mariana Mazzucato or Larry Summers. The enthusiasm for blogging amongst popular authors including Tim Hardford and David Smith suggests that sharing small, topical pieces of your writing does not hurt book sales either.

The change in academic attitudes is best exemplified by the Impact Blog at the LSE. Originally intended as a short-term project about the impact of social sciences, it has become a focal point for discussion about the process of scholarly publication in many different disciplines, including lots of advice and opinion about academic blogging itself.

The biggest risk is of *non-involvement*; of being invisible in this open, fast-moving space where public discussion and scholarly discussion of your subject overlap. Still, there are some potential downsides to consider before you leap fully into blogging.

Effect on your job, or your next job

People have lost jobs as a consequence of what they have written on their blogs, even if they have taken care not to refer directly to their employers and have blogged under pseudonyms. You should bear in mind that your current or any prospective future employer may find your blog online and take it into account when assessing your employability.

Relationship with your institution

If your blog is set up within a Virtual Learning Environment or an institutional blog hosting service, it will be clear that you will be writing as a member of your university or college. This means that you will be subject to the relevant code of conduct or appropriate use of computing resources policy for your institution. While few institutions have a policy specifically to cover blogging, should you feel restricted by any limits these policies place upon your writing, you may wish to blog outside the confines of the IT systems provided for you by your institution.

Intellectual property

A blog may be a useful forum for floating new ideas, theories or areas of research, but it is not usually a formal project output. It is not clear whether ideas expressed or published on a blog, are covered by the same rules and regulations as a book, article or other output produced while you are an employee of an institution or being funded by a research grant.

Republication of your posts on other sites may be something you want to prevent, or something to actively encourage, so long as you are given credit and a link. Put a copyright statement or a Creative Commons licence prominently on your blog so readers know which further uses of the text are allowed.

Blog ethics

Blogs come with their own set of social rules or blog etiquette. For example, any online source cited or quoted in your posts should be acknowledged with a link. Retrospectively editing a blog entry is frowned on, as this may make some of the comments users have posted to your initial article look out of place. Consider using strikeout formatting (~~like this~~) to show edits or make additions to the bottom of a post to show how your views may have evolved.

Comments

The default setting for most blogs is to allow comments from readers. While this can lead to fruitful interactions, debate and links to useful further resources, like any open form of conversation, it can lead to inappropriate or offensive comments and Internet marketers will try to "spam" your blog with vacuous comments linking to their sites. Blogging software has tools to defend against most spam, as explained in an earlier section.

You may wish to investigate the security options in your blogging software. You could require readers to register before posting a comment to your blog, or hold comments in a queue for your approval before they are published.

Other legal issues

The Electronic Frontier Foundation has produced a Legal Guide For Bloggers, which looks at some of the key legal issues that affect blogs. However, it should be remembered that this has been written from an American perspective and therefore some of the advice would not necessarily apply elsewhere. Also, this is an area of law that is developing all the time, so what may be true today could be changed by a new piece of legislation in the near future.

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7. Uses for Economics

Henry Farrell is an Assistant Professor at the Department of Political Science and the Elliott School of International Affairs of George Washington University, and he is also one a group of scholars who contribute to the Crooked Timber blog. He has identified five uses of blogs within the classroom:

- replacing standard class web pages
- professor-written blogs which cover interesting developments that relate to the theme of the course
- organization of in-class discussion
- organization of intensive seminars where students have to provide weekly summaries of the readings
- requiring students to write their own blog posts as part of their grade

Canadian learning technologist Stephen Downes has expanded on these uses in an article for the EDUCAUSE Review.

But what is the potential for blogging in Economics teaching? Steve Greenlaw of the University of Mary Washington explores the broader role of technology in teaching via his blog Pedablogy: musings on art and craft of teaching.

A series of specific examples are presented below:

Replacing standard class web pages

Have you ever struggled to craft your own course website? It can be a valuable aid, enabling you to post suggested readings, set tasks / exercises / assignments or just remind students when they are expected to turn up for lectures. Using a blog can let you concentrate on adding the information, rather than having to learn additional IT skills.

This is something that Tim Kochanski at the University of Alaska Southeast successfully trialled. He created a blog as part of a four-week class on introductory economics. He was keen to investigate a low-cost alternative to using his institutional course management system (Blackboard). He found that the journal format of a blog, as well as other features provided a valuable resource to help guide his students through a semester of economics. A detailed case study is available in the Economics Network's Ideas Bank.

Professor-written blogs which cover interesting developments that relate to the theme of the course

You may already be finding things online that are relevant to your teaching. A blog can enable you to bring these resources together, comment on them and organise

them in a manner which may be helpful to your students. You may want to try and make the theoretical aspects of what you are teaching meaningful in a broader context, by highlighting items of topical interest.

The Tutor2u website is a good example of this. It offers a range of subject-specific blogs. Geoff Riley (Head of Economics at Eton College) maintains the Economics Blog and provides a regular commentary on economics issues and trends. Although the primary target audience is secondary school students some of the resources could be useful in first year undergraduate courses on introductory economics.

Organization of in-class discussion or seminars

You may have experimented in the past with discussion boards and found that they can produce useful dialogues. Opening up this process with a group blog can enable students to post items, comment on them, get to know each other and even answer their own questions. You may get contributions from students who find face-to-face discussion difficult, but who find online communication more suited to their learning style.

David Tufte manages an 'Economics Classes Blog' at Southern Utah University:

His students regularly post items of interest and ask thought provoking questions. Tufte then invites his students to offer their feedback/analysis on that particular economics issue, by placing comments on the blog, where he occasionally offers comments of his own to relate the items to ideas he has mentioned in class.

8. Conclusion

"I'll publish, right or wrong" (Byron)

This guide has outlined the possibilities that blogs offer in terms of teaching, personal and professional development, and engaging with a global audience. The chance to take advantage of an "invisible college" of fellow scholars, informed readers and actively engaged students, means that blogs can provide a whole new dimension of interaction in helping people make sense of economic issues. Using blogs as part of the classroom experience can take the technical strain out of producing a website and allow you to concentrate on writing, discussing and teaching online.

We hope that this short guide has made you aware of the mechanics of blogging and some of the potential pitfalls, given you some ideas as to how you could use them for economics teaching and opened your eyes to some of the future possibilities that blogging as a technology can offer. If you successfully build blogging into your normal work routine, you may soon find that blogging starts to take over your life and that it is increasingly difficult to live without your virtual notebook.

The freedom that blogs bring to the voiceless in politically repressive regimes is a good example of how blogs enable anyone to publish anything online. The chance to hear from alternative viewpoints, to publish ideas that may not get an airing elsewhere, to sidestep the mainstream media and to experience quality writing freely and openly, means blogs can help produce a genuine free market in ideas.

The Handbook for Economics Teaching Assistants (2020)

Based on the "LSE Handbook for Graduate Teaching Assistants" by **Kate Exley** and **Liz Barnett**, Teaching and Learning Centre, London School of Economics and Political Science, and "Small Group Teaching in Economics" by **Caroline Elliott**, Aston University and **Christian Spielmann**, University of Bristol. Edited by **Dimitra Petropoulou**,
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1. Introduction

The purpose of this handbook is to provide Graduate Teaching Assistants with practical information and insight into teaching. It includes some basic tips and suggestions on planning, preparation and delivery of small-class teaching, particularly aimed at newcomers to the profession.

Current research clearly suggests that effective learning happens when students construct their own knowledge in an engaging and student-centred learning environment. What makes small group teaching special is that it lends itself to interactive and student-centred teaching and thus has the potential to be an incredibly effective mode of instruction, when appropriate teaching approaches are adopted. Nevertheless, much of economics small group teaching still takes the form of front-led seminars, where the teaching assistant develops answers to a set of questions with limited focus on students' process of actually understanding the material. This chapter provides a guide on how to make these sessions student-centred and engaging so as to facilitate the effective learning of economics.

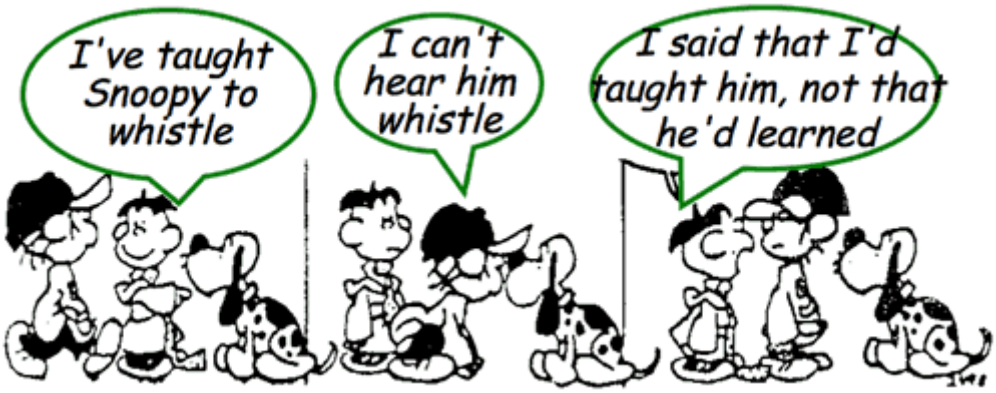
2. How students learn

> "Learning takes place through the active behavior of the student: it is what *he* does that he learns, not what the teacher does."
>
> Ralph W. Tyler (1949)

Tyler (1949) just rephrases the old adage that we learn best by doing. This idea is the basis for all constructivist learning theories (see particularly Piaget (1950) and Bruner (1960, 1966)), which essentially suggest that learning happens when students 'construct knowledge with their own activities' (see Biggs, 2007, p. 22). A tutor's role is not merely to present knowledge, but to create an environment where the student can truly engage with the material.

Far too often, tutors think that just because they "went through" the material, students will have grasped those concepts and be able to apply what has been taught. However, this is not necessarily true.

Figure 1



Biggs (2007) identifies different learning activities that can be implemented in small groups. In a small group, there is the possibility for effective use of class discussions, games and experiments, think-aloud tasks, role play, research projects, presentations or collaborative group work. Such activities put students in charge of their own learning.

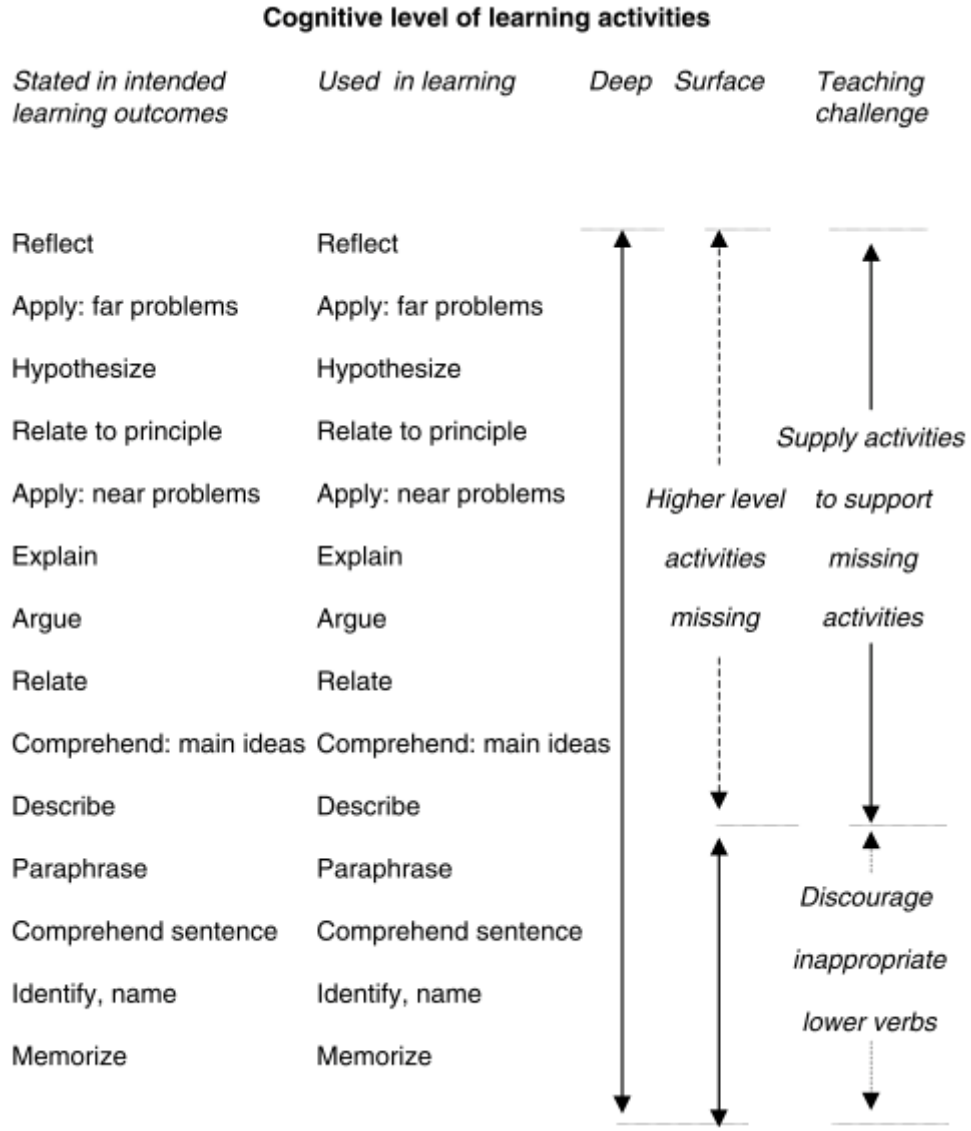
Research suggests that when students create knowledge themselves, retention rates are much higher. The so called 'learning pyramid' matches retention rates to different learning activities. Sousa (2006) ranks different learning modes according to their average retention rates after 24 hours:

- lectures (5%),
- reading (10%),
- Audiovisual (20%),
- Demonstration (30%),
- Discussion Group (50%),
- Practice by Doing (75%), and
- Teach Others (90%).

While the educational literature still debates the validity of these estimates, there is a general consensus about the effectiveness of participatory teaching methods.

Activities with higher retention rates are ones that engage the student to construct new knowledge, for example through reflection, hypothesizing, explaining and arguing, thereby facilitating so-called deep learning. Enabling deep learning is a key aim for a successful tutor. Figure 2 orders some learning activities in their relation to deep and surface learning.

Figure 2: Bigg's Adjectives to Describe Cognitive Engagement (from Biggs, 2007)



Small groups ideally lend themselves to activities which facilitate deep learning and which can create a constructivist learning experience. Table 1 is an overview:

Table 1

Suggestions for small and medium sized group sessions	**Activities**
Working in pairs	• Prepare answer to a question • Clarification of ideas • Compare individual answers and arrive at a joint answer • Marking each other's work
Working in threes	• As with pairs • Speaker/listener/observer

Working in fours or fives	• Debating topic and arriving at a team view • Preparing answer for plenary session (use of flip-chart paper) • One or more members present team view to whole seminar • Project team with division of labour
'Pyramid' or 'snowball group' (combining groups or adding individuals to groups one-at-a-time)	• Group problem solving • Bringing together and comparing work/answers/views of small groups • Getting the different constituent groups to focus on a particular aspect of a topic and then bringing the aspects together to form an overall view/report
'Fishbowl' (the 'fish' discuss an issue, while outside observers note criteria used etc)	• Group problem solving & discussion • Exploration of an issue
'Envoys' or 'crossover groups'	• One person from each group joins a different group to inject new ideas into discussion. • Groups are split up and re-formed to share ideas.
Formal debate (four speakers, formal debate rules, contributions from floor, vote at the end, possibly vote at beginning also and then two votes compared)	• Individuals assigned roles in advance, so that they can prepare their speeches. • All students required to prepare the topic in advance. Then groups assigned to each side and prepare their speeches. • Individuals then chosen by tutor or by lots to make the speeches.
'Your witness' (modelled on Radio 4 programme)	• A panel of students is chosen, primed to represent different views on a topic. Other students are given a specific part of the topic to prepare and to be the 'expert'. They are called upon one-at-a-time and the panel quizzes them. Tutor chairs the proceedings. • Seminar split into several panels and the 'experts' move from group to group. Each group then prepares short report in the light of the evidence it has gleaned. Reports are then presented to the whole seminar or handed in to the tutor for marking.
Quiz show (individuals or preferably in teams)	• There are many shows that could be copied or adapted, such as University Challenge, The Weakest Link, Who Wants to be Millionaire? or Brain of Britain. • Students could prepare specific topics

Presentation with primed respondents	• An individual student is assigned to prepare a short presentation/paper and one side of A4 of key bullet points/diagrams/ equations, which are distributed to the rest of the group in advance or tabled. Another student is assigned to be the respondent. The rest of the students are assigned to particular aspects of the topic and asked to prepare one question. • Two or more students are assigned to prepare particular aspects of a topic, and then as above. • Advance reading is done, and then the final draft of the paper is prepared in small groups, and one student is allocated to make the presentation.
Role playing	• Students allocated specific roles and given a scenario. (Examples of role playing include: price setting under oligopoly, wage negotiations, international trade negotiations, pre-Budget ministerial/interest group negotiations.) The tutor can introduce new evidence as the exercise progresses. • Watch a video with at least two points of view. In small groups, students each take on the role of someone in the video and debate the issues.
Game, simulation or experiment (there are many games or simulation exercises available)	• Whole-class games (single session) • Games in small groups (single session) • Games played lasting several weeks, where a round is played either weekly or at less frequent intervals. The time taken playing a round in class may be only a few minutes. Much of the playing/negotiation can take place outside the class.
Computer lab session (using instructional software, such as WinEcon, or using data sets and/or statistical packages: see Economics Network site for details of software)	• Tutor-led. Tutor introduces the software (maybe using a data projector) and then students work on an assigned task, individually or in pairs. • Tutor-supported. Students work at their own pace and the tutor is available or provide support of the student is stuck or has questions.
Virtual seminar (distance-based learning, using chat room facilities of a virtual learning environment/conferencing system, such as Blackboard or Moodle: students contribute from a terminal on site or at home)	• Tutor-led, real time. Students log on at a particular time and then the tutor leads a debate, with students contributing on-line. Can be done anonymously, with students identified by number or fictitious name. Seminar can last for a normal period of time. • Tutor-led, open time. Student log on when they please and contribute postings to a debate. • Student-led (no tutor present): either real time or open time. Tutor can come online afterwards to post comments.

Video (preferably not longer than 20 minutes)	• Students then prepare answers to set questions and report on them. • Quiz on video material • Debate (whole or small groups) on issues raised. Students can be allocated specific roles.

While implementing many of these activities may seem daunting at first, they are likely to improve student learning immensely. In addition, they are fun both to organise and perform in the classroom.

3. How to approach small group teaching

3.1 The role of the teaching assistant

> "Teachers should guide without dictating and participate without dominating."
>
> C.B. Neblette

It is often tempting to plan a small group teaching session where the onus is always on the tutor: maybe to revisit material covered in large group teaching sessions and then to provide answers to problem set, or to even 'lecture' new material to the students. In fact, if we always talk, there may also be less risk of students asking challenging questions.

As highlighted elsewhere in this chapter, students may also be temporarily relieved that the onus is not on them. However, students are highly unlikely to engage properly with the material taught in such a tutorial, and are unlikely to experience deep learning. To facilitate such learning, the role of the tutor is instead to organise the session, facilitate discussion and learning, and hopefully to inspire students. One way to do this is to demonstrate to students what fascinated you in economics, motivating you to teach and research the subject.

Tutors need to plan activities which make students responsible for learning. These may be discussions, group work, student presentations and many more, which we discuss throughout this chapter.

A recurring theme of this chapter is that to facilitate interaction and learning requires careful *planning*. Activities and stimuli for the students should be planned, but at the same time sufficiently flexible to accommodate the students' learning journey. This is hard to do while preserving the overall coherence of the session. In this sense, your role is that of a moderator who guides and structures the students' learning journey. Alongside activities and stimuli, tutors may need to present some material, but this should not be the principal focus of the tutorial.

The tutor's role is an incredibly important one. For students to willingly engage, they must feel at ease contributing. The tutor's role extends to providing helpful comments and suggestions, encouraging students to work effectively with their peers. This might require the tutor to lead initially and then increasingly facilitate student discussion and contributions. The objective is for students to have the confidence to ask questions, not only of the tutor, but of each other, and of the economics discipline. The tutor's role is certainly not easy, but it can be immensely rewarding.

Finally, tutorials are ideal for fostering students' transferable skills, including the ability to think critically, work effectively in small groups, present and articulate their ideas. The lack of such skills is a recurring complaint of employers when hiring economics graduates (for example in the Economics Network Employer Survey).

3.2 The first session

However familiar you are with your subject, the first session teaching it can be daunting, especially where the tutorial is interactive and students are unfamiliar with the tutor and potentially each other. Ultimately teaching is partly a performance, and we need to appear confident even if we do not always feel so. However, confidence needs to be balanced with approachability. Students should always feel that they can speak to tutors.

Students expectations about the module and the tutor are largely formed in the first session. Moreover, student perceptions display inertia — it can be very difficult to change students' views about the module later on. During the first class, the tutor can set the tone and familiarise students with the 'rules of the game'. When this is done properly, the learning atmosphere is more likely to remain positive throughout the term. So the first session needs to be planned carefully. If you have a session during the first week, when little material has been covered, this can be a great opportunity to use the time to get to know each other and create a good learning atmosphere.

Things to include in the first small group teaching session (see also Section 4.7):

1. It seems a basic point but do not forget to introduce yourself; not only your name, but also how you can be contacted.

2. Ask students to introduce themselves. Wherever possible it is immensely helpful to learn student names. Students appreciate it, but it may be particularly helpful if a student has problems. By knowing a student's name you can more easily access further support services or resources for a student.

   It will be useful to find out more than a student's name. Student cohorts can be very diverse. There may be students in a class studying for different degrees, with different previous qualifications, very different motivations for taking a class etc. Hence, it can be invaluable asking students about, for example, the degree that they are enrolled on, their quantitative background etc. This can be done verbally, using Personal Response Systems (clickers) or software that allows students to answer questions using mobile devices. If technology is used, this can serve as an introduction to technology that will be used in subsequent tutorials. It can also be done by a short activity, which introduces students to the active learning tasks they will encounter in the module.

Teaching Tip:

Consider asking students to interview their neighbour and then present their peer to the class. This way students already practice presenting and speaking up, something which you as an instructor will expect them to do on a regular basis.

3. Students should all receive information on their modules, in the form of a module handbook. However, it may still be very valuable to spend a few minutes checking that students know where to get the learning resources they need for the module, understand the structure of the module, as well as how and when they will be assessed.

4. Finally, set expectations of what is required of students and what will happen in sessions more generally. If it is not acceptable to come to class late, then indicate this. Similarly, tell students if you expect them to turn mobile devices off. Most importantly, tell students to what extent you expect them to participate in class. Prepare students for group work, for giving presentations, or for coming to the front of the class to discuss answers on a whiteboard.

   Make clear to students if you do not plan on covering all material, for example all questions on a question sheet or everything from the book chapters, in every session. You should make sure that students know what they are expected to do on their own and whether you will focus on only the challenging content or questions. Crucially, make clear to students what work they are expected to do before coming to the session, as well as after.

Teaching Tip:

Having noticed that students increasingly were forgetting to turn their mobile telephones off or turn the ring tone to silent, invariably leading to disturbances when a telephone rings, I established a rule: if anyone's mobile (including mine) rings during class they have to bring sweets / chocolate / biscuits for the rest of the group to the next class. I have found that I do not even need to police the rule as students themselves are very keen to identify fellow students who should bring treats.

3.3 Planning a session

Every teaching session, assign some time for a proper introduction and a conclusion. Even though tutorials often seem too short, we must take time to introduce the subject, check that students are comfortable with the concepts to be discussed, and make sure that students are clear about how the lecture and tutorial complement each other.

> "It looks as if there is not much communication between lecturer (module organiser) and class teacher. Often the class teacher is unaware of the progress made on the module or of what and how some material has been taught in the module."

As highlighted above, students complain if they see no link between lecture and tutorial content. However tempting, avoid 'diving into' solving problems or delivering core material, even if concerned about limited class time. Similarly, always end by summarising what has been covered, any follow up work expected or that might be beneficial to students, and if possible, linking material covered with later material in the module.

Generally, take care to explain to students what is expected of them, not only during a teaching session, but also before and after in terms of work. Also try and provide an appreciation of how material is covered in the module. At university there is a much greater onus on the student to engage in independent learning. Students do not always appreciate what this entails, especially first year undergraduates who will have been more closely guided prior to university. The first class may be a particularly crucial time to get students thinking about this.

Individual sessions are part of the larger learning journey students embark on. Be it a lecture, a class or an online activity, the question arises how individual teaching sessions fit together.

Teaching Tip:

Do not view small group teaching sessions as stand-alone events. Rather, consider — and communicate to students — how they fit with previous and future teaching sessions in the module.

When thinking about sequence, first think about the aims of the individual teaching session within the larger context of the module (i.e. does the session introduce new material, does it take up ideas from the last lecture(s), etc.) and then consider what students should do before and afterwards. A guiding question when planning teaching should always be what students do before, during and after the session.

Table 2 summarises some ideas about student activities before and after the session.

Table 2

Student Activities	
Before session	**After session**

Check understanding of lecture material	Extend beyond core reading
Make notes on further reading	Check notes are complete on a topic
Attempt relevant online quizzes	Check question sheet answers are complete
Prepare answers to set questions	Collect relevant past examination questions
Consider applications / examples	Attempt past examination questions
Formulate questions for the tutor	Check understanding of how a topic 'fits' into a module

3.4 Teaching question-based problem sets

Most commonly economics tutorials provide students with the opportunity to develop the knowledge gained in lectures. Each tutorial relates to particular lectures and students are required to prepare answers to a set of problem set questions either in advance or during the session. Such problem sets are common for technical material, including model work and derivations. However, they can also be used for interpretive material, where essay-type short answer questions are set on — for example — an assigned reading.

It can be tempting for a tutor to simply go through the answers to the problem set questions on the whiteboard at the front of the class. Students often seem to favour this, as the onus is on the tutor to provide solutions. There are several problems with this approach. Learning happens best when students construct knowledge. As discussed in section 2, retention rates and understanding remain low when students copy results without attempting the questions themselves. Furthermore, this is a very expensive mode for just 'giving out sample solutions'. In fact, printing solutions and running an office hour in case a student has questions may be an easier way of achieving the same goal. In addition, if the tutor presents the answers to all the questions set during the teaching session, students have less incentive to prepare the work prior to coming to class, or even to attend class.

Interactive and engaging teaching sessions, by contrast, encourage students to prepare for sessions in advance, will help students identify material that they find difficult, will facilitate 'deeper learning' and thus improve recall at a later date.

When planning a problem-set based teaching session, work through the question sheet and consider which questions to cover. Do not feel under pressure to go through every question but if you decide not to discuss particular questions make sure you explain to the students why you chose not to cover certain questions. Potentially coordinate with other tutorial teachers and discuss the fact that you will not cover all aspects with the module leader. However, also be prepared to be flexible. Ask students which questions they found most challenging, either during class with a show of hands or online voting or in advance of sessions; this information will help you prepare.

Plan approximately how much time to spend on different activities in the session. For example, you may want to allot time for students to check answers with each other; to prepare answers to present to the rest of the group; to play a short, illustrative economics game etc. Consider whether sessions can be planned so that there is a mix of individual, small group, and whole class activities, so as to keep students engaged.

> "Spoon feeding in the long run teaches us nothing but the shape of the spoon."
>
> E. M. Forster

Evidence (for example Springer *et al.* (1999)) points to benefits for students working in small groups, The question therefore arises of how we can get students to work effectively in such settings. In the following boxes we share some ideas on possible approaches. Remember, for any interactive teaching session, it is vital to plan carefully in advance.

Group work:

Ask students to work in small groups — each group may work on a different question — with each group expected to present their answer to the rest of the class. To save time, the student groups can be asked to prepare their presentation prior to the session so that minimal class time needs to be spent by groups. If presentations on different questions are prepared in advance they can be uploaded to the Virtual Learning Environment (VLE) to create a bank of student answers. However, the answers should be checked by the tutor for accuracy before being uploaded.

Once students gain confidence from presenting their work in groups, it is easier to ask them to contribute individual answers.

Student Discussions:

Especially effective for interpretive sessions, this is good for getting students to reflect on different sides of an argument. Students could be split into two groups (there are several ways of forming groups and you may wish to mix them up) and each group asked to reflect on arguments for a specific position. Make sure students use economic evidence to support their arguments. It is vital to ensure the level of the discussion is appropriate to the academic setting. Let students prepare a 5 minute speech to formulate some of their arguments and then start the discussion. During the discussion, your role is one of moderator. You may allocate speaking time, ask groups directly how they would counter a specific argument, ask clarifying questions etc. You may also stop the discussion for a short time to review some economic arguments.

Teaching Tip

For example, a discussion about the appropriate amount of abatement to combat climate change may be put on hold when students talk about discounting. You as an instructor may review the concept of discounting before getting back into the discussion. It is your role to clearly define the learning outcomes (the concepts and arguments the students should grasp) and moderate the session to achieve these.

Role Play:

Role Play could be a variation of the student discussion. In particular, you could assign specific roles to students.

Teaching Tip

In a discussion about environmental damage after a large oil spill I once let students discuss ways of estimating compensation payments to local fisheries. I assigned the role of the oil company, an economist, an environmentalist, and the local fishery to different groups and 'played' a discussion about the appropriate compensation payments. The exercise enables students to reflect about different approaches to calculate economic value and that the choice of method and aspects to include may strongly depend on personal preferences.

Student Presentations:

You may ask your students to prepare presentations on a specific topic or a research paper, where you use the questions in the problem set to guide the flow of the presentation.

There are several advantages to letting students present problem set answers. First, the problem set questions can be micro-tuned to assure a specific flow of the presentation. Second, by explaining to others, students can show whether they have really grasped the concepts and workings of a model. Third, the students gain transferable skills important for the workplace. In principle, student presentations can be used for both interpretive and more quantitative material.

Students can either present answers by themselves or in small groups. In the first case, students may be asked to prepare material, for example read a research paper. A first question could be to summarise the article in a few sentences. One could then pick out specific concepts and questions and let students reflect on these. For more technical material, one could ask students to prepare a short presentation of a specific technique, explain the steps of a derivation or use a graphical model to run through a specific economic argument.

As an instructor, you want to make sure the whole group is engaged, rather than one individual. This can be easily achieved by stopping the presentation and asking the group questions like: “Why did the student do a specific step?”, “What is the potential problem with this approach?” or “How else could we have answered the question?”. The structure of a problem set may also lend itself to mixing up presenters.

Teaching Tip

Instructors often claim it is difficult to get students to the board. One way of achieving this is to ask students first for an answer. If the answer is correct, congratulate the student and ask if she/he could write it up on the board. Once in front of the class, the student can be asked another question.

3.5 Revision classes

Revision classes need to be prepared carefully. It is tempting, especially as teaching draws to a close, to think that all that is required is to turn up and answer student queries without divulging too much information about the forthcoming assessment. However, revision classes require careful planning and preparation to ensure that students gain as much benefit as possible.

First, consider if there is any information (other than the topics of unseen assessments that students invariably ask for!) that can usefully be provided to students. Examples include:

- A brief overview of the overarching structure of the material covered in the module
- Guidelines as to the format of a forthcoming assessment and any information that will be provided, for example an equation sheet, copies of statistical tables etc.
- Past assessment questions
- Specimen past answers
- General assessment feedback documents that were circulated to students who sat the assessment or examination previously
- Module or assessment specific marking criteria
- Details of the marking process
- Resit provision

We often assume that students are informed about the format of assessments and marking criteria, but we should not lose sight of the vast quantity of information that students receive. When providing information, such as the items suggested in the list above, also set aside time to talk through the documents, and give students an opportunity to ask questions. For example, marking criteria statements may be easy to understand for an academic or teaching assistant, but challenging for students.

Students may not be aware of the rigorous marking procedures in place in universities. It can be reassuring to students to know their work is marked by one (internal) marker, with at least a sample marked by a second (internal) marker, with a sample also being looked at by an external examiner. Further, that attention is given to the distribution of marks across a cohort and any papers that receive marks close to classification borderlines are given particular attention at multiple stages of the marking process.

Check whether any past scripts have been saved and whether former students gave permission for anonymised answers to be circulated. Students often find it enlightening to see examples of good and weak answers by former students. Examples of high quality work can inspire students to do well, while both stronger and weaker past work, alongside marking guidelines, can help students appreciate what is expected of them.

Consider whether you would like students to undertake any specific activities in advance. To help both tutors and students prepare, students can be invited to submit questions in advance for consideration. Similarly, students can be asked to prepare draft answers to previous years' questions.

Teaching Tip

Consider using an online forum to collect questions. In such a forum students can also answer questions of their peers. This will facilitate student discussion and enable students to explain material to others, which is the ultimate check of whether the material has been truly understood.

Ideally a revision class should remind students of the overall narrative of a module and provide students with an opportunity to clear up any niggling doubts about material covered, while providing an opportunity for them to appreciate what is required for a first class / distinction level answer. Revision classes should be interactive with lots of opportunity for students to ask questions and contribute.

Teaching Tip

A competitive element can also be introduced. Asking questions using personal response systems or mobile devices can help students discover where they may have gaps in their knowledge. Similarly, a team game based on 'Noughts and Crosses' can be used to encourage students to answer questions and also set questions for another team, in so doing offering an additional opportunity for students to revisit their module notes. This game is outlined on The Economics Network website:

https://www.economicsnetwork.ac.uk/showcase/elliott_0x

Consider whether to recommend specific activities for after the class. Students know they need to learn material but may less clear about how to learn. A student may take in little from reading a text book for even an hour, and may need suggestions as to how to vary their revision activities. Consider recommending any of the following:

- Diagram drawing practice
- Self-testing on frequently used mathematical or statistical methods
- Past question practice, maybe writing essay plans rather than full essay answers
- Reading relevant recent newspaper articles for illustrative examples to support answers
- Revising with other students
- Discovering academic references beyond those recommended on module reading lists.

Teaching Tip: Reviewing previously submitted work

One activity that students find hugely beneficial is reviewing work previously submitted by students. This could be work submitted for module assessments or answers to past examination questions. You must remember to get students' permission to use their work and ensure it is anonymised. Give examples of very good and also weak answers. Students can be asked to read answers in advance or in class, and then asked as a group to comment on the strengths and weaknesses of the answers, offering suggestions as to the appropriate marks. Consider doing this in conjunction with the marking criteria. The resulting discussion is often very lively and revealing to students, highlighting what is expected of them.

> *"I found the evaluation of previous projects extremely helpful in understanding what was wanted from me - it would be great if other courses took this up!"*

4. The skills of the class teacher

As a class teacher you will need to hone your personal and communication skills. In particular, your listening skills, questioning skills, ability to give complex and difficult explanations and your ability to end classes effectively. This section includes some advice in these areas.

4.1 Effective listening

1. Try to keep an open mind and listen to what is actually said.
2. Listen for meaning. For example a student maybe asks you a muddled question about a small detail. Actually, what s/he may be telling you is that s/he is completely lost and doesn't understand this at all - or this student may be dyslexic.
3. Try not to pre-empt what a student is saying, by cutting them off mid-question and giving them an answer to a problem as you see it. As much as possible, let them explain their uncertainties and confusions. According to a reasonable body of the Higher Education research literature, concept development often requires that students first understand how new ideas presented fit in relation to what they already know, and IF the new concept requires them to let go of some previous understanding, this needs to be actively acknowledged (ie: you can't simply overlay a new and contradictory set of ideas before the old ones have been explored and deconstructed).
4. Try to find a workable balance between, on the one hand, thinking ahead in the discussion in order to maintain the flow and focus and, on the other, being overly directive and forcing the discussion along your set path.

4.2 Questioning skills

There are a number of techniques you can use to encourage students to ask questions and to open up discussion.

The most obvious is to draw on students' questions and comments and to enlarge upon them with your own remarks. What do you do if the subject matter is new and your students are too?

You may want to jot down several statements or questions beforehand and use these as a springboard.

For many quantitative subjects, you may want to plan out a sequence of short questions aimed at helping students work their way through a problem, or grasp a better understanding of a theory or model. A number of class teachers in Economics, Maths, Statistics and Accounting and Finance use this approach. Some will go round the class more or less sequentially, so students know when their "time" to answer is approaching and can prepare. Others take a more random approach, calling on people by name. Yet others ask questions to the group as a whole, and let whoever wishes to respond.

This issue, of whether or not to call on students individually and by name to contribute to the class, is one of the more controversial aspects of questioning. Clearly tutors have different styles and students will have varied expectations. The advantage of addressing individual students is that you can tailor comments and make interventions that are appropriate for specific students. It may be a way of involving a very quiet student who you know has useful contributions to make but finds it difficult to raise them in the class. However, great care should be used when 'spotlighting' students. If some students think that they may be 'picked on' to answer questions it may make them very uncomfortable in the class and less able to think and work out their own position or solution. (This may particularly affect the non-native speakers of English in your class and those with disabilities.) This may also have a knock-on effect on the other students and so the positive atmosphere in the class can be eroded.

If you choose to use a direct questioning approach it is also sensible to think through what you will do when a student cannot answer your question or gives a muddled or an incorrect response. It is likely to fall to the tutor to 'rescue' the situation and in some circumstances to help re-build the confidence of an embarrassed or flustered student. Because of these potential difficulties it is, therefore, suggested that you do not ask individual students to answer your questions so directly until you have established a good rapport with your class and you have got to know your students better.

With more discursive subjects, it is generally preferable to open up discussion with open-ended questions which will get students thinking about relationships, applications, consequences, and contingencies, rather than merely the basic facts. Open questions often begin with words like "how" and "why" rather than "who", "where" and "when", which are more likely to elicit short factual answers and stifle the flow of the discussion. This more closed questioning approach tends to set up a "teacher/student" "question/answer" routine that does not lead into more fruitful discussion of underlying issues. You will want to ask your students the sorts of questions that will draw them out and actively involve them, and you will also want to encourage your students to ask questions of one another. Again, it is for you to decide whether to call on students directly, or leave the discussion and discussant "open". Above all, you must convey to your students that their ideas are welcomed as well as valued.

Very occasionally you may have a student in your class who suffers from more than the normal level of anxiety or shyness when called upon to contribute to the class discussions or to present their work. In some circumstances this may be related to a disability, or to language proficiency. Treat such situations with sensitivity and if appropriate seek specialist guidance.

Top Tip

"On the introductory workshop we heard about a discussion technique that works well for me. I ask a question, I then ask the students to write down their answer and then compare it with the person sitting next to them. I then ask the question out loud to the group again and I always get someone happy to kick off the discussion."

There are a number of pitfalls in asking questions in class. Here are the four most common ones:

1. Phrasing a question so that your implicit message is, "I know something you don't know and you'll look stupid if you don't guess what's in my head!";
2. Constantly rephrasing student answers to "fit" your answer without actually considering the answer that they have given;
3. Phrasing a question at a level of abstraction inappropriate for the level of the class - questions are often best when phrased as problems that are meaningful to the students;
4. Not waiting long enough to give students a chance to think.

The issue of comfortable "thinking time" is an often-ignored component of questioning techniques. If you are too eager to impart your views, students will get the message that you're not really interested in their opinions. Most teachers tend not to wait long enough between questions or before answering their own questions because a silent classroom induces too much anxiety for the class teacher. It can be stressful if

you pick on a student for an answer and all the group are waiting for a reply (see below). Many students, particularly those with certain disabilities or dyslexia, students who are not confident in speaking in public, or not confident in speaking English, may become unduly flustered in such a situation. Creating a more comfortable space in which to think is likely to induce a better 'quality' of answer and increase the opportunities for all students to contribute effectively.

The above approach is likely to help make your students feel more confident for a number of reasons. First the students have the chance to 'check out' their answers with a peer; secondly, they are required to 'rehearse' and put their thoughts into words; and thirdly the answer gains a form of endorsement from the peer which increases confidence in its value. Once the students have confidence that you will give them time to think their responses through, and you show them that you really do want to hear their views, they will participate more freely in future.

Asking Questions Relating to Work Students Have Not Done

This is clearly a different issue from those noted above, and comes back to issues around agreeing ground rules with students to ensure that they prepare adequately for class. It is important to establish agreed working patterns from the start, and follow them through.

4.3 Clarity of explanation

The first piece of advice here is to try not to do too much explaining in class. This may sound a little strange but it is all too easy to be drawn into the trap of giving mini-lectures rather than facilitating learning. However, there are times when your students will look to you to help in clarifying points or linking class discussions and course work with related lectures.

In giving a clear explanation you should start from where your learners are. You may choose to summarise "what we know already" or indeed ask one of the students to do this task for the group. There are four quick tips to help structure your explanation:

1. Structure what you say so that you have a clear beginning, middle and ending;
2. Signpost your explanation to make the structure clear to everybody;
3. Stress key points; and
4. Make links to the learners' interests and current understanding. You can do the latter through the use of thoughtful examples, by drawing comparisons and by using analogy.

Top Tips

"All too often students come to class unprepared, sometimes without even having read the question. Thus, reading the question before getting into the answer can be very important. One of the greatest skills is to succeed in making relatively unprepared students understand, and take an interest in the questions at hand, without compromising the level of the explanation offered or delaying the progress of the class." One class teacher goes round the class each week to check who has attempted that week's problem set. Students only need to hand in two pieces of work per term for tutor marking. However he finds that by doing the round weekly, most students do the exercises in advance most weeks, and will be candid (and generally give convincing explanations) when for some reason they have not been able to do the work.

"I try to think of really good examples to illustrate the main points I want to make. If you can find something current from the papers or the news then you are often onto a winner - I like to bring along the paper and hand it round the group. I thought about asking the group to bring in their own examples too and I might try this next year."

4.4 Teaching diverse classes

- Give "minority" students equal attention in class, and equal access to advising outside class. Don't overlook capable but less experienced students.
- Give "minority" students equal amounts of helpful and honest criticism. Don't prejudge students' capabilities.
- Revise curricula if necessary to include different kinds of racial and cultural experiences, and to include them in more than just stereotypical ways.
- Ensure that the teaching methods and materials you use are accessible to students with different learning abilities and disabilities
- Monitor classroom dynamics to ensure that "minority" students do not become isolated.
- Vary the structure during the course to appeal to different learning styles and modes of learning.
- Don't call on "minority" students as "spokespersons" for their group, e.g.: "So how do Moslems feel about...?".
- Recognise and acknowledge the history and emotions your students may bring to class.
- Respond to non-academic experiences, such as racial incidents, that may affect classroom atmosphere and performance.

Adapted from "General principles in teaching 'minority students'", in *A Handbook for Teaching Assistants*, University of California Santa Barbara (UCSB)

4.5 Bringing classes to a close

Getting the timing of classes right can be a challenge to most teachers. There is inevitably pressure on time, as many classes try to "do" as much as possible in the time available. Finding that time has simply run out is a common experience. With that in mind, it is useful to plan the end of sessions as carefully as planning the beginning, and then to watch the clock so that you can decide when the "end game" needs to start. An obvious element in "ending" that many class teachers include is to summarise the ground that has been covered, key learning points and main issues raised. This can give a sense of "neatness" and closure to sessions.

Another way of looking at the end of a class though is to see it as an opportunity to prompt students to further study. Rarely will a class manage to "complete" the topic under discussion. As such, you may wish to consider ways of using the summing up more as an opportunity to identify any "gaps" or issues that haven't been addressed, key readings which you may be have noted students have not yet read, but probably would benefit from spending time on, and in giving students some pointers as to further work they may engage with. Finally, it is often worth reminding students what will be covered in the next class and prompting them to plan ahead, to make links to the next lecture and class, and ensure that everyone is on track to make the most of the next class in the series.

Top Tip

"I find important ending the class with a summary of the key arguments discussed, results found and conclusions drawn."

"wishing them a nice weekend at the end of class, showing that they are cared for"

4.6 If your first language is not English

Many class teachers in UK universities are post-graduate students who are themselves from overseas. Teaching in a foreign language can be a fantastic way of improving your English.

However it may also present a number of challenges too. Here are a few common sense reminders if this applies to you.

1. Always face your students when you are talking to them so that they can also use your eye contact and body language to fully understand your meaning.
2. In discussion, write down key terms and names when you are referring to them. You can do this on the white board or flipchart as you speak or include them in a brief handout and explicitly refer to them in class.
3. Encourage your students to ask questions.
4. Try to talk slowly and clearly so that students will have every opportunity to understand what you are saying.
5. If your students ask you a question that you don't understand, you can:
    - Ask the student to repeat or rephrase the question;
    - Open up the question for the whole class to think about (e.g. "That's a good question can someone begin to help us answer it?");
    - Attempt to rephrase the question yourself and answer it when you are sure you understand correctly.

If you experience problems with being understood, your institution may be able to provide voice or pronunciation training: check with your staff development department.

Top Tip

"I know my English isn't perfect, so when I met my class I said to them "you need to stop me if I talk too fast or my accent is too strong". We needed to sort out how they could stop me without feeling embarrassed - one of my groups actually wave at me if I lose them!"

4.7 Top Tips

Start off on the right foot	by getting to know your students' names; encouraging them to learn each other's names; contracting; establishing ground rules; setting objectives and orientating them to the module.
Use 'structures' to manage group learning	by arranging the furniture in the room suitably; breaking up the group, breaking up the tasks; using sub-groups (pairs, triads, pyramids, debate etc).
Encourage students to participate	by using structures (e.g. rounds, brainstorming); using students' interests; using students' questions; asking different kinds of questions; managing the vociferous students effectively.
Encourage students to take responsibility	by distributing group roles; encouraging students to work alone or in groups in class; leaving the room; asking students to present their work; establishing and supporting self-help groups; awarding group grades.
Evaluate the work of the	by encouraging group self-monitoring; having group observers; checking up on group process; tape-recording the session; consulting the group.

group	
Use written material	such as posters; group charts; students' notes; handouts; essay preparation; open-book tutorials.
Help students express their feelings	by dealing with 'what's on top'; self-disclosure; praise and encouragement; managing closure.

5. Preventing and resolving problems

5.1 Common difficulties in facilitating class discussions

The following are some of the common problems that can occur in classes and some ideas about how to cope with them:

- **The whole group is silent and unresponsive** — ask students to work in pairs to get people talking and energised. Ask "What is going on?" Ask groups of four to discuss what could be done to make the group more lively and involving and then pool suggestions.
- **Individuals are silent and unresponsive** — use open, exploratory questions. Invite individuals in: "I'd like to hear what Clive thinks about this," Use "buzz" groups (pairs or groups of three).
- **Sub-groups start forming with private conversations** — break them up with sub-group tasks. "What is going on?" Self-disclosure: "I find it hard to lead a group where..."
- **The group becomes too deferential towards the tutor** — stay silent, throw questions back, open questions to the whole group. Negotiate decisions about what to do instead of making decisions unilaterally.
- **Discussion goes off the point and becomes irrelevant** — set clear themes or an agenda. Keep a visual summary of the topics discussed for everyone to see. Say: "I'm wondering how this relates to today's topic." Seek agreement on what should and should not be discussed.
- **A distraction occurs (such as two students arriving late)** — establish group ground rules about behaviour such as late arrivals. Give attention to the distraction.
- **Students have not done the preparation** — clarify preparation requirements, making them realistic. Share what preparation has been undertaken at the start of each session. Consider a contract with them in which you run the seminar if they do the preparation but not otherwise.
- **Members do not listen to each other** — point out what is happening. Establish ground rules about behaviour.
- **Students do not answer when you ask a question** — use open questions, leave plenty of time. Use buzz groups. Ask students to write down their answers first and share with a neighbour.
- **Two students are very dominant** — use hand signals, gestures and body language. Support and bring in others. Give the dominant students roles to keep them busy (such as note-taker). Use structures that take away the audience. Think about how you position yourself. If you sit next to them rather than opposite them, it is harder for them to "come in". See if you are giving them too much "non-verbal" encouragement, such as nods, eye contact and positive comments. You may need to break some social rules now and then!
- **Students complain about the seminar and the way you are handling it** — ask for constructive suggestions. Ask students who are being negative to turn their comments into positive suggestions. Ask for written suggestions at the end of the session. Agree to meet a small group afterwards.
- **Students reject the seminar discussion process and demand answers** — explain the function of seminars. Explain the demands of the assessment system. Discuss their anxieties.
- **The group picks on one student in an aggressive way** — establish ground rules. Ask 'What is going on?' Break up the group using structures.

- **Discussion focuses on one corner of the group and the rest stop joining in** — use structures. Point out to the group what is happening. Look at the room layout, how are students positioned and where do you sit? — see if physical re-organisation can make a difference to undesirable group dynamics or can enhance discussion flow.

Adapted from materials produced by Dr Alan Booth (University of Nottingham) and Jean Booth (University of Coventry). *Enhancing Teaching Effectiveness in the Humanities and Social Sciences: participant guide* (1997) UK Universities and Colleges Staff Development Agency, Sheffield, p115-6.

5.2 Suggested DOs and DON'Ts for running problem-solving classes

With thanks to Tony Whelan from the LSE for some of the following. Tony is a highly experienced class teacher who has run classes in Maths, Statistics and OR.

Possible DOs for running problem classes

1. **Provide background:** In some sessions, it may be appropriate to discuss the theory and methods involved in a topic, at a fairly general level, and then to use that discussion as the basis for approaching the issues raised by homework exercises.

   > On an elementary statistics course, homework revealed that students had considerable difficulty with one important idea, namely that of an estimator. One successful class session involved spending half the time studying the relevant definitions and properties, with lots of examples of things that were, and that were not, estimators. This clarified the issues involved, and it was then possible to go back to the homework questions and clarify how the basic ideas applied in all of them.

2. **Read and contextualise the question(s):** In most sessions it is fruitful to encourage students to read questions carefully and to absorb the information in the question. In many applied areas this can be motivated by the observation that, in the "real world", real problems require considerable effort and thought to decide what is important about them, and what mathematical approach(es) might be fruitful.
3. **Identify thought processes:** In most sessions it is also fruitful to discuss the thought processes that students need to engage in while approaching how to solve a problem: at each stage, students need to be able to decide, "what should I do next"?

   > In an elementary statistics course, there are strategies for calculating probabilities using two results known as Bayes' Formula and the Total Probability Formula. It is often useful, at an appropriate stage, to (re-)display those results, in a different colour from the "solution", to remind students just why the next calculation is the appropriate one to carry out. Similarly, in explaining the Gaussian Elimination method of manipulating matrices, it can be useful to put coloured boxes around the key cells and blocks being used at various stages in the calculations.

4. **Use examples:** It is frequently useful to motivate ideas and techniques by reference to real-world examples.

   > In an elementary statistics course, students meet the concept of "outliers", that is to say values in a set of data that seem a long way away from the bulk of the known data. In real-world situations, such anomalies can be due to, for instance, instrument errors. The discovery of the famous hole in the ozone layer, over Antarctica, illustrates both the importance and the difficulty of dealing with this problem in "real-world" situations: it was discovered using meteorological balloons, but then the question arose why meteorological satellites observing the same area earlier had not identified it first. It turned out that the computer programmes used to analyse the satellite data had been so written as to reject, as "outlier" instrument errors,

true readings which ought to have revealed the ozone hole but were ignored until it was discovered a different way.

5. **Prepare and structure:** Make sure that classes are well prepared, with a proper structure: some ideas about this can be found just above, and also in the section on **'Preparation and planning'**.
6. **Explain, then summarise:** Be prepared to repeat things, often from slightly different angles, and to summarise the ideas you are trying to get across, e.g. as bullet points.
7. **Observe your audience:** Pay careful attention to whether students appear to be following what is being said: there are all sorts of clues that can help with this, involving body language and facial expressions as well as any explicit questions or interjections that they make.
8. **Encourage participation:** Even when a class teacher is dominating the discussion (which will often be the case in problem-solving classes), s/he should make sure that students are encouraged to yell out if something is unclear, or wrong.
9. **Involve students:** One other technique that helps to involve students, even when a class teacher is dominating the discussion, is from time to time to ask something like "Someone tell me what comes next". This approach can be varied by asking particular students something similar, but whatever detailed approach may be used, teachers need to be aware of the twin dangers of the "pushy" student, who likes to show off how much s/he knows, intimidating or discouraging others, and of the shy or nervous student, who needs to be encouraged to respond in such situations.
10. **Use follow-on exercises to check on understanding:** Students can be told in advance that they will be given an exercise in class as a follow-on from, or as another example of, an exercise they have prepared. They could work on these in small groups with the groups reporting back.
11. **Give students enough time:** If you give students work to do in the class as a follow-on exercise from the ones they have prepared, give them enough time to complete it, or at least to get sufficiently far through it to benefit from the subsequent explanation.

Definite DON'Ts in running classes

1. **Read aloud:** Don't just read out, or ask students to read, pre-printed solutions supplied by the teacher in charge.
2. **Skip parts of explanations:** Don't "skip" detailed points of reasoning on the grounds that they are "easy" or "obvious". Maintain a consistent level of depth of explanation and remember that points that are "obvious" to you may not be so to your students.
3. **Rush:** Don't go too fast.
4. **Try to hide errors:** Don't be afraid to acknowledge errors when they happen or to admit that there is something you do not know. If asked a question that you feel you cannot accurately/adequately address on the spot, then do not waffle or offer a vague explanation. Tell the students you will look into their question and let them know. Make a note of any unresolved questions or queries and make sure you get back to them with a response.

5.3 Dealing with difficult students

At some point in your career as a class teacher you may have to deal with a student who causes disruption in the class or who does not meet his/her course-related obligations, such as handing in assignments, attending classes regularly, etc. Although each case will be different, you will need to take some steps. Here are a few tips:

- If a student who is on the class register does not attend the first class/classes, check that your class register is up to date and, if so, contact the student to remind them they should be attending class, informing them of your office hours in case they wish to come and discuss the course/classes they have missed with you. Typically, students will respond to this and start attending more regularly. If such encouragement is ineffective, then alert the student's tutor/other appropriate member of staff about the matter, copying in the student.
- If a student does not submit the required assignments, then contact the student and give them a reminder and, if appropriate, a final deadline for submitting work. Be flexible and understanding if a student is facing some particular personal or academic difficulty, but maintain a level playing field

for the whole group. If failure to submit coursework persists, alert the student's tutor and copy the student.
- Familiarise yourselves with the regulations relating to course assessment so as to advise students accordingly.
- If a student causes disruption in class, for example is rude, aggressive to other students, uncooperative etc, then you have to decide whether the level of class disruption is such as to necessitate intervention (asking the student to stop or, in extreme cases, to leave the room), or it is sufficient to speak to the student later, outside class, about the matter. If you ask the student to leave the classroom, then contact the student's tutor and the undergraduate/graduate tutor directly after the class and explain what occurred. Take care not to offend or humiliate any student in front of his peers, even if his/her behaviour is very challenging.
- Different class groups taught by the same GTA may have different atmospheres. Some may be boisterous and loud, while others may be quieter. It is inevitable that the mix of student personalities and that of the class teacher will jointly determine the atmosphere in the classroom. Sometimes a simple solution is to move a student to a different class group, if possible.
- Keep organised e-mail records for students that cause problems so as to be able to provide an accurate account of the problems at a future date if the need arises.
- Students may try to undermine your authority as class teacher if they perceive you as not being very assertive. Different approaches work for different people but deal with problems professionally *as soon as they arise* in order to prevent escalation.
- Take time to understand what is motivating the poor attendance/challenging behaviour of students and take steps to encourage and motivate them.
- Ask for advice if faced with problems that you are unsure how to tackle.

5.4 Getting feedback

At various points in the year, you will want to assess how well you and your students are doing. Here are some suggestions to help you evaluate your classroom teaching:

Checking student progress

- As noted in 'questioning skills' in the section on 'the skills of the class teacher', ask questions designed to monitor student understanding. This is an informal way to assess student progress.
- Watch for student reactions to your discussion section. Take notice of body language and eye contact.
- Consider using short quizzes designed to monitor students' understanding of the previous week's material. (The Economics Network has links to many tests and past papers that you might want to use or adapt.)
- Try out an "instant questionnaire". This is a simple technique of asking three or four "indicative" questions or statements about a particular session, and getting an instant response to them from the students. Statements might take the form of "I now feel confident to tackle problems about x", "Today's class was too fast for me", "I really feel I need more help on understanding theory y", etc.

Feedback on your class teaching approach

- Ask students how things are going, over coffee, or when they come to see you in office hours.
- A few weeks into term, ask students to jot down answers to the following: what would you like me to stop doing; continue doing; start doing? (Think of variations on this theme, for example asking them to comment similarly on what they'd like from their fellow students in the class.)
- Using peer observation of teaching sessions can also greatly benefit the reflective class teacher. It can be very useful to agree to observe and be observed by another class teacher reciprocally to help develop teaching skills.
- Invite the teacher responsible for the course to observe your teaching and arrange a feedback session afterwards.
- You may wish to videotape your classes to review your own approach (you would need to consult with your students about this and probably explain that it is for your benefit and therefore ultimately

for their benefit!).

Top Tip

"I asked if I could sit in on one of the experienced class teacher's classes, before I met my own group, just to see how he did it. I really liked his approach but I knew I wouldn't have the confidence to mimic him - still it gave me an idea of how to break up the time and how to avoid doing all the talking."

6. Conclusion

A teaching assistant working with a small group of students has the opportunity to create an environment where students can follow a more individual learning journey and actively engage in the learning process. The chapter has offered various ways to achieve that active engagement. This mode of teaching is demanding, as interaction also means unpredictability, but can be extremely fulfilling.

Hopefully these suggestions are the basis for you to develop your own style of teaching. This handbook's chapter on using media in teaching goes further into using social media, online video or personal response systems. Other chapters go into other specific topics in teaching economics and the Ideas Bank has many case studies of specific activities. Consider what is feasible in your own classes and what fits the way you want to teach.

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The Handbook
for Economics Lecturers

Case Studies

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1 Introduction

'Knowledge is the beginning of practice; doing is the completion of knowing. Men of the present, however, make knowledge and action two different things and go not forth to practice, because they hold that one must first have knowledge before one is able to practise. Each one says, 'I proceed to investigate and discuss knowledge; I wait until knowledge is perfect and then go forth to practise it.' Those who to the very end of life fail to practise also fail to understand. This is not a small error, nor one that came in a day. By saying that knowledge and practice are a unit, I am herewith offering a remedy for the disease.'
Wang Yang-ming, Chinese philosopher, 1472–1529

The main aim of economics education is to enable students to 'think like economists'. According to recent research, thinking like an economist includes not only analytical or problem-solving skills but also creative skills, which 'help determine how to frame questions, what tools and principles apply to particular problems, what data and information are pertinent to those problems, and how to understand or explain surprising and unexpected results' (Siegfried *et al.*, 1991, p. 199). A large body of evidence (see, for example, Brown *et al.*, 1989; Boehrer, 1990) shows that an effective way to accomplish this learning is to provide students with increased opportunities to become more actively engaged in the application of economics. However, much of the teaching in many higher education institutions takes the traditional form of lectures and seminars supplemented by problem sets, written assignments and limited class discussions. As recently pointed out by Becker and Watts (2001), the predominant teaching method in economics departments in the United States is still what they refer to as 'Chalk and Talk'.

As lecturers, we would generally agree that the most vivid and powerful lessons from our own educational experiences are related to projects in which we were actively involved. Concepts, ideas and experiences are harnessed and clarified in our mind more easily and quickly through direct experience than through the reading of books and abstract theories and concepts. This is particularly true in the early development of cognitive skills.

The use of the case method in the teaching of economics has received greater attention in recent years. Velenchik (1995) discusses her experience in using the method to teach international trade policy. She provides an evaluation of the method by comparing the results of students exposed to case discussion with the results of students on the same course but who have instead been taught in more traditional ways. She observed that the students on the case course had a more complete grasp of theory and did better in examination questions requiring analysis of real-world situations using theory. She also observed a dramatic improvement in students' analytical thinking and in their ability to express themselves verbally.

Carlson and Schodt (1995) discuss their experience of using the case method in teaching development economics and international monetary economics. They present a detailed account of students' evaluation of the case method and they are able to show that students are emphatically positive and convinced that the use of cases helped them to learn economics. According to their findings, students feel that the use of cases adds interest to the study of economics and makes their classroom much more real. Carlson (1999) explains how students on his statistics course are presented with a situation that requires statistical and economic analysis to solve a realistic problem. Cases with data for real applications are supplied to students who are then required to prepare a written report to a policy decision-maker. The author's evaluation of the case method shows that the students' involvement in problem solving

has greatly improved their learning of statistical methods.

Traditional lectures and seminar are still valuable for transmitting information and knowledge. However, to help our students learn to 'think like economists' we need to consider seriously ways of moving beyond this more traditional mode of instruction. Some of the innovative and more active suggested forms of teaching and learning include the use of classroom games simulations, the introduction of experimental economics, the use of popular and business press, the use of case studies and co-operative learning. In this chapter we will focus on how case studies can be used in economics teaching. The remainder of this introduction explains the basic philosophy of the case method of teaching, its pedagogical value and the different approaches to the use of case studies.

1.1 The case method

The case method was born out of research, teaching and consultancy activities at Harvard Business School. Over the years, case programmes have been established at both Harvard Business School and the Kennedy School of Government. The experience accumulated by tutors and teachers is shared through the publication of short papers that discuss the various pedagogical approaches to case method teaching (see, for example, Boehrer, 1995; Shapiro, 1994). The classical case method has three main components: the *case* itself, the students' *preparation* for the case, and the *discussion* that takes place in the classroom.

Cases are stories about situations in which individuals or groups must make a decision or solve a problem. Cases supply students with information, but not analysis. Although many cases are drawn from real events in which decisions have been made and the outcome is known, most do not describe the decision itself, leaving students with the task of determining what the correct course of action would be. Case method teaching is a form of discussion teaching in which students prepare a case, either individually or in groups, and then seek collectively through in-class discussion to discover a solution to the problem presented by the case.

Unlike problem sets, *cases* do not set the problem out in clear steps; nor do they lead to a single correct answer. Unlike examples used in lectures, textbooks or scholarly articles used for discussions, cases contain facts and description but no analysis. The story in the case can be told in narrative form, with numerical data, charts or graphs, with maps or other illustrations, or with a combination of all these techniques.

Newspapers and magazine articles, insofar as they chronicle events without presenting analysis, can effectively be used as cases. This is true even for articles describing a policy decision or an action that has already been made, as long as they do not provide an analysis of the decision-making process itself. Cases can often be composed of a number of newspaper articles, particularly if they present different points of views about a single issue. For the inexperienced lecturer, approaching case method for the first time, newspaper articles (or newsclips) on a particular case can be effectively used as the first step towards the gradual development of an in-depth and comprehensive account of the case. This 'progressive' approach to the use of case studies will be discussed in more detail later in the chapter.

The success of the case study method is critically dependent upon student *preparation*. Students must come to class well versed in the facts of the case and prepared to provide an analysis of these facts. In the early stages of a module, it is usually helpful to provide students with study questions to guide their preparation, including questions aimed at focusing attention and questions that help them to begin the analytical process. These questions generally ask students to think about the relationships between the facts and events described in the case.

The in-class *discussion*, the core of case method teaching, is flexible enough to accommodate a variety of different strategies for involving students. Role playing, for example, heightens the

identification of students with actors in the case. Students may be organised into groups as a means of building consensus or of sharpening conflict. Students might prepare the case within a group or form groups more spontaneously during the course of discussion. Individual or group presentations can be the starting point of the discussion.

1.2 The pedagogy of case studies

The case method is based on a philosophy of professional education which associates knowledge directly with action (Boehrer, 1995). This philosophy rejects the doctrine that students should first learn passively, and then, having learned, should apply knowledge. Instead, the case method is based on the principle that real education consists of the cumulative and unending acquisition, combination and reordering of learning experiences.

There are two fundamental principles underpinning the case method. First, the best-learned lessons are the ones that students teach themselves, through their own struggles. Second, many of the most useful kinds of understanding and judgement cannot be taught but must be learned through practical experience. When instructors assign problems or papers in a course, they are motivated by a similar concern: by working through the problem set on their own or writing the paper, students reach a deeper understanding of the concepts and ideas than they would have if they only read the text or listened passively to lectures. Case method teaching extends this principle to make preparing for class and the class session itself an active learning experience for students. By using complex real-world problems as the focus, it challenges students to learn skills that will be appropriate to deal with the practical problems that they will face as economists, civil servants or private managers.

Teaching through the case method allows educators to address specific pedagogical issues and to develop higher-order skills in students. Velenchik (1995) highlights four pedagogical issues addressed by the case method:

- *Motivation to learn theory*. In general, undergraduate economics courses tend to treat applications as secondary to the exposition of theory. In our teaching we often use examples to illustrate the application of particular theoretical concepts. However, we tend to use the example to reinforce the theory, having taught the theory first, rather than thinking of the theory as a set of tools for answering the question posed by the application. The focus, therefore, is on the theory itself, and the application is often perceived as incidental. When students do not understand the purpose of theory, the process of learning becomes more dry and difficult than it needs to be, and they often fail to grasp the tools they need. In the case method, the problem that the students are challenged to solve takes centre stage. They soon realise that they do not have the tools and they start looking for the tools. They want to learn theory.
- *Application of theory*. The ultimate goal of economics education is to enable students to apply economic reasoning to particular policy issues. The focus is generally as much on the process of policy analysis as on the specific area of policy. One method for illustrating the process is through examples related to lectures. However, this is problematic. The example is often preceded by theory, so that students think of the application as a use of the theory, rather than seeing the theory as a tool for dealing with the issues raised by the application. Examples are commonly selected because they are good illustrations of particular theoretical concepts, but they do little to help students learn which theories are appropriate for which kinds of policy problem. On the other hand, the case method requires the student to identify the theory that best addresses the economic problem under investigation.
- *Use of evidence*. Empirical analysis, guided by theoretical concepts and analytical tools, is central to many economics modules. Students are often required to develop an ability to use quantitative

evidence. This often involves a number of tasks, including determining what types of evidence are relevant measures of particular phenomena, evaluating the credibility of available information, performing calculations to arrive at appropriate and useful measures, and finding the best way to convey this information using tables and graphs. In this respect, although the lecture and example method usually provides students with some exposure to quantitative information, it does not require them to do the work themselves. A prepared classroom example does not provide training in how to select, manipulate and present such evidence; nor does it help students learn to interpret evidence themselves. Case studies include raw data that students have to manipulate, represent and comment on in order to solve the problem.

- *Limitation of theory*. One of the most difficult aspects of applying economic analysis is understanding which parts of a question can be answered by economic analysis, and which are best addressed using other disciplines. In particular, students need to learn the difference between identifying economic consequences of a policy choice and considering these decisions in the broader social and political context in which policy-makers and business leaders find themselves. It is difficult to use a lecture and example to fulfil these goals, since classroom examples are often abstracted from their context. The case method forces students to be confronted with the broader (non-economic) consequences of economic decisions.

The case method can also be used in a very effective way in order to move students gradually up the cognitive skills ladder from the low skills levels of *knowledge*, *comprehension* and *application* to the higher and more desirable skills of *analysis*, *synthesis* and *evaluation*. This educational taxonomy was originally proposed by Bloom (1956) and, even if not uncontested, it provides a transparent and structured approach to the development of students' skills. The following list describes this educational taxonomy and then explains how the case method helps in developing each of the skills.

- *Knowledge*. This refers to the student's ability to *remember* previously learned information. It involves the recall of a wide range of material but all that is required is bringing appropriate information to mind, not necessarily *understanding* its meaning. The case method is probably not the most efficient way to convey knowledge. However, in combination with some lectures, it can be used to broaden knowledge.
- *Comprehension*. This skill is defined as the ability to grasp the meaning of material and it can be demonstrated by translating material from one form to another, by interpreting material and by extrapolating information. By basing knowledge within a real-world context, the case method supports and facilitates the comprehension of basic knowledge.
- *Application*. This is the ability to use learned material in new and concrete situations. It may include the application of rules, methods, concepts, principles, law and theories. Through the analysis of policy decisions or business strategies, students develop an understanding of how theory is applied in real-world contexts.
- *Analysis*. This identifies the ability to break down material into its component parts so that its organisational structure may be understood. The process generally includes identification of the parts, analysis of the relationships among the parts and recognition of the organisational principles involved. As already mentioned, analysis is at the centre of the case method. The case studies require students to break down complex information, establish relationships and identify issues.
- *Synthesis*. This skill refers to the ability to put parts together to form a new whole. The process may involve, for example, the production of a unique communication (presentation) or a plan of operations (research proposal). Case studies foster this skill by requiring students to identify relevant information, summarise fundamental concepts and present a concise summary of main events.
- *Evaluation*. Critical evaluation is concerned with the ability to judge the value of material for

a given purpose. After having analysed and synthesised a particular case, students are required to engage in an evaluation of alternative policies or strategies available to policy-makers or business leaders. This can include an evaluation of decisions already taken against possible alternative solutions.

The case method is a rich and powerful approach to the development of cognitive skills in students. It is also a flexible approach, in the sense that lecturers can use it in alternative ways. These are discussed in the next section.

1.3 Adopting the case method

There is no single approach to case teaching. Instead there are several approaches which work for different people in different situations. However, in general, it is possible to distinguish between two main ways of using case studies.

The first way is to use the case study as a support and an illustration in lectures and seminars. For example, in the lecture you might explain how the case illustrates typical dilemmas or issues that policy-makers, public or private managers face and the principles that can be used to help them reach a reasonable decision. In seminars, short cases can be discussed to show the application of theory, stimulate analysis and induce evaluation. This approach to the use of case studies does not necessarily require the development and presentation of long and elaborated case studies. Extracts from newspapers and business journals can be used to great effect in investigating issues and fostering students' analytical skills. The main advantage of this approach is that it requires relatively little preparation and constitutes an easy and gradual introduction to the use of longer and more comprehensive case studies at a later stage.

The second way of using case studies is to challenge the students to grapple with a decision-maker's dilemma, formulate a strategy and come to a class prepared to explain and defend their recommendations. In this approach, which is usually referred to as 'case method teaching', the instructor either does not lecture or conducts a limited number of lectures that are complemented by the analysis of longer and more complex case studies. The role of the lecturer is to moderate a classroom discussion among the students in which the students compare their different approaches. Learning from each other, the students work together to reach a richer understanding. This requires more effort on the part of the lecturer in order to prepare the required case studies and to plan for their use in class discussion.

This chapter outlines each of these two approaches to case studies teaching. If you believe in the pedagogical value of case studies and are new to this teaching method, the gradual progression from the use of newsclips to the use of more comprehensive case studies can represent the best way of introducing this approach into your teaching. Section 2 explains how you can introduce the case method by using short newspaper articles. Section 3 focuses on 'case method teaching', which contemplates the use of longer and more comprehensive case studies. In both sections the overall aim is to show how you can accommodate the case method in your economics modules and, above all, to show how they help achieve the pedagogical goals discussed in subsection 1.2.

2 The case method through the use of newsclips

The use of newspaper articles in economics is relatively well documented (e.g. Becker, 1998). Many instructors like to use newsclips because they portray the complexity of business and political situations and the role of economic theory in unravelling that complexity. Case studies and, by implication, newsclips allow teachers to manipulate data, investigate hypotheses, deal with uncertainty and complexity and, ultimately, come to a decision. Many introductory textbooks complement the more formal exposition of theories and concepts with newsclips that show the applicability of theory to practice. However, less is known and written about the actual use of newspaper articles in the teaching room and its pedagogical value. The work of Becker (1998) is, therefore, something of an exception. He discusses his experience in using newsclips to motivate students' analysis and to help them to learn quantitative skills. The next subsections intend to address these issues, but before this is done we present a short taxonomy of newsclips.

2.1 A taxonomy of newsclips

The term 'newsclip' should be interpreted as news that has a cited source. In particular, we refer to articles published in business newspapers and magazines or in the financial pages of daily newspapers. Bredon (1999) identifies four main ways in which the news is used in teaching economics:

- *Osmotic newsclips*. These are newsclips that have no commentary except possibly for course headings that may help students identify their relevance. They are used in the belief that familiarity will eventually translate into economic literacy.
- *Case study newsclips*. These are published intact and are accompanied by questions and/or analysis. They are usually complex in their coverage.
- *Focused newsclips*. These are short news excerpts used to illustrate a given economic principle or theory.
- *Reworked news*. This is written in the author's own words with specific acknowledgement of the news source.

The use of newspaper articles in your teaching will mainly require the use of *focused* and *case study* newsclips.

2.2 Embedding newsclips into the lecture

In the lecture you should use *focused* newsclips, since the information provided to the students needs to be clear, simple and straight to the point. In many cases, articles contain additional information that is not directly relevant in the context of the topics that the lecture intends to address. This 'noise' in the article can create confusion and take attention away from the relevant issues. Without careful selection the danger is that newsclips simply end up confusing and discouraging students.

Make sure to select newsclips that contain (technical) terminology that is part of the economic theory discussed in the lecture. This will make students aware that the issues discussed in class are not abstract concepts, but are readily applied in the business context.

TOP TIPS

Use focused newsclips in the lecture. Clear, simple and short newsclips attract students' attention and help them focus on the topic under investigation.

The lecture could then be structured as follows. At the beginning of the lecture, show the article to the students to introduce the lecture topic and to highlight the main points of discussion. Read the article with the students and emphasise the main issues emerging from the article. In this way you will be able to create the context for the delivery of the lecture. The students' attention is captured, interest is stimulated, issues are raised and general *knowledge* is conveyed. Conclude the reading of the article by posing questions concerning the actions, decisions and strategies of the economic agents portrayed in the article. This helps to focus the issues under investigation and suggests the lines along which the lecture will be articulated.

TOP TIPS

Show the article at the beginning of the lecture and use it to create a context for the analysis of the theory.

Thus, the case study provides a motivation to learn theory because the students begin to understand that unless they have some further knowledge, they will not be able to deal with the issues raised in the newsclip. Learning theory is no longer a dry and passive affair, but an active exercise aimed at solving problems. The ground for the development of the theory is then prepared.

The lecture should then develop along traditional lines where the main theoretical concepts are developed and explained. However, in your explanation you should continuously refer to the article's content and always attempt to place the theory within the context of the article. This helps the students to put theory into context: knowledge is conveyed while comprehension is supported and application is shown. Throughout your explanation, you should gradually answer the questions that were posed at the beginning of the lecture. This allows students to understand how theory can be applied to address a specific issue.

TOP TIPS

The use of two overhead projectors displaying the article and the theoretical concepts simultaneously and side by side would help in cross-referencing theory with practice.

At the end of the lecture, you should summarise the main issues developed in the lecture and you should show the case again to the students. This helps them to fix basic concepts in their mind and, more importantly, students can develop a first understanding of how analysis can be carried out. The delivery of the lecture through the use of the case study generally helps students to develop the 'lower' skill levels of knowledge, comprehension and application. The development of the 'higher'-order skills of analysis, synthesis and evaluation is then carried out through the seminar activities. However, before proceeding with an analysis of seminar activities, an example can help illustrate how the approach is used in the lecture of a second-year economics module.

Example: using newsclips in the lecture

Business Economics is a second-year module that deals with the economics of business organisation, market structure and strategic behaviour. Students are introduced to an economic analysis of issues such as the horizontal and vertical boundaries of the firm, strategic interaction in oligopolistic markets and competitive advantage. Within the analysis of the vertical boundaries of the firm, one of the topics dealt with in the module is the hold-up problem. Figure 1 presents the article that was used in the lecture.

The article is shown at the beginning of the lecture and the main 'elements' characterising the business transaction are highlighted: bilateral bargaining, contractual negotiation, asset specificity, transaction costs. In essence, these are the core factors comprising up the hold-up problem. After reading the article, the following questions are posed to the students:

> 'The largest order ever taken to lengthen a luxury liner was revoked yesterday after the Italian owners of the *Costa Classica* pulled out of a deal, leaving 26,000 tonnes of steel (worth £51m) beached on the docks of the Mersey. The Cammel Laird shipyard … was told by Italian cruise operator Costa Crociere that it had postponed delivery of the ship because the work was behind schedule … union leaders and local MPs began a series of crisis meetings late on Thursday to salvage the contract to build and fit a 45-metre extension to the 56,000 tons *Costa Classica*, cutting it in half and inserting the new section in the middle… The Italian shipowner had applied for arbitration to find out whether they could postpone or even terminate the contract, arguing that the work was substantially behind schedule and efforts to resolve the dispute commercially had failed…' (*Guardian*, 25 November 2000)

Figure 1 Article introducing the case

1. How many parties are involved in this transaction?
2. How can Costa Crociere back off if there is a legally binding contract regulating the business transaction?
3. Can Cammel Laird shipyard sell the ship-extension to somebody else?
4. What do you understand from the phrase 'efforts to resolve the dispute commercially had failed'?

The lecture then develops around a detailed account of hold-up problem theory by continuously referring to the issues identified at the beginning of the lecture and to the article. At the end of the lecture, the main issues are summarised, the article is shown again and the link between theory and the case is demonstrated.

2.3 Using the newspaper in seminars

Lectures are usually complemented by seminars or tutorials that take place the week after the lecture. This subsection assumes that students are given a set of problems and tasks to prepare beforehand and suggests how seminar activities could be structured.

First, ask the students to solve simple abstract numerical problems whose solution requires the *application* of basic knowledge (i.e. formulae, expressions, etc.) acquired during the lecture and through the reading of the assigned material. It is helpful in this case to design your own problems rather than to use problems taken from textbooks (an example is provided at the end of this subsection). In this way you have better control of the gradual development of cognitive skills in students.

These problems could then be followed by a set of more complex problems in which students have to show an ability to *analyse* a specific economic situation or business decision and to produce a solution. These problems are specifically aimed at developing analytical skills, requiring students to break down information into simple components, establish links and produce a solution. In many cases it is possible to combine application and analysis in one single problem. A very simple example could be a problem that gives information about the fixed and variable costs of production of two alternative technologies and the output the firm expects to produce. The students can then be asked to set up the total and average cost functions. This task would require an ability to apply knowledge. The problem can then continue by asking which technology the firm should employ in production. This task requires students to use the results computed in the earlier parts of the problem to produce a solution by suggesting the most efficient technology.

The seminar could conclude with the investigation of a case study. It is suggested that you use a *case studies* newsclip drawn from leading business newspapers and magazine. The newsclip can be longer than that used in the lecture, even if brief and compact articles should be preferred. Long articles (usually more than 500 words long) can contain too much information that can make the students' analysis difficult and put them off the case. Moreover, time constraints often make it unfeasible to deal with long and complex cases. The investigation of the case study aims to complete the educational taxonomy by inducing students to engage in the synthesis and evaluation of more complex information. Each case study should be accompanied by a set of questions that help students focus their attention on the issues that are relevant to the topic under discussion. It is important to include these questions because, particularly in the early stages of the module, students do not have a clear ability to distinguish important from peripheral information. By attending the lecture and experiencing the approach to case study analysis in the classroom, students should develop some understanding of how to deal with the article. However, in many cases their approach will still be rough and lack the necessary focus.

TOP TIPS

Complement the newspaper article with questions that help students approach the analysis in a structured and coherent manner.

With appropriate guidance and direction, the case study helps students to develop an ability to break down complex information into simple components: analysis is fostered. These simple components can then be linked together and cross-referenced to interpret the actions of economic agents and the strategies of businesses: synthesis is stimulated. This new information is then used critically to evaluate the business strategy against alternative strategies or some set objective: evaluation is triggered.

In the early part of the module, the students will find it difficult to approach case study discussion in a structured and rational way. Your role is to coach the discussion and guide the student through a logical and informative investigation. As students develop a better understanding of how to approach case study analysis, your role in the discussion will reduce and you will be required to intervene much less frequently. In later stages of the module, you can start supplying case studies that are not complemented by any question so that students have to show their analytical skills without the guidance of pre-set boundaries. Indeed, the students' ability to engage in the case analysis without the 'guidelines' provided by the questions will reveal their actual development of higher-order skills.

Students' preparation is important but not necessary. It is important and desirable because it will generate a speedy and livelier discussion of the case. It is not necessary because the length of the case usually allows a quick reading of the article and an almost immediate ability to engage in the discussion. At the end of each seminar, you can distribute additional case studies for students to analyse and provide a short written report. This would allow students to practise and to strengthen their skills. As discussed below, this additional activity could be managed with the help of a Virtual Learning Environment.

Students engage in each element of Bloom's taxonomy through the range of activities in the case study. The development of the lower skills of knowledge, comprehension and application that started with the lecture is then complemented by the seminar activities that are specifically designed to push the students towards the higher skills of analysis, synthesis and application. This structured approach to learning, with the case study method at its centre, can be an effective method for developing higher-order skills in students. An example of case studies in seminar activities is given below. The assessment is the final part of the learning process. The next subsection explains how case studies can be used in various assessment methods to test the students' cognitive skills.

Example: structuring seminar activities

The seminar activities that complement the hold-up lecture, discussed in the previous example, include first a numerical problem aimed at developing comprehension and application and at stimulating analysis. The problem in Figure 2 has been used in the past.

> You are the owner of Engines Ltd, a company that specialises in the production of engines for motorbikes. You are approached by the managers of Aprilia, who are planning to produce a new motorbike that meets new higher government environment standards. They require you to produce a new engine whose emissions must be below the limits imposed by recently introduced anti-pollution legislation. After many discussions and project analysis, you work out that the production of the new engine will require an investment of I = £4 000 000 and that the average variable cost of production will be C = £200. After discussion with the Aprilia managers you agree to supply Q = 50 000 engines at a price of P^*=£400 each. The managers of Engines Ltd know that by signing the contract with Aprilia they commit themselves to the production of a highly specialised product that they will only be able to sell to other motorbike manufacturers at a lower price of P_m = £250. Eventually the contract is signed and the investment is carried out.
>
> 1. What is the rent that Engine Ltd expects to make?
> 2. What is the value of the relationship-specific investment?
> 3. What is the quasi-rent?
> 4. Will Aprilia have incentives to renegotiate the contract once Engines Ltd has carried out the investment? Will the 'hold-up problem' emerge? Briefly explain.
> 5. Assuming that the managers of Engines Ltd are rational agents, would they have signed the contract with Aprilia in the first place and would they have carried out the investment? Briefly explain.

Figure 2 Hold-up problem: a numerical example

The exercise is structured in such a way as to require the students to compute, step by step, the values of the main determinants of the hold-up problem. Thus, once questions 1–3 are solved, the student has all the necessary elements to understand whether the hold-up problem will emerge or not. When the problem is organised in this way, the student is helped to approach it in a structured and logic manner. A problem that included only questions 4 and 5 would require the student to do much more background thinking. This can be problematic, particularly in the early stages of the module, if the student has not fully developed an ability to use elementary information to deal with complex issues.

The seminar then continues with the analysis of two related short case study newsclips. The first article (Figure 3) describes a dispute between a British low-cost airline and the owners of the airport from which the airline mainly operates. The article is actually a quotation drawn from the airline's website (http://www.easyjet.com/en/).

> '*Stop Barclays increasing your air fares by £5!* Barclays Bank now controls Luton Airport and wants to increase landing charges to easyJet customers at Luton by 300%, or about £5 per passenger, a significant percentage of easyJet airfares. John Prescott, the Secretary of State for the Environment, Transport and the Regions will decide SHORTLY whether Barclays should be allowed to get away with it. John Prescott has two options – either let Barclays charge whatever it likes, or ask special government appointed experts to decide how much easyJet and other airlines' customers should pay for using Luton Airport.'

Figure 3 Quotation from airline website

'Both easyJet and Ryanair are facing severe cost pressures at their home airports. When easyJet opened services from Luton Airport, it negotiated a five-year deal where the airport earned just £1.60 per passenger plus a 62p handling charge. Luton wants £7.89 per passenger, and two weeks ago reached an interim deal where easyJet will pay a fee believed to be £5 to £6 per passenger.

easyJet insists that this will not lead to higher prices, but it is axing its Luton–Liverpool route, which started at £20 return. "It is just not commercially viable to offer services at that price", says an easyJet spokeswoman. She says expansion plans at Luton are now on hold while it develops alternative hubs at Geneva, Amsterdam and Liverpool.'
(*Guardian*, 17 February 2001)

Figure 4 The evolution of the dispute

The students were given some basic background information on how the airline industry operates and then were asked to identify within this particular case the main determinants of the hold-up problem. This task helps students develop a rational and structured approach to the analysis of information and the synthesis of relevant knowledge. The following are examples of questions asked in the seminar:

1. easyJet is a new airline. Explain the process that led it to choose Luton as its main hub.
2. What types of investment did easyJet carry out at Luton Airport?
3. Why is Luton Airport in a strong negotiating position with easyJet? Given the contractual dispute, why does easyJet not change hub?

Once the students were able to provide an informative and logical analysis of the case study, they were asked to provide an evaluation of the business dispute by suggesting, in particular, the strategies available to the airline. The main aim of this task is to reinforce in the students a clear understanding of the core element of the hold-up problem (i.e. asset specificity) and to evaluate alternative courses of action for a solution of the dispute. The students would first be asked to express their own thoughts and then they would be shown Figure 4, which reports the evolution of the dispute between the two business partners.

The article shows the short- and long-run strategies chosen by the airline. While in the short run it had to give into the airport's requests, the long-run response is diversification and less asset specificity. By the end of the seminar, the students should have developed an ability to investigate similar cases, identify the presence of the hold-up problem and suggest solutions.

2.4 Assessment through the use of the news

Newspaper articles can also be used in assessment. Here we discuss how they can be used in examinations, coursework and presentations. Other assessment strategies can be considered, but we focus on these because of their widespread use.

Examination

If students are assessed by examination, we suggest structuring the paper in four sequential sections aimed at assessing the development of cognitive skills. The higher-order cognitive abilities receive a greater weighting in the mark scheme. The first section should require students to answer short essay-type questions aimed at assessing their level of knowledge and comprehension. The second section should contain some abstract problems whose solution reveals the students' ability to apply theory to practice. Questions aimed at testing the students'

ability to analyse alternative policies or strategies within the context of a fictional problem should feature in the third section. The case study should be included in the fourth section and students should be asked to deal with a set of questions aimed at testing their ability to synthesise and evaluate knowledge. A pass mark should be awarded to students who complete satisfactorily at least the first two sections and who, therefore, show at least some basic knowledge and comprehension. A first-class mark is awarded only upon a satisfactory completion of all four sections.

There are many advantages in structuring the exam paper in such a way. It would represent the 'natural conclusion' to a module whose activities are structured around the principles of the gradual development of cognitive skills and the use of case studies. It offers transparency for both students and lecturers, since the ability to deal with the various sections reveals the students' actual level of knowledge. It also clarifies to students the amount of effort required to achieve desired results. Figure 5, from the exam paper for the first-year course Introduction to Macroeconomics, reflects this educational taxonomy.

Section A - Knowledge and Comprehension – Answer the following questions. (30 marks)

1. What is an open market operation? Show, by using graphs, how the central bank can use an open market operation in order to influence economic activity.

2. What are the three types of unemployment? What is the natural rate of unemployment?

3. What is the real exchange rate? If domestic inflation is higher than foreign inflation, but the domestic country has a fixed exchange rate, what happens to net exports in the domestic country over time? Why?

Section B - Application – Solve the following problems. (20 marks)

4. The following table lists a number of components of UK gross national product from both income and expenditure sides of the account for 1995 (figures are in £000s).

Consumer expenditures	367,853	Taxes on expenditures	83,023
Subsidies	5,878	Profits	63,912
Rent	44,092	Capital consumption	63,968
Net property income from abroad	328	Stock changes	–5,303
Government expenditures	121,899	Investment spending	95,442
Exports	135,115	Wages	387,315
Other factor incomes	1,665	Imports	140,415

a) Use the *expenditure approach* to compute the economy's gross domestic product (GDP) and gross national product (GNP) and national income.

b) Use the *income approach* to compute the economy's gross domestic product (GDP), gross national product (GNP) and national income.

5. A typical family living in Sandy Island consumes only apple juice, bananas and cloth. Prices in the *base year* are £4 a litre for apple juice, £3 a kilogram for bananas and £5 a square metre for cloth. The typical family spends £40 on apple juice, £45 on bananas and £25 on cloth. In the *current year*, apple juice costs £3 a litre, bananas cost £4 a kilogram and cloth costs £7 a square metre.

a) Calculate the retail price index on Sandy Island in the current year.

b) Calculate the inflation rate between the base year and the current year.

c) Was your calculation of the price index based on the Laspeyres Index or the Paasche Index? Briefly explain.

d) Are these two indexes a good measure of the price index in the economy? Briefly explain.

6. The following expressions show the relationships between variables in the goods and money markets. Fill in the gaps (dotted lines) in these 'chain relations' and briefly explain their meaning.

a) Central bank buys bonds → Price of bonds (P^b) → M^S → Æ Interest rate (i)

b) $i \downarrow$ → Cost of borrowing → I → AD → Y

c) Contractionary open market operation → M^S → i → Cost of borrowing → I → AD → Y …

Figure 5 Embedding the educational taxonomy in the exam paper *(continued overleaf)*

Section C – Application and Analysis – Solve the following problem. (10 marks)

7. In a closed economy autonomous consumption is given by $c_0 = 200$ and the marginal propensity to consume is $c_1 = 0.8$. Investment, government spending and taxes are, respectively, $I = 300$, $G = 300$, $T = 200$.

a) Determine the equilibrium level of output Y^e.

b) Draw the goods market graph showing the economy's equilibrium.

c) Compute the government budget balance. Is it in surplus or deficit?

d) Compute the level of consumption and savings in the economy.

e) Show that in equilibrium injections equal withdrawals.

f) Show the relationship between investment and private and public saving.

g) Assume that full employment in the economy is achieved when $Y^e = 4{,}000$. How much should the government spend (G) in order to achieve this level of output?

h) Calculate the government spending multiplier.

i) Suppose now that taxes are endogenous and that the tax rate is $t = 0.25$ so that $T = 0.25Y$. Compute the equilibrium level of output (assume that government spending is back to $G = 300$).

j) What is the government spending multiplier in this case? Is it bigger or smaller than that you computed in h) above? Briefly explain.

Section D – Analysis and Synthesis – Solve one of the following problems. (10 marks)

8. Suppose that a closed economy is initially operating at Y_n. Now suppose that the government increases spending in the economy so that G increases.

a) Use the AD/AS graph to illustrate the initial equilibrium, the dynamic adjustment and the medium-run equilibrium.

b) What are the initial effects of the increase in G on the price level P, real money M/P, the interest rate i, investment I and output Y?

c) What happens to the unemployment rate u and output Y relative to their natural levels during: the short run, the dynamic adjustment and the medium run?

d) When output Y is greater than its natural level Y_n, what happens to the AS curve for the next year? Explain.

e) As the AS curve shifts, what happens to the price level P, real money M/P, the interest rate i, investment spending I and output Y?

f) Does output Y return to its natural level Y_n? If so, what does this suggest about the price level P and the expected price P^e in the medium run?

9. Suppose the domestic economy is initially experiencing a trade deficit. Further assume that government officials would like to eliminate the trade deficit. By using the goods market and the net export graphs, answer the following questions.

a) What type of (domestic) policy could be pursued to eliminate the trade deficit? What effect would this policy have on output? Explain.

b) What type of exchange rate policy could be pursued to eliminate the trade deficit? What effect would this policy have on output? Explain.

c) Suppose domestic policy-makers can put pressure on foreign policy-makers to alter their fiscal policy. What type of foreign fiscal policy could be implemented to eliminate the trade deficit? What effect would this policy have on domestic and foreign output? Explain.

10. Suppose that the British government decides to adopt a fixed exchange regime so that the pound to euro exchange rate is fixed at a specific parity.

a) What are the implications of this decision for monetary policy?

b) The British government explains this policy decision as an attempt to control inflation. Comment on this policy decision. Why should a fixed exchange rate regime help in controlling inflation?

c) Suppose that after the introduction of the fixed exchange rate regime the United Kingdom experiences higher inflation than in euroland. What are the economic implications of such an inflation differential?

d) 'By looking at the inflation differential between the UK and euroland, financial speculators can be tempted to trigger a financial crisis.' Explain this statement.

Figure 5 Embedding the educational taxonomy in the exam paper *(continued)*

e) Suppose that shortly after the introduction of the fixed exchange rate regime the UK economy experiences a recession. Shortly after the start of the recession there are calls for the abolition of the fixed exchange rate regime. Experts predict the possibility of a financial crisis. Explain the rationale behind these calls and predictions.

Section E - Synthesis and Evaluation – Comment on the following article. (30 marks)

'Hopes that the UK manufacturing sector has stabilised received a further boost on Wednesday, with accelerating output and order books pushing a closely-watched survey to its highest level since December 1999.

Meanwhile, a Confederation of British Industry survey suggested the retail sector, which had been burgeoning while manufacturing slumped, appeared to be tempering itself.

The purchasing managers' index (PMI), compiled by the Chartered Institute of Purchasing and Supply (Cips) and Reuters, rose from 50.6 in March to 53.4 last month. This was the third consecutive month that the index stayed above 50, the mark which signals growth.

Manufacturing demand rose at the fastest rate for almost two and a half years as companies reported an increased volume of new business from both domestic and foreign customers, Cips said.

Export orders rose for the second time in the past three months, and at the fastest pace for more than five years. Companies surveyed said business conditions were improving.

Although the survey added to hopes that the manufacturing sector is emerging from the months of recession, it is unlikely to change expectations that the Bank of England's prime interest rate will remain at its 38-year low of 4 per cent until the second half of the year.

Cips said many companies thought a recovery in the US manufacturing sector had helped stimulate growth in much of Europe, with demand from the Middle and Far East, as well as Canada and the US, also up in April.

However, companies doing business with South American countries, particularly Argentina and Brazil, reported slower growth in export orders.

Seventy per cent of companies reported that sales were up in April, while 13 per cent said they were down. The plus 57 per cent balance was a significant improvement on the plus 31 per cent in March and was the highest individual monthly balance since August 1988.

… The three-month moving average, which smooths out month-to-month fluctuations, suggested sales were still slightly below the growth rates of last autumn, the CBI said.

Grocers reported the strongest annual growth since August 2001, while other retailers reported strong growth in sales of clothes, durable household goods, furniture, carpets, hardware, china and DIY products.

Last week, gross domestic product data released by the Office for National Statistics showed the UK economy stagnated for a second successive quarter in January to March, growing just 0.1 per cent in the quarter after zero growth in the quarter of 2001.

The annual rate of growth was down from 1.6 per cent in the fourth quarter of last year to 1 per cent – the lowest for almost 10 years.'
(*Financial Time*s, 1 May 2002)

Comment on the above article and use the AD/AS model to explain the economic situation in the United Kingdom. Should the Bank of England intervene in the economy by changing the interest rate? Why? (*Suggestion*: before using the AD/AS model, use the aggregate demand relation to comment on the UK economy.)

Figure 5 Embedding the educational taxonomy in the exam paper *(continued)*

Coursework

Students assessed by coursework should be given a case study newsclip and should be required to provide a detailed account of the events described in the article by resorting to economic theory. The analysis should break up the article into simple components. Relationships between economic agents, actions and outcomes should be established, and an evaluation of the problem should be provided.

It would be helpful to accompany the case study with specific questions that determine the boundaries within which students need to work. The questions should be similar to those used for the discussion of newsclips in seminars. In particular, it is important to set questions aimed at assessing the students' development of cognitive skills. In this respect, a first question could, for example, simply ask the student to describe the economic theory that can help investigate the case study. The answer to this question would simply reflect the student's level of knowledge and comprehension. The student can then be asked to provide an analysis of the article and to show how the theory applies to the specific case. Application and analysis would be tested. Further questions can ask the student to summarise the most important elements of the events described in the article and to provide an evaluation of the economic situation and suggestions for future actions. The students' ability to deal with these questions would reveal their actual level of skill development and would consequently determine the grade they would be rewarded with.

Presentation

Assessing students by presentation is not only an effective way of testing their level of understanding, but also helps them develop other transferable skills such as the ability to communicate to a particular audience, time management and organisational skills. The presentation might require the student to act, for example, as a business news reporter who has to analyse, present and evaluate a piece of economic news for a wider general audience. In this respect, the reports presented by the economics correspondents in programmes such as the BBC's *Newsnight* provide an appropriate model. The student should be asked to provide a summary of the news, identify the main emerging issues and provide a critical evaluation of the implications for various agents in the economy.

2.5 What makes a good newsclip?

There are some basic guidelines that you can follow in the search for the 'ideal' newsclip. The discussion so far has hinted at some of the properties of a good newsclip. The following is a list of attributes that are desirable in the articles you intend to use.

- *Source*. The case study should be drawn from leading business newspapers and magazines or the financial page of good newspapers. This guarantees the quality of the articles and the detailed treatment of the news. Moreover, it is also likely that any development in the case will be followed in future articles. In turn, this helps to accumulate more information that can eventually lead to the creation of an in-depth and more elaborated case study.
- *Freshness*. Fresh news is good news! An event that has recently been reported in the news and that is at the centre of general attention can be helpful in motivating students and in stimulating them to follow day-to-day developments.
- *Pedagogical value*. It is important that the article has enough 'content' to address the pedagogical values that the lecture intends to address.
- *Length*. Articles used in the lecture should not be too long, otherwise students will quickly lose track of the main issue and will lose concentration. The article used in the lecture should not be longer than one overhead transparency, while the suggested maximum length for the article used in the seminar is 500 words. Even if a focused newsclip is used, it is important that the original article is not too long, otherwise it becomes difficult to 'tailor' the article for the classroom analysis. The length of the article is less important for articles used in seminars. However, it is good practice to avoid long articles, particularly in the early stages of the module, since this can frighten students and deter them from engaging in the analysis.

- *Terminology*. It is important that the article contains some of the technical terminology that characterises the theory developed in class. This makes students aware of the fact that the concepts that they are taught are not abstract and that these terms need to become part of their vocabulary if they intend to develop an ability to deal with economic news.
- *Decision making*. A good article should contain an element of decision making, where the economic agents involved in the case have to make or have made a decision that needs to be evaluated and analysed. This helps students to identify themselves with these decision-makers and evaluate in a rational and logic way the best course of action to take.

2.6 Using Virtual Learning Environments

The use of a Virtual Learning Environment can be an effective support of case teaching.

- *Distribution of material*. A dedicated website allows you to post relevant cases for class discussion as soon as they become available.
- *Links*. Links to the websites of business newspapers and magazines allow students to explore news by themselves. You can stimulate such an exploration by asking students to report any new article that they might think related to some of the issues discussed in class.
- *Virtual seminar*s. Students can be given articles to analyse by themselves and they can post their investigation for you to check and mark. In this way the rigid lecture–seminar structure is removed and students can engage with the lecturer in a more flexible way that suits their personal commitments. Similarly, you are free to organise the interaction with students when it is more convenient for you.
- *Bulletin board*. The communication facilities in a Virtual Learning Environment allow a greater interaction among students and facilitate the 'virtual' discussion of cases. You can stimulate the discussion by posting a case and by making some comments on the strategy or policy described in the case. You can then ask the students to discuss the case and your comments. You should follow the development of the discussion and whenever interesting issues are raised you can intervene to steer the discussion towards the analysis of relevant aspects. When you think that the discussion has exhausted the investigation of all possible leads, you should intervene by providing a short structured summary and a closure of the discussion.

2.7 The costs of teaching with newsclips

There are some inevitable costs associated with the use of newsclips:

- *Search time*. You need to dedicate some time to the search and editing of newspaper articles. However, many leading business newspapers and magazines are available on the internet. Their websites have search facilities that allow you to retrieve articles on the basis of keyword searches. This greatly reduces the search time. Bredon (1999) suggests other ways through which the internet can be used to generate newsclips.
- *Teaching time*. The presentation and discussion of newsclips during the lecture is bound to reduce the time available for the analysis of formal theory. Thus, you will have to restructure your lecture and to decide how to accommodate the discussion of theory within the shorter time available.
- *Teamwork*. Teaching with newsclips in a module where you share seminar classes with other tutors requires that your teaching team be fully committed to this teaching method. This implies that they share the same approach, enthusiasm and commitment in the discussion of the allocated cases. You will have to make sure that they will approach the case discussion in similar ways – the supply of guidelines and teaching notes can help the co-ordination activity.

3 Case method teaching

While newsclips can easily be accommodated into the standard lecture–seminar structure, the use of longer and more comprehensive case studies requires some adjustments in the organisation of classroom activities.

3.1 Lectures versus case teaching

Teaching a case is very much an exercise in leadership: engaging student participation in the collective exploration of a problem and the effort to reach a joint resolution. In a traditional lecture, you analyse course material and convey your interpretation of it to the class. In a case discussion, the students analyse the material themselves and your function is to guide and facilitate their work: frame the task, focus the enquiry, stimulate interaction, probe thinking, set direction, register progress and bring closure. The different interaction between the instructor, students and course material in lecture and in case discussion is described by Boehrer (1995), as shown in Figure 6.

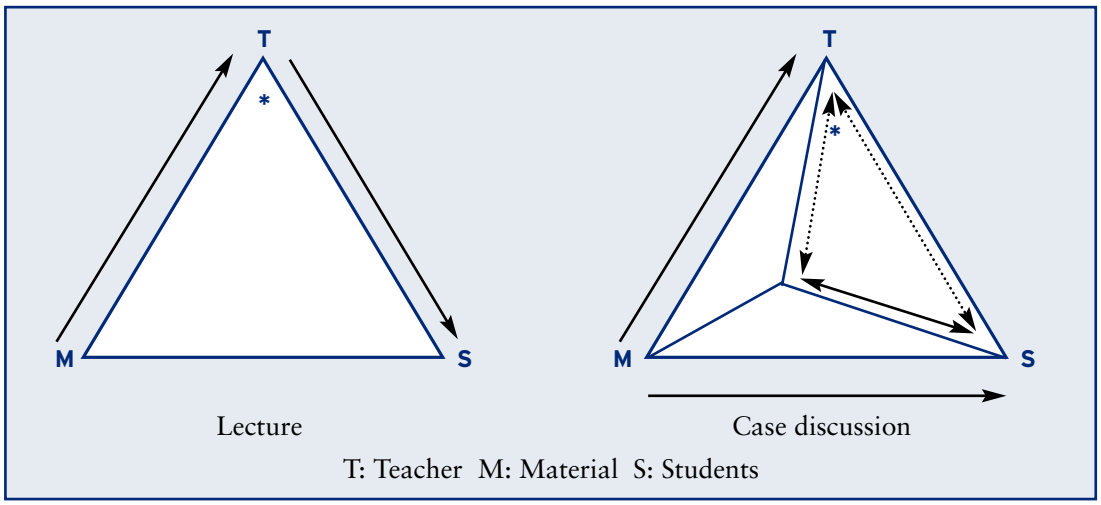

Figure 6 Interaction in lectures and case teaching

The teacher stands between the material and the students in lecture. In case discussion, the students meet the material more directly, and they interact with each other as well. Your role in teaching a case is to manage those encounters towards purposeful ends and, as the dotted lines suggest, to learn from them as well, about the students and the case. While intellectual and procedural authority (*) belongs to the teacher in lecture, teacher and students share it in case discussion. Both determine what is learned, and students, as well as teachers, can raise questions. With case discussion the exercise is more challenging and interesting. However, the success of the discussion is critically dependent upon a number of factors that need to be carefully considered when planning the introduction of the case method. The remainder of this section discusses these factors.

3.2 Placement

The first task in teaching a case is to place it purposefully within the framework of a module. It is also important to keep in mind that one case will often fit into several modules. Having assigned the case to a module segment, you need to determine where it fits into the sequence of related classes and materials, particularly those that concern theory. The most obvious sequence is to present the theory first, then ask your students to apply it to the case, but cases can contribute to the learning of theory in alternative ways. Pedagogical issues can guide the decision concerning the placement of the case studies.. In this respect, you can consider two approaches that are not necessarily exclusive.

Motivating students to learn theory

In the first approach, the case is used to motivate students to learn theory. This can be an extremely successful technique, but it requires careful attention to the timing, selection and teaching of the cases. This application of the case method tends to be more difficult than the use of cases as applications. However, it is especially rewarding, particularly since it increases student engagement in the lectures on theory that follow.

TOP TIPS

To motivate students to learn theory, discuss a case before the lectures take place.

To be used as motivating devices, cases should be introduced *before* the students have heard lectures on the relevant aspect of theory. At first, the students will find this approach more difficult, even if engaging. Thus, it is important to reassure them that you are aware that they do not have the theoretical tools necessary to complete the analysis of the case. Take special care to allow them to explore all possible analytical methods without imposing a particular structure. The goal is to allow them to come to the conclusion that they need some analytical tools, and this will happen only if they are given the opportunity to think the problem through on their own.

Make sure that the case you select raises interesting and relevant questions, without undue complexity. Some quantitative data should be included, but you should be careful to avoid overwhelming students with too much information. Select decision-forcing cases where the outcome of the case is not indicated and challenge students to determine what the best course of action would be. This type of case works much better than those with a described outcome.

You should steer the class discussion towards the generation of a list of questions that need to be answered before the problem posed in the case can be solved. This is a better approach than to present the students with a menu of possible solution choices. In this way you stimulate the development of analytical skills in students: break up the problem into simple elements, synthesise them to create a new entity and evaluate possible courses of action. The questions raised in the discussion should be of a type that can be answered by the application of economic theory. Students will tend to pose these questions in terms that are specific to the case. You should gently intervene and guide them to rephrase them in more general terms.

You should end the case discussion with a set of questions that need answers. They will be provided progressively in the lectures that follow the case discussion. In the subsequent lectures, you should restate the questions at the beginning of each lecture to remind students of what they are trying to understand and continue to make the connection between the case and the theory. This use of the case method motivates students to learn theory, primarily because they wish to understand the case and evaluate the arguments presented in it.

The case as an application of theory

The second approach to placement is to use the case as an application of theory, providing students with an opportunity to 'do' economics and to apply acquired knowledge in real-world contexts. This approach to case study teaching fulfils other pedagogical goals by inducing students to apply theory, use evidence and recognise the legitimate range of application of economic analysis. In the cognitive skills ladder, the approach helps to develop the higher-order skills of analysis, synthesis and evaluation.

TOP TIPS

Discuss cases after the lectures in order to show the application of theory.

You can structure the learning activities by choosing between two alternative approaches. One option is to introduce a case after each lecture. One or more seminars after the lecture are then dedicated to the analysis of the chosen case. A second option is to teach a series of cases after the completion of a series lectures on a theme. In this instance, the traditional weekly lecture–seminar structure is replaced by a series of lectures followed by a set of case discussions.

This second method is more demanding for students, since it forces them to do more work in figuring out which theory to apply in which case. In this respect it helps to address the pedagogical goal of identifying the relevant theories to apply in economic analysis. The major drawback of such an approach is that it produces a long series of lecture classes uninterrupted by the change of pace provided by cases. This dilemma can be dealt with by teaching some short cases during the part of the class period throughout the lecture sequence. The short cases can be used to reinforce specific theoretical concepts. At the same time, students' interest is kept alive since application of abstract knowledge to real cases is shown.

TOP TIPS

Use brief newsclips to intermit the sequence of theory lectures and show the applicability of theory in short cases.

You could then teach two or three broad and more complex cases after all the lectures on the subject have been completed. The choice of how many cases to explore is yours and you should base it on factors such as students' interest, the availability of cases and the time required to present theory.

3.3 Structuring the case discussion

Case discussions depend upon the active and effective participation of students. Students must get involved and take the prime responsibility for their learning. In this respect there are various issues that students and lecturers need to consider in order to make a success of the case study approach. This section discusses five issues that are pivotal to this success: the relationship between the student and the lecturer; the leading questions that will direct the case study; preparation for the case study by teacher and students; the procedure for the case study; and closure.

The relationship between the student and the lecturer

TOP TIPS

At the beginning of the module, establish an explicit contract with the students by showing your expectations of their performance and yours.

The relationship between the student and the lecturer is vital to the operation of the case class. Both parties play an important role in making the case method successful, and both the students and the lecturer have duties and responsibilities. To show your commitment to students and to induce students to participate actively in the exercise, you can make an explicit contract with the students at the beginning of the module (see Shapiro, 1984).

The contract will describe how the teacher and students will be expected to behave with dedication, responsibilities, integrity and a commitment to excellence. Students should commit themselves to the '4 Ps' of the student involvement in case discussion:

- *Preparation*. If the student does not read and analyse the case, and then formulate an action plan, the case discussion will mean little.
- *Presence*. If the student is not present, she or he cannot learn and, more important, cannot add her or his unique thoughts and insight to the group discussion.
- *Promptness*. Students who enter the classroom late disrupt the discussion.
- *Participation*. Each student's learning is best facilitated by regular participation.

The students will, over time, grow to understand the importance of these four elements, but it is important that they are stressed early in the module. Your contractual responsibilities might typically include:

- careful and complete preparation for the classroom experience;
- concern and devotion to the students in all dealings;
- striving to make the course a satisfying development experience.

In general, the more you do, the more the students will do. By showing your commitment to the students, by being well prepared and by showing concern for the students, you will be able to extract a similar level of commitment on the part of the students. Nothing creates student commitment to preparation as much as having the instructor quote case facts, such as numbers, from memory in the first class. Students will generally prepare up to, but not beyond, the standards of preparation shown by the instructor.

Leading questions that will direct the case study

The central task in teaching a case is asking questions, to guide students' preparation, to guide discussion and to facilitate students' participation. They are your fundamental means of mediating your students' encounter with the case and managing their interaction. In planning case teaching, it is important to identify central aspects of the case and to formulate key questions that will direct students' investigation.

A case discussion requires just a few major discussion questions. Class sessions seldom afford time for more than three to five. Typically, they encompass defining the problem, selecting among action alternatives and reflecting more broadly on the situation. A typical sequence of questions would invite observation, analysis, prescription and then evaluation. Questions such as 'what stands out?', 'how does it fit together?', 'what should be done?' and 'what does it all mean?' help students to focus on their main objective and set the boundaries within which the discussion should be conducted.

Preparation for the case study by teacher and students

The foundation of good case discussion is preparation – the students' as well as your own (Hitchner, 1977; Zimmerman, 1985; Gomez-Ibañez, 1986; Lundberg, 1993). The contract that you agree with the students at the beginning of the module should emphasise the importance of discussion learning and clarify your view of the connection between their participation and their learning. You can use three common tactics for stimulating students' preparation:

- *Study question*. You can assign study questions to guide students' reading of the case with the aim of a) getting them to organise the information in the case for themselves, b) focusing on key discussion issues and c) beginning the analysis of those issues.
- *Encourage conversation*. You can encourage preliminary conversation of the case among students by organising study groups of five or six students or simply suggesting that students meet informally to talk about the case before class. Group work increases the incentives for

students to prepare individually and enables them to pool information and try out ideas. It also helps to build confidence for participating in class discussion.

- *Written assignment*. You can also ask the students to prepare a brief written assignment. The thinking required by a written piece of work usually results in a deeper discussion. You could, for example, ask the students to provide some tentative conclusions, as in a one-page memo from a policy adviser or a short economic report. You can then decide to collect this written assignment and make it part of the overall assessment, or simply use it as a means of giving feedback to the students. Writing encourages thinking and reflection.

TOP TIPS

You can use the communication facilities in a Virtual Learning Environment to stimulate discussion among students.

As part of your preparation for the case discussion you should consider the following:

- *Structured questions*. You could formulate questions to foster discussion and guide the students towards a full exploration of the case. You also need to master the information in the case.
- *Anticipate students' reactions*. List key facts and issues, outline the situation, summarise different actors' perspectives and consider alternative analyses of the problem as you prepare to react effectively to what your students say.
- *Organise the discussion*. Plan how you will display the students' analysis on the white boards and arrange the room, if you can, to enable them to see and talk directly to each other. Think in advance whether you want to stage any role-play during the discussion. Plan how you might open the discussion, which students you might ask particular questions and what transition you can make from one question to the next.

Example: teaching trade policy with the case method

This example is drawn from an article by Velenchik (1995) and shows how the case method is used at the beginning of a trade policy course. The course starts with a case discussion of a several-page transcript of the congressional testimony of the president of the National Association of Manufacturers of Scissors and Shears with regard to a proposed reduction in tariffs pursuant to the Trade Expansion Act of 1962. He argues that the tariff must be maintained, and his testimony in support of this belief includes both quantitative and qualitative data, as well as several attempts at analysis of the situation in the industry, not all of which are correct. He makes statements about the competition from German and Japanese industries, the employment consequences of tariff removal, and the importance of scissors and shears to the domestic economy. The case provides students with the opportunity both to evaluate the veracity of the testimony and to consider how they would go about deciding whether to maintain the tariff.

The students were given the case before the class discussion and they were encouraged to prepare some written analysis of it. These reports were not marked but students could receive informal feedback from the lecturer on request.

In the course of the analysis, students discover that their decision depends on the answers to some specific questions requiring knowledge and tools they do not yet possess. By the end of the class, students have produced a list of questions that usually include the following:

- What determines a country's trade pattern?
- Is free trade good?
- Who gains and who loses from trade?

- How do tariffs affect these gains and losses?
- What are the efficiency and equity trade-offs in making trade policy?

However, students do not usually generate these questions in this form. The class usually begins with a question like 'Why is the US scissors industry less and less able to compete with Japan and Germany?' and from there, with some gentle prodding on the lecturer's part, develop the more general form in the first question above. The case motivates students to learn theory, primarily because they wish to understand the case and evaluate the arguments presented in it. After the case, the lecturer gives a series of lectures on the basics of trade theory and the theory of commercial policy, making frequent references to the case and to the questions the students raised.

Procedure for the case study

The process of case discussion needs to be carefully structured and managed (Shapiro, 1984; Boehrer, 1995).

You need to provide the discussion with context and direction, draw your students into the case situation, keep their comments focused on the current question, help them develop their ideas, encourage their efforts and challenge their thinking, pull the strands of conversation together, and bring the whole exercise to some sort of conclusion.
Boehrer, 1995, p. 6

In managing the discussion process, you should consider the following issues:

- *Introduction*. It is a good idea to start framing the discussion with a few remarks that tie the case into the module and set an overall direction.
- *Role-play*. At the beginning of the session you can ask students to put themselves in the position of one or more of the economic agents involved in the case. Much of the power of the case to engage student thinking and generate learning through discussions lies in its being a real story that comes to life when students inhabit or take ownership of the situation and face the problem as if it were their own. You can decide to assign students to specific roles before class, but it can also help if you make them act spontaneously.
- *Generate participation*. Once the first question has been posed, it is your task to generate participation. You can use various techniques to stimulate discussion. You can invite a couple of students to open the discussion and give them time to think while you make your opening remarks. When they have commented, you can open the conversation to the rest of the class. Well-prepared students will volunteer while others will need to be called upon. Try not to surprise the students: make advanced eye contact; call them by name and ask a question that they can decline. You should spread participation around the room and be selective.
- *Active listening*. Your role as a listener in the discussion is a critical element in establishing the students' ownership of the discussion. You should limit your own comments during the discussion and you should be sure to listen hard and carefully to each comment. Your listening should be *active* insofar as it encourages elaboration, confirms your understanding and asks for evidence or illustration from the case. It is often necessary to act as interpreter to make what one student says clear or accessible to the rest of the class. You may also have to ask for the relevance of a comment, or remind the group what the current question is, in order to keep focus. You may want to probe a student's reasoning or assumptions, or challenge the thinking you hear. In order to encourage students to participate and to voice their ideas, you need to make sure that their interventions are respected and protected. Protection does not mean that standards are low and any idea is accepted and embraced. It does mean that such a comment is not ridiculed but is subject to positive, critical review, preferably by other students' comments.

- Use of the white board. You should record your students' contribution on the board. This will help them to track the discussion and help you to reflect their thinking. The board can also be helpful in occasionally summarising and assessing the students' progression. Use the board to list and prioritise topics and to compare and contrast contributions. The board might also be used for flow diagrams and tables that list advantages and disadvantages or arguments for and against a proposal. It is important for you to remember that the board provides students with important feedback by setting each contribution in context and by providing a critical review of the significance of comments.
- *Keep to the teaching plan*. Keeping your teaching plan in mind will alert you to openings to subsidiary issues and the next major question. By planning your questions in advance, you make a smooth transition between issues more likely. When an opening emerges from the discussion, you should decide how to proceed. If the previous issue has been well explored, you can briefly summarise it and continue the discussion of the new opening. Taking an opening when it comes helps to keep the discussion moving. On the other hand, if the previous issue has not been fully explored, you can acknowledge the opening and reserve it as the next step in the discussion after the conclusion of the present issue. When a spontaneous issue emerges, you can consider adjusting your teaching plan if you regard it as an important development in the discussion. Often some of the best discussions take their directions from student questions.

TOP TIPS

Use the board to clarify conflicts and issues. Do not use the board as a passive recording device.

Closure

It is important that at the end of the discussion you provide a structured closure. To be satisfying, the exercise requires some sense of completion, even if time runs short. One class seldom exhausts the possibilities of a good case. However, irrespective of the state of the discussion, you should reserve some minutes to end it.

The notes on the board can represent a starting point for your summary. You must be careful not to invalidate your students' work by presenting a solution to the case. Though good cases concern problems that have no single correct answer, some students feel 'lost' if they do not get a clear-cut answer to a problem. It is your task to make them understand that the most important aspect of the whole exercise is their ability to provide a structured approach to the problem. Whether the analysis leads them to one solution or another simply helps them understand how many real-world outcomes are determined by circumstances and other external factors.

A good summary of the discussion should also involve the students. If the discussion itself has generated new questions, it will be worthwhile to formulate them as an invitation to continued exploration. They may help you tie the case into upcoming classes. In general, however you end the class, a good sign of a successful case discussion is if your students keep talking about the case after its end.

3.4 What makes a good case?

Once you have decided to adopt the case method in your teaching, you need to find the cases to use in your classes. You have two options. You can use 'ready-made' cases supplied in textbooks or by academic institutions. Harvard Business School Publishing and the Case Program at the Kennedy School of Government are the natural places to look at for such cases. Suggested sources of available case studies are indicated in section 4.

Alternatively, you can decide to create your own case studies. As mentioned above, you can use a gradual approach and take newspaper articles as your starting point. Contacts with members

of the business community, consultancies and research work in external agencies can constitute other sources of inspiration. Robyn (1986) discusses the core elements of a good case, and some guidelines to take into consideration when developing a case are summarised below:

- *Pedagogical utility*. The most important question you should ask yourself is: what teaching function will the case serve? What pedagogic issues will the case raise? Are those issues that cannot be raised equally well or better by an existing case? The rule of thumb for judging the pedagogical value of a potential case is: 'Every case needs a theory'. The corollary to this rule is that cases should not be thought of in isolation but rather as part of a module or course sequence.
- *Conflict provoking*. Controversy is the essence of a good case discussion: it engages the students; it forces them to analyse and defend their position; and it demonstrates to them that, while there are generally no right answers, there are certain questions that it is essential to ask. Most cases are fundamentally about something controversial: a policy over which people disagree; a managerial decision that involves difficult trade-offs; an ethically questionable business decision. In preparing your case, you can ask yourself the following question: 'Is this an issue about which reasonable people could disagree?'
- *Decision forcing*. Generally a case works better if it leaves decisions unresolved. That is, it is helpful if the case presents a choice or decision that confronts a manager or analyst without revealing what the protagonist did and the consequences of that action. A case that forces students to make a decision will prove more effective at getting them to take the first-person perspective rather than looking on from the outside.
- *Generality*. A measure of a good case is its generalisation to some larger class of economic or analytical problems. Usually, if a case is interesting because it is unique, it is probably not a very useful case pedagogically.
- *Brevity*. Cases that are too long and that contain too many facts tend to keep the discussion grounded in particulars. Thus, brevity is generally desirable.
- *Quantitative information*. The cases should contain quantitative information presented in a variety of forms, including tables, charts and graphs. Ideally, some of this information would be irrelevant, some would need additional manipulation in order to be useful and all would require significant interpretation beyond that provided in the text of the case.
- *Institutional and historical knowledge*. While the analysis of the case should require students to use theory learned outside the context of the case, it is important to select cases that do not require students to posses a large stock of institutional or historical knowledge. Usually, students have different backgrounds and cases that require previous knowledge tend to disadvantage students whose backgrounds are less comprehensive. However, if you decide to use such a case, make sure that you provide students with an accompanying handout, including definitions or some historical information if the case is incomplete.

3.5 Assessment within the case method approach

The case method does not provide any prescription about the strategy to use in assessment. For example, Carlson and Schodt (1995) report assessing their students through exam (70 per cent) and homework and case discussion (30 per cent). However, alternative strategies are feasible. In general, the issues raised in subsection 2.4 hold within the case method approach. However, given the particular importance of participation and class discussion for the case method, you should consider making class attendance compulsory and awarding grades for the level of class discussion.

You might also consider group work as a viable and effective way of developing both subject-specific and transferable skills. For example, groups of students could be given separate cases to

investigate. Their findings could be summarised in a written report and presented to other students, who will have an opportunity to test their colleagues. This strategy will help students to develop an ability to work with others and to present in public, and it also encourages greater discussion among students.

3.6 The costs of adopting the case method

The pedagogical value of the case method has been discussed throughout the chapter. However, you must be prepared to face the following costs if you intend to introduce the case method in your teaching.

- *Class control*. The use of the case discussion means that you trade off considerable control over the class outcome for a dynamic, student-centred exercise. This can be problematic. By allowing students to express their ideas, the case method gives some students the impression that all ideas are equally good. It is up to you to guide the class through the process of distinguishing between good and bad ideas. Similarly, students do not always take away from the discussion the ideas one hopes. Even if this problem is common to other teaching methods, it is particularly evident in case analysis. However, a good closure at the end of the case discussion can help reduce or eliminate such a problem.
- *Preparation costs*. Preparing and conducting a case discussion tends to demand more energy and time than lecturing. It is still relatively difficult to find good cases in economics and instructors find they must spend time working them up themselves.
- *Students' preparation*. Students must prepare much more than they typically do for seminars and they must also take the risk of expressing their ideas in public and being willing for these ideas to be subject to critical review.
- *Breadth of curriculum*. Teaching cases takes time and it can lead to the elimination of some material from the curriculum that would have otherwise been presented. However, the experience from lecturers who have adopted the case method shows that while students tend to have a less thorough and detailed knowledge of models, they have a good understanding of the fundamental insights and basic mechanics of some central ideas in economic theory and are able to apply them to the analysis of policy. What they learn is not what we cover.
- *Colleagues' involvement*. The use of the case method in big modules where the teaching is shared among more than one lecturer requires that all those involved in the teaching share the same passion and belief in the method. Sometimes it can be difficult to find such co-operation. In this respect, it can be helpful to prepare relatively detailed teaching notes that simplify the work required by colleagues and promote consistency in the teaching approach.

4 Where next?

4.1 Suggested reading

The following are good sources of case studies in economics:

Gomez-Ibañez, J.A. and Kalt, J. P. (1990) *Cases in Microeconomic*s, Prentice Hall, Englewood Cliffs, NJ.

Rukstad, M. G. (1992) *Macroeconomic Decision Making in the World Economy: Text and Cases*, 3rd edn, Harcourt Brace Jovanovich, Fort Worth, TX.

Yarbrough, B. and Yarbrough, R. (1991) *The World Economy: Trade and Finance*, Dryden Press, Hinsdale, IL.

Research and development of case studies is carried out by various associations, among which is the North American Case Research Association. Journals such as the *Case Research Journa*l, the *Asian Case Research Journal*, the *Journal of Economic Education* and the *Journal of Education for Business* regularly publish articles on the case method.

4.2 Websites

The Harvard Business School Publishing, the Kennedy School of Government, the Darden Business School at Virginia University and the Richard Ivey School of Business websites contain extremely helpful material and information about the case method. You can access samples of their case studies by following the instructions on their websites:

Harvard Business School Publishing:
http://harvardbusinessonline.hbsp.harvard.edu/b01/en/cases/cases_home.jhtml

Kennedy School of Government Case Programme: http://www.ksgcase.harvard.edu

Darden Business School Case Programme: http://www.darden.virginia.edu/

Richard Ivey School of Business: http://www.ivey.uwo.ca/IveyPublishing/

The North American Case Research Association is dedicated to the development of case studies and the diffusion of the case method. It provides a gateway to other case resources and it can be found at: http://nacra.net.

The Economics LTSN website contains links to Web-based resources on the case method and it can be accessed at: http://www.economics.ltsn.ac.uk/teaching/casestudy.htm.

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Bloom, B. S. (Ed). (1956). Taxonomy of Educational Objectives Handbook 1: Cognitive Domain. New York: Longman, Green and Co.

Boehrer, J. (1990) 'Spectators and gladiators: reconnecting students with the problem', *Teaching Excellence*, vol. 2, no. 7, pp. 1–2.

Boehrer, J. (1995) 'How to teach a case', *Kennedy School of Government Case Programme*, case no. C18-95-1285.0.*

Bredon, G. (1999) 'Net news – old wine in a new bottle?', *Journal of Economic Education*, vol. 30, pp. 28–32.

Brown, J., Collins, A. and Duguid, P. (1989) 'Situated cognition and the culture of learning', *Educational Researcher*, vol. 181, pp. 34–42.

Carlson, J. (1999) 'A case method for teaching statistics', *Journal of Economic Education*, vol. 30, pp. 52–8.

Carlson, J. and Schodt, D. (1995) 'Beyond the lecture: case teaching and the learning of economic theory', *Journal of Economic Education*, vol. 26, pp. 17–28.

Gomez-Ibañez, J. (1986) 'Learning by the case method', *Kennedy School of Government Case Programme*, case no. N15-86-1136.0.*

Hitchner, S. B. (1977) 'Preparation of teaching notes', *Kennedy School of Government Case Programme*, case no. N14-77-189.0.*

Lundberg, C. C. (1993) 'A framework for student case preparation', *Case Research Journal*, vol. 13 (summer), pp. 132–44.

Robyn, D. (1986) 'What makes a good case?', *Kennedy School of Government Case Programme*, case no. N15-86-673.0.*

Shapiro, B. P. (1984) 'Hints for case teaching', *Harvard Business Schoo*l, 9-585-012.

Siegfried, J. J., Bartlett, R., Hansen, W. L., Kelley, A. C., McCloskey, D. N., Tietenberg, T. H. (1991) 'The status and prospects of the economics major', *Journal of Economic Education*, vol. 22, pp. 195–224.

Velenchik, A. D. (1995) 'The case method as a strategy for teaching policy analysis to undergraduates', *Journal of Economic Education*, vol. 26, pp. 29–38.

Zimmerman, P. B. (1985) 'Case development and teaching: communicating the results', *Kennedy School of Government Case Programme*, case no. N15-85-653.*

* available from Kennedy School of Government Case Programme:
http://www.ksgcase.harvard.edu.
available from Harvard Business School Publishing:
http://harvardbusinessonline.hbsp.harvard.edu/b01/en/cases/cases_home.jhtml.

The Handbook
for Economics Lecturers

Problem-based Learning

2nd (Revised) Edition

Frank Forsythe, University of Ulster

Preface to the Revised Edition

This revised chapter incorporates numerous enhancements to the original chapter published in 2002.

There are now more examples of how PBL has been used to teach undergraduate economics within a UK context, accessible via the Economics Network website, www.economicsnetwork.ac.uk, and which are listed in Section 6, "Where Next", of this revised chapter. These applications offer potential users of PBL an excellent information source on how the basic PBL concept can be modified to suit particular learning environments. An Appendix has been added containing 4 exemplars of PBL tasks that have been used successfully on a first-year economics module at the University of Ulster. These exemplars reinforce the general principles of PBL design outlined in Section 3, "Designing Problems/Tasks"; an updated "UK Housing Market" exemplar has been retained in Section 3. Section 2 has been extended to highlight some of the recent PBL innovations introduced on economics modules at the University of Ulster.

The original chapter attracted positive comments, for example:

"This chapter is self-contained in that it provides all the information one needs to implement PBL, including the preliminary information that should be given to students, how to set up a successful PBL environment and designing PBL tasks. Group work is very important in teaching Economics. It can be used in various forms in seminars, in Problem Based Learning, in Simulations, Games and Role play, in Case Studies, in Cooperative Learning."

Higher Education Academy, June 2002.

"This is a set of guides to inform and improve the practices of university teachers of economics; however, it is interesting and informative for teachers in all curriculum areas."

University of Leicester, "Employment skills within an accessible curriculum".
See http://www.le.ac.uk/ssds/esac/employability_problemsolving.html

It is hoped that the revised chapter remains a useful learning resource for anyone contemplating a PBL approach to teaching.

Contents

1 Introduction

1.1 The changing learning and teaching environment

In many UK universities the learning and teaching environment is changing. In the context of economics, the teaching environment is more complex and diverse than formerly. Curriculum design is now more flexible to accommodate wider student choice. Consequently, economics is often taught within joint or multidisciplinary programmes, with many 'non-specialist' students taking economics for one year or one semester only[1]. This poses problems for the economics teacher who must confront learners who exhibit varying degrees of commitment to, and aptitude for, the subject. In addition, many students of economics, including those specialising in the subject at single or joint honours level, experience difficulty with the method of economics, particularly in relating abstract concepts, diagrams and models to real-world economic issues and problems.

More generally, teacher–student contact time is also diminishing, making it even more imperative that students develop independent learning skills to ensure that non-contact hours are utilised effectively. Diminished contact time also places additional responsibility on teachers to ensure they adopt appropriate teaching and learning strategies that meet the learning needs of students. Changing attitudes in respect of the role of universities mean that student learning needs are no longer measured in terms of subject-specific skills alone, but encompass a broad range of general skills that enhance the employability of graduates. Pressure on universities to meet these extended learning needs is now formalised through the QAA monitoring procedure with its emphasis on skills development within the programme of study.

Concern about teaching quality is also likely to come from students themselves. With the rising personal cost of university education, one can expect students to insist on a quality learning environment that meets their preferences rather than passively accepting whatever is provided.

1.2 Limitations of the traditional lecture-seminar format

My own experience of lecturing undergraduate economics over many years has made me aware that the traditional lecture–seminar format (TLS)[2] is not suited to all students. With lectures, the emphasis is on *giving information* rather than *learning* – lectures represent what teachers do and not necessarily what students need. Although most lecturers can 'talk' a good syllabus, the real teaching challenge is to ensure that most students are not lost in the process.

Many students lack the confidence (or lack the interest in the case of multidisciplinary and 'non-specialist' students) to participate effectively in seminars, with the inevitable result that seminar discussions tend to peter out after a relatively brief period. In these circumstances, it is all too easy for the traditionally organised seminar to fall far short of the ideal, in which there is healthy teacher–student and student–student interaction, and come dangerously close to being a teacher-dominated environment in which students are spoon-fed. The learning environment becomes a struggle for both teacher (students will not talk) and students (classes are boring).

Students who, for whatever reason, are content to adopt a passive rather than an active role in the learning process are difficult to motivate within a TLS environment. Such a regime may do little to develop confidence and independent learning skills in students who need help in these respects, or to stimulate those who become disinterested. Indeed, the traditional lecture–seminar format can actually *alienate* such students from the learning process rather than *embracing* them within it.[3]

1.3 How to use this chapter

Readers who are familiar with PBL may go directly to the 'design' issues examined in sections 3 and 5, and the 4 exemplars in the Appendix. The PBL structures depicted in section 5 do not need to be implemented in full and can be easily modified to suit the specific learning environment. They are designed to give the reader flexibility and choice in how PBL is introduced into the curriculum. This chapter is self-contained in that it provides all the information one needs to implement PBL, including the preliminary information that should be given to students, how to set up a successful PBL environment and designing PBL tasks. The 'Top Tips' included are based on the author's experience of PBL over a number of years. If new to PBL, it is probably a good idea to try one task only in the first instance. A limited pilot-run will allow you to evaluate the PBL experience from both student and teacher perspectives before undertaking what may be significant changes to your teaching methods second time round.

2 What is problem-based learning?

2.1 Key features of PBL

PBL involves learning through tackling problems. Although the problems, or tasks, may not always have a 'solution', PBL nevertheless provides a rich learning environment in which students identify what needs to be studied and learnt from examining the problems confronted (Gibbs, 1992). The problems are used as a tool to achieve both the required knowledge base and the skills to 'solve' them (Barrows, 1986). The basis of PBL is that students learn by *doing*. It is a student-centred system whereby students, working within small groups, generate the information necessary to respond to, or solve, a specific problem or task. One attractive feature of PBL in my experience is that it helps develop in students both subject-specific and transferable skills (Figure 1).

Subject-specific skills are developed directly through problem design, while transferable skills are developed indirectly via the PBL process itself.

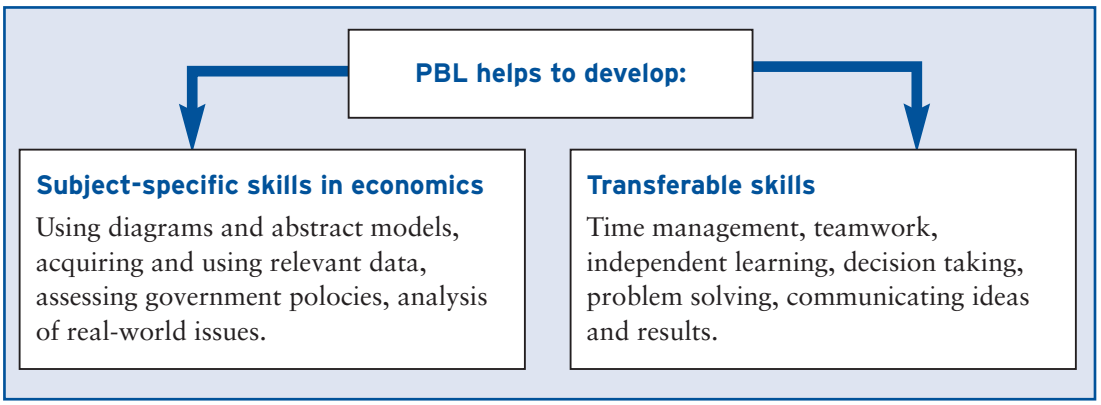

Figure 1 Problem-based learning and skill development

A PBL environment will normally incorporate the elements depicted in Figure 2. This cycle is repeated for each task. When implementing a PBL environment, one may adopt a 'partial' or 'full-format' model (see section 5 for further details).[4] In a 'partial' PBL environment, formal lectures are retained and PBL is used to organise the weekly tutorial sessions in support of lectures. In a 'full-format' PBL environment, there are no lectures and the learning environment is driven entirely by PBL methodology.

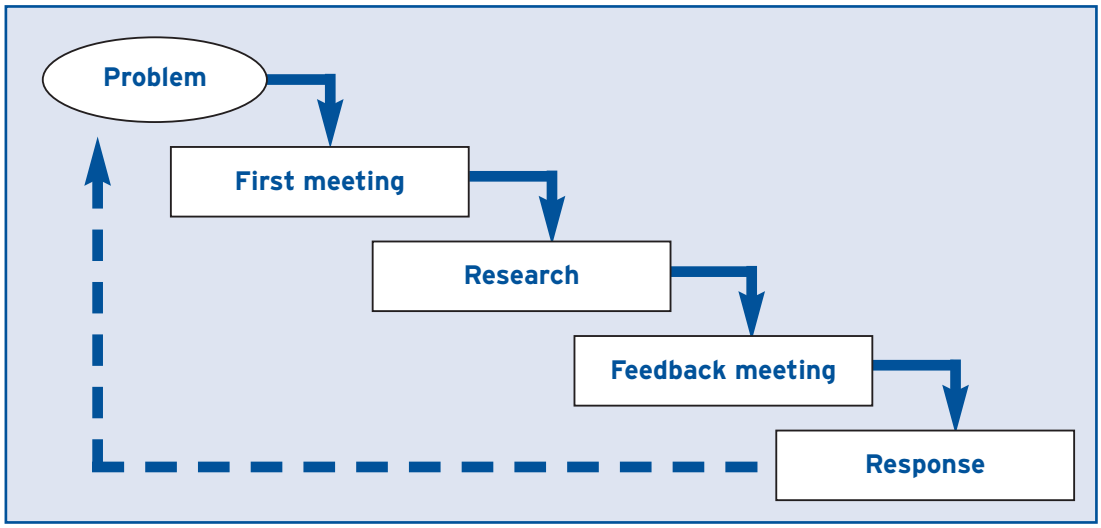

Figure 2 The PBL process

The problem/task

When designing tasks, the aim is to make students primarily responsible for acquiring and assimilating the information necessary to solve them. In a PBL environment the teacher relinquishes the role of 'expert' and assumes the role of facilitator[5]. Student learners must adapt to a learning environment in which there is no 'expert' information source. The teacher designs tasks so as to develop the learning outcomes appropriate to the target learner group. I normally design tasks that incorporate data acquisition, model manipulation and evaluative components (the latter may relate to a particular public policy issue, theoretical model or literature review). In this way, the tasks 'drive' students to encounter (and struggle with) subject-specific concepts and issues (Thomas, 2000). The design of PBL tasks for economics students, along with examples, is discussed in section 3.

First meeting

Students are organised within small groups that work independently from other groups throughout the teaching term. Since I usually design tasks that comprise different components, I use groups comprising 6–8 members. During the first meeting the PBL group discusses the problem for the first time. The meeting is structured to incorporate the following features based upon the 'seven-jump' procedure for handling tasks within PBL groups (Bouhuijs and Gijselaers, 1993; see also the guidelines given to students in relation to the UK housing task illustrated in section 3):

- Initial discussion to ascertain 'first-impression' views of the problem.
- Brainstorming session to identify relevant issues and essential information required to 'solve' or respond to the problem.

- Identification of specific study tasks (library research, etc.) to be undertaken by group members before the 'feedback' meeting.
- Allocation of study tasks to individual group members (the number of students working on a particular study task will also be determined at this stage).
- For each task the team should select a different task leader and 'recorder'. The task leader is responsible for keeping the discussion going and ensuring that all members participate in team discussions. The task recorder has the responsibility of recording the research responsibilities delegated to members during the first meeting and for reading out this information at the start of the feedback meeting. The students are responsible for all decisions arising from the above activities. The facilitator should not interfere with the governance of group procedures.

Research

Between the first and feedback meetings associated with a particular problem or task, group members undertake the study task allocated to them at the first meeting. This may entail providing a summary and assessment of relevant journal articles, trawling internet sources, acquiring and tabulating relevant statistical information, etc. Sufficient time must be made available between first and feedback meetings to facilitate research. One-week research periods are used at the University of Ulster (see section 5 for suggestions on designing a PBL environment).

TOP TIPS

Groups with 6–8 members are easily managed and allow members to work in pairs (if necessary) during the research phase. Groups with fewer members can be successful, particularly with level 2 or 3 students, but the workload on individual members is heavier.

Feedback session

Members report back the results of their allocated research activity to the group (after the task recorder has reminded the group of individual responsibilities). Using this information, the group formulates an agreed response to the problem.

Group's response

This can take various forms. It may be a formal presentation using OHP facilities or a written report. The facilitator requires some form of response so that formative feedback can be provided. Assessment may also be summative, in that the response is graded and contributes to overall assessment for the module. Issues and suggestions concerning the assessment of student responses to PBL tasks are considered in section 4.

2.2 Arguments for the use of PBL

Research findings relating to PBL

The use of PBL as a teaching method originated within a medical and health-care context during the 1960s. Although it is now implemented across a wide range of disciplines, PBL research literature is still dominated by medical-based applications. For an assessment of PBL, particularly when compared with conventional lecture-based teaching, see the extensive literature reviews undertaken by Albanese and Mitchell (1993), Vernon and Blake (1993) and Dochy *et al.* (2003).

Relative to conventional lecture-based methods in which information is transferred from teacher to student, the research literature suggests that:

- PBL fosters a deeper approach to learning (see also Gibbs, 1992).
- PBL promotes more versatile studying methods and PBL students are more likely to use the library and library resources to study.
- PBL develops greater knowledge retention and recall skills.
- PBL students tend to exhibit stronger knowledge application skills (according to Dochy *et al.* (2003), this is a very strong and robust result to emerge from the literature).
- From a teacher perspective, PBL appears to be a very satisfying method of teaching.

When comparing the relative performance of two student cohorts studying introductory macroeconomics under conventional lecture-based and PBL methods, van den Bosch *et al.* (2004) also found that the PBL students exhibited better knowledge application skills than the conventionally taught cohort. According to these authors, PBL promotes a structuring and elaboration of knowledge that develops a more accessible knowledge base.

In terms of the relative knowledge *coverage* acquired through PBL and conventional lecture-based teaching (as distinct from the *application* of knowledge to real-world situations), the literature suggests rather mixed results that appear to depend upon the scope of PBL implementation. Based on their literature review, which included only one non-medical research paper, Dochy *et al.* (2003) found that if the whole curriculum is PBL based, then it is likely that conventionally trained students will have covered, or have been introduced to, more knowledge and facts than PBL-trained students. This, of course, must be weighed against the possibility that conventionally trained students may be less able to retain and apply their wider knowledge base relative to PBL students. The possible differential in knowledge coverage between lecture-based and PBL teaching methods becomes negligible when PBL forms only part of the curriculum.

Finally, one aspect of PBL that requires further study is the possibility that PBL students become too dependent on a small-group environment (Albanese and Mitchell, 1993). PBL students may lack the confidence and the skills to work alone in solving/tackling problems. Clearly any negative effect of excessive reliance on small-group activity will also depend on the scope of PBL implementation within the curriculum. This may also be an issue that is more relevant within a medical rather than an economics or business context.

The PBL experience at the University of Ulster

The comments below are based upon my own experiences of introducing PBL within a TLS-dominated curriculum to teach economics at the University of Ulster in a variety of teaching contexts that has included full-time/part-time students, specialist economics/non-specialist students and first/final-year students. Many of the experiences noted below are consistent with the discussion provided in Gibbs (1992) on how PBL can help develop a deep approach to learning.

Teacher perspective. Students are normally expected to spend additional self-study time for each contact hour with the teacher. At Ulster, for example, 25 per cent of total designated module hours are 'contact' hours during which students meet teachers. Under the more traditional lecture–seminar format, students who are unable to manage the remaining 75 per cent non-contact time, perhaps due to weak independent learning skills, may waste excessive non-contact time before the teacher becomes aware that a student is having difficulty with the module. A key advantage of PBL is that it can help students manage 'non-contact' hours more effectively, since it is during these hours that PBL students are required to generate information for the group within a given time-scale (one week at Ulster). The PBL tasks designed by the teacher determine the learning activities undertaken by students during non-contact hours. This helps to reduce wastage of non-contact hours.

Another key advantage of PBL is that students are required to communicate and discuss the

subject with other students on a regular basis. This feature of PBL, which requires students to 'talk economics' throughout the teaching term, is particularly attractive when, as at Ulster, one is faced with a student culture that tends to adopt a passive, non-communicative stance under more traditional seminar formats. Such students, many of whom lack the confidence to participate in a teacher-led environment, prefer the teacher to do all the talking and invariably, after an initial struggle, this tends to be the outcome in a conventional seminar format. In this context it is interesting to note that according to the latest available statistics (HESA, 2009) 46.5 per cent of the intake of full-time undergraduates to the University of Ulster fall within the four lowest NS-SEC socioeconomic groups (the UK average is 29.5 per cent). This characteristic of the student population was also highlighted in the QAA Subject Review Report for Economics at Ulster (QAA, approved March 2001, para. 23), and may help to explain the passive stance taken by many students at Ulster within a conventional lecture–seminar environment.

Well-designed PBL tasks also encourage students to become 'information-seekers', undertaking library research and accessing varied information sources – texts, journals, the internet and key statistical sources (i.e. education, health, labour market statistics, etc). This not only helps to develop important information-seeking skills in students, but also encourages greater diversity in student responses to economic issues compared to what may be expected when the teacher is the primary information source.

When PBL is used in 'full format', as described in section 5 (there are no formal lectures), students are obliged to respond to a number of tasks that encompass the full syllabus. Students cannot choose to specialise in the first few topics for examination purposes (and ignore the rest), since PBL requires them to continue working and generating information over all topics. One of the reasons why PBL imposes a severe work regime on students is that it encourages a fuller coverage of the syllabus than the TLS format.[6]

Finally (and according to students themselves), there are externalities associated with PBL. The independent learning, research and time-management skills that are developed within a PBL-based module help students study more effectively in other, non-PBL modules. This suggests that the sooner students experience PBL methods within the curriculum, the greater will be the potential 'externality' effect elsewhere – in other words, some PBL within the curriculum is better than none.

Student perspective. Every student introduced to PBL at the University of Ulster has an opportunity to comment upon his or her PBL experience. A sample of these comments is included in section 5 (where they are discussed in the context of the particular PBL environment encountered).

PBL requires students to work within strict time limits. There is also the additional responsibility of having to contribute to team effort. In the sample of student comments included in section 5, students emphasise the benefits that result from the shared workload and the exchange of ideas that are typical features of PBL. Despite the constant pressure of work, a significant majority of students indicated that their PBL experience was positive rather than negative. Students who disliked PBL cited two reasons – the high workload and a preference for lectures in which the teacher is a primary source of information.[7]

The bottom line: is PBL worth the effort?

Establishing a successful PBL environment is hard work, requiring written documentation for students, preparation of facilitators, design of suitable PBL tasks, monitoring and assessment of group activities and, very likely, having to manage resources (room layout, for example) that are not designed for group activities.

PBL can also be stressful for both teacher and students, particularly when it is introduced to

final-year students who are accustomed to a TLS-dominated environment. In these circumstances, teachers must have confidence and belief in what they are trying to achieve if they are to coax the students along. It is at this point one realises that lecturing is a much easier alternative.

Despite the hard work and occasional periods of tension, I continue to use PBL. As a teacher it is a privilege to witness a dynamic group of students working on their own initiative, fired with enthusiasm, striving to solve an economics-related problem. Such groups become extremely efficient at organising the learning environment, arranging additional meetings during non-contact periods and exchanging information via summary reports, photocopies, e-mail and fax (in the case of part-time students). This is active student learning at its best and the effort required to achieve it is worthwhile.

2.3 Recent PBL innovations at the University of Ulster

The following innovations have been very successful at Ulster, and are worth serious consideration for anyone contemplating introducing PBL.

(1) Use of final year economics undergraduates to facilitate first year economics PBL groups

Funding from the Economics Network Learning and Teaching Development Project scheme during 2006-07 permitted the use of final year economics students as PBL group facilitators on the first year microeconomics programme. Depicted below are the views of two final year facilitators, written during the final week of term prior to sitting their own examinations for the BSc (Econ). The facilitators took the same module 4 years previously under a traditional lecture-seminar format, and had the same teacher as the current first year students under a PBL format. They were, therefore, ideally placed to comment upon the new PBL regime (see Figure 3).

"The group seemed more willing to take time to explain the basic concepts to individuals who needed help, which in turn seemed to encourage anyone who could not first grasp key concepts to identify problem areas for discussion at the next meeting. It was also surprising to me to note the quality as well as the quantity of work that was completed on time, and this seemed to improve as the weeks progressed. The "positive externalities" included a number of very important aspects of student life, which I felt were often not addressed fully. The development of real, tangible, transferable skills through dialoque, discourse and discussion meant that students better appreciated how to communicate more effectively."

Malcolm Campbell BSc (Econ), facilitator on the first year PBL project, 2006-07

"I liked the emphasis PBL placed on self-study and the penalty system for team members who did not participate. If students did not do their work the group could penalise them and award 0% if necessary. On the whole I do believe that PBL did make the students more committed to, and interested in, the subject compared to traditional class lectures. The most important thing is the attitude that students take to the new working arrangements – it is important that no individual is allowed to drag a group into inactivity"

Paul Keen BSc (Econ), facilitator on the first year PBL project, 2006-07

Figure 3 Use of final year economics undergraduates to facilitate first year economics PBL groups *(Continued overleaf)*

"I think this module has definitely enhanced my employment prospects. If I was to write about my experiences in other modules, which were all lectures, it is questionable if they have actually developed my skills. However, with this module I can say that I have improved in many aspects. My teamwork and leadership skills have certainly improved. In most jobs you are inevitably going to be part of a team. This module has certainly given me more confidence in a group situation.

This module has also forced me to be organised, as I have to do the work or else I would be letting my group down. This has instilled good discipline which I hope would carry over to a job.

Another aspect of this module was the presentations. I have done presentations before, but never as involved as those required for this module. At the same time I really enjoyed doing the presentations and was calm and relaxed. I have no doubt that I felt this way because I was comfortable being up with my group members with whom I have formed a bond. Hopefully I can carry over these benefits into employment."

Year 1 student, Microeconomics 1 PBL project, 2006-07
(comments were not edited by the author)

Figure 3 *(Continued)*

Extending the limits of student self-governance (see Figure 4)

A primary objective of student-centred learning is to develop confidence in students to make decisions. The measures noted in Figure 4 were introduced for this purpose. If students can be encouraged to take simple decisions on their own initiative, they will eventually develop the confidence to take more difficult decisions.

Extending the limits of student self-governance is achieved in two ways:

- PBL groups decide WHAT to study by selecting any 'X' topics from a total of 'Y' topics forming the syllabus (all topics are represented in the final examination). The teacher determines the values of X and Y.
- PBL groups decide HOW to respond to the PBL task – written report (W) or formal presentation (P). The teacher determines the split between W and P, which ensures that every PBL group is assessed equally.

For example, suppose there are 6 themes, or topics, forming the syllabus (Y=6), all of which are represented in the final examination, and candidates must answer any 3 questions. In the first week of class PBL groups are formed and each group has full information on all the topics in the syllabus including all the learning resources associated with each topic. If PBL groups have to select any 4 topics (X=4), they are covered for the examination. In addition, 2 of the selected topics have to be orally presented (P=2) and the remaining 2 have to be submitted in the form of a written report (W=2). This 'enhanced' PBL regime requires PBL groups to begin functioning from the outset, since in the second week each group must (i) select the first topic and (ii) decide whether to respond in the form of W or P.

The above scenario adds an edge to the group format by introducing the need to make important decisions at the beginning of the teaching period. Despite this early pressure to make team decisions, this format is popular with students since it introduces a degree of freedom and flexibility to the learning regime.

Allowing PBL groups to determine X, W and P has proved to be a very successful PBL format on a "labour market" module offered on the final year of the business studies and economics (minor) programmes at the University of Ulster.

Figure 4 Extending the limits of student self-governance

Some Facts

PBL v LECTURES on the Microeconomics I module, 2007-2008 and 2008-09

Following the 2006-07 PBL mini-project experience, in the 2007-08 academic year the microeconomics I class was split, with half the students following a PBL format, while the remaining half were taught using the traditional lecture-seminar format (TLS). The syllabus content and teacher were the same for both classes. All students sat the same end-of-year examination. In the 2008-09 academic year all students were taught using the TLS format only. Again the syllabus content and teacher were the same over both academic years (and, indeed, the same as the 2006-07 academic year). Prior to 2008-09 all students were registered on the single honours BSc (Economics) programme (S); in 2008-09 students registered on the new BSc (Economics Major) programme (M) took the microeconomics module for the first time. One-third of each year on the economics major programme comprises a non-economics discipline.

	% Failure Rate (Exam)	% Median Mark (Exam)	% Failure Rate (Coursework)	% Attendance Rate
PBL students 2007-08	15	55	8	95
TLS students 2007-08	53	41	33	< 60*
TLS (S) students 2008-09	18	45	24	74*
TLS (M) students 2008-09	33	43	33	75*

* The attendance rates for those failing the examination was < 50% for all TLS classes.

3 Designing problems/tasks

3.1 Four steps in designing a task

This section outlines four key steps in the design of PBL tasks. To illustrate the discussion, a specific task relating to the UK housing market will be considered in detail in this section. The design features outlined in this section are further illustrated by additional exemplars provided in the Appendix.

When designing a task, one should first be aware of the learning activities that students will perform when tackling the task and, secondly, try and visualise (and thus eliminate) possible difficulties that may arise in the process (Bouhuijs and Gijselaers, 1993). In relation to the first consideration, one needs to design tasks that are consistent with the learning outcomes specified for the module and to ensure that the learning outcomes *intended* are actually realised. Poor problem design may result in actual and intended learning outcomes being different (Dolmans *et al.*, 1993). In respect of the second consideration, a number of difficulties may arise that prevent students from realising intended learning outcomes. One must ensure, for example, that the learning resources required to tackle the task are available – computing facilities, general library resources, access to journal articles, etc. The designer must also ensure that key references are in adequate supply – there is no point in having large numbers of students trying to access one text within a limited time-frame.

Step 1: Determine the form of the PBL environment

In a 'partial' PBL environment, in which PBL is used to organise seminars in support of lectures, PBL groups will probably only have an opportunity to meet for 1 hour per week. In a 'full-format' PBL environment, where PBL replaces lectures, PBL groups will have an opportunity to meet for at least 2 and possibly 3–4 hours per week. Clearly the form of the PBL environment will affect task design in a number of ways, particularly in respect of the learning activities embodied in the tasks and the form of response required of students. Tasks designed for a full-format PBL environment must span the full syllabus, whereas this is not necessarily the case when designing tasks for a partial environment. In the latter context, one must decide which parts of the syllabus will be reinforced by PBL methods; additionally, one may decide to design tasks that focus on particular learning outcomes, such as data acquisition and/or simple model application. Tasks designed for a full-format environment must relate to all the learning outcomes of the module, and there must also be sufficient time for students to evaluate competing theories, etc. These possibilities and limitations must be taken into account when designing tasks.

Step 2: Focus on target learning outcomes

The focus for the PBL task should be provided by the subject-specific and transferable outcomes that are being developed. It is useful to start from the outcomes appropriate to the level of the award for which the task is being designed. The target outcomes I use when designing tasks for level 1 students are summarised in Box 1.

To facilitate development of the skills identified in Box 1, tasks normally comprise 3–4 components, encompassing the following elements: (a) diagrammatic manipulation; (b) fact finding; (c) model application; and (d) appraisal. The first three are regarded as being most important at this level. Not all subject-specific skills need be developed by every task. At the introductory level it is also a good idea to have group responses to PBL tasks take the form of presentations (although groups should still provide a written list of sources used).

Some target outcomes for students working at level 3 are presented in Box 2. My level 3 classes are all full-format, with no formal lectures. Once again, tasks normally incorporate 3–4 components.

Box 1 Subject-specific and transferable skills at Level 1

Subject-specific skills

- Use of basic diagrams (i.e. models) and economic concepts to explain, describe and analyse real-world situations.
- Use of varied information sources: introductory texts, internet, newspapers, statistical sources and, occasionally, non-technical journal articles and government reports when appropriate (e.g. the occasional online article from *Fiscal Studies, Economic and Labour Market Review*).
- Use of key facts in support of one's viewpoint.
- Evaluation and appraisal skills – evaluation of a particular situation or public policy issue and ability to give a considered viewpoint or conclusion (though this is given less weighting at level 1 than the other subject-specific outcomes).

Transferable skills

- As part of a team provide, as required, either a formal verbal presentation of the team's response to the task using OHP facilities or a brief written summary. A written listing of all sources accessed must be included in both cases.

Box 2 Subject-specific and transferable skills for a final honours module

Subject-specific skills

- Use of relevant statistical sources, competence in presenting statistical information and an awareness of the limitations of statistical sources used.
- Competence in the use and evaluation of economic models.
- Evaluation of relevant journal articles in support of one's viewpoint.
- Evaluation and appraisal of economic analysis and public policy.

Transferable skills

- PBL groups will provide, as required, either a formal presentation of the team's response to the task, or a written report. Full referencing of all sources accessed must be included in both cases.
- In respect of presentations, teams will demonstrate effective presentational skills using appropriate resources within the time allocated

Step 3: Determine the learning activities associated with the task

Table 1 illustrates how the task is related to the chosen target outcomes. This particular task was designed for level 1 students within a partial PBL environment in which PBL was used to organise seminars in support of formal lectures. The task requires students to apply an economic model (supply and demand analysis) to a real-world situation (the UK housing market). It also requires students to undertake information-seeking activities and to share ideas and experiences with peers. Although the basic supply and demand model is introduced during lectures, no reference to the housing market or the related information sources is made during lectures. Data on the UK housing market are available from a wide range of sources, many of which can be accessed via the Bized website.[8] Tasks can be tailored to accommodate non-specialist students. In the case of law students taking introductory economics, for example, one can design tasks that relate economics to the issue of soft-drug legalisation, discrimination and gender earnings differentials.

Table 1 Designing a PBL task: the UK housing market

Task components (content)	Skills developed (purpose)
1. Provide regional data for UK house prices	*(Professional/ transferable)* Data acquisition (Web and media-based)
2. Model (diagrammatic) manipulation	*(Subject-specific/intellectual)* Diagrammatic exercises using basic supply and demand model
3. Explain regional variations in UK house prices	*(Subject-specific/intellectual)* Application of basic supply and demand analysis
4. Consider market differences between owner-occupier and private-rented housing sectors	*(Subject-specific)* Extension of basic concepts to an assessment of a related situation
5. Group delegation of study tasks; collection, synthesis and presentation of group response to set task	*(Transferable)* Team skills, independent learning, presentation skills

Step 4: Presenting the task to students

Provide all students with a written copy of the task, presented in a format that is helpful to them. The example shown in Figure 5, which is in the format that students receive at the University of Ulster, includes four sections:

- statement of the tasks;
- guidance for the group leader;
- suggested sources of information;
- anticipated learning outcomes.

TOP TIPS

Make the last task more demanding than earlier tasks and use it as a 'tester' to gauge how well PBL has worked in terms of developing subject-specific and transferable skills.

Key concepts (supply, demand) are highlighted in the task instructions to draw students' attention to the theory they are expected to investigate. At the start of the teaching period, each student is provided with a PBL handbook containing all the tasks for the module (all presented in the same format as Figure 5). Thus each team member has a personal copy of these instructions before their group meeting. The times allocated within each phase of the PBL first session make it more likely that the process is completed within the available time. In this example, first- meeting sessions are restricted to 40 minutes to facilitate the formal presentations that are featured in the partial PBL format outlined in section 5; under the full-format mode, all meetings are of 55 minutes duration (see section 5 for further details).

TOP TIPS

In this task students are provided with specific online articles relating to the UK housing market. This is highly recommended in the first PBL task. In later tasks students are expected to incorporate their own online sources.

In my experience it is helpful to provide students with the general guidance depicted in Figure 5, as this is one way of ensuring that actual and intended learning outcomes coincide; it also ensures that the self-directed learning effort by students is channelled in the right direction (Bouhuijs and Gijselaers, 1993).

TASK 1 UK HOUSING MARKET **(page 1/2)**

(A) List four factors that are likely to cause the market **supply** of UK owner-occupied housing to shift and four factors that are likely to cause the market **demand** for UK owner-occupied housing to shift.

(B) Using supply and demand diagrams, illustrate how each of the factors listed in (A) are likely to affect UK owner-occupied house prices.

(C) Explain (i) why there are regional variations in UK house prices (provide regional house price statistics in support of your answer) and (ii) the fall in UK house prices since 2007Q3.

(D) Identify, giving reasons, the factors listed in (A) that are also likely to influence the price of UK private-rented accommodation.

(E) Comment briefly on the factors affecting the provision of social housing in the UK.

Notes for task leader

1 Appoint a 'Recorder' for the session, and ensure everyone has pen and paper ready to make notes. (5 mins)

2 'Brainstorm' session during which group members discuss ideas (given spontaneously) as to what information they feel is required to provide an adequate response to the task. (15 mins)

Figure 5 Example of instructions for students *(Continued overleaf)*

3 Identify 'learning objectives' (to be noted by Recorder): these relate to concepts/ideas arising in 2 above which the group feels are *possibly* relevant to providing adequate response, but which require additional research time fully to understand/assess relevance. (15 mins)

4 Allocate responsibility for research tasks (to be noted by Recorder). It is via research tasks undertaken between meetings that the group is able to realise the learning objectives identified in 3 above and provide a final, agreed, response to the set task. Emphasise that members must report back their research results to the group at the next meeting. (5 mins)

Hints for leader

You may need to prompt the group to encourage discussion in the following areas:

Key concepts: Supply, demand, own price, conditions of supply and demand, equilibrium price, market mechanism, supply and demand diagrams.

Essential reading Text, pp. [text references here}

Internet sources: http://www.bized.co.uk (keywords: *UK Housing Market*)
http://www.timesonline.co.uk/tol/news
http://www.houseweb.co.uk
http://www.nationwide.co.uk
http://www.ft.com/home/uk

You may also find the following helpful (all sourced online using the keywords above):
Housing Market Explained, http://www.housingmarket.org.uk, 18/2/2009.
'Housing shored up by lack of supply', *The Financial Times*, 15/5/2009.
'Demand for rented homes soars as buyers shun market', *The Financial Times*, 23/10/2008.
'Brown told to put £6bn into social housing', *The Financial Times*, 23/2/2009.
'House prices rise in good state school catchment areas', *The Times*, 15/8/2008.

Aims of Task 1

1 To make students aware of the factors affecting the supply, demand and market prices of UK housing.

2 To encourage students to use supply and demand diagrams.

3 To make students aware of the Internet as an information source.

4 To encourage discussion between students.

5 To encourage group responsibility and sharing of economic ideas and knowledge.

Learning outcomes

After this task students will:

1 Be aware of the factors affecting the UK housing market.

2 Have manipulated supply and demand diagrams to analyse the UK housing market.

3 Have interacted with peers.

4 Have acquired information for the group and accessed relevant websites and other sources.

Figure 5 Example of instructions for students *(Continued)*

4 Assessing the response to a task

4.1 Formative assessment

All responses by PBL groups must, at the very least, receive formative feedback. If the response has been in written form (a group report, for example) this allows the tutor to make written comments on the report before it is returned to students. In addition, when returning written responses the tutor should also discuss with individual groups the strengths and weaknesses of their response. Thus students benefit from both written and verbal feedback from the tutor. In the case of an OHP presentation, the tutor should take notes during the presentation so as to ensure a worthwhile feedback discussion with the group.

When providing formative feedback, students must be made aware of the factors affecting the quality of their response (both positive and negative) in terms of the learning outcomes associated with the task. This involves both subject-specific and general outcomes. Poor responses can arise due to inadequate team preparation, regardless of the input of individual team members. In the case of weak responses, students require guidance on how to improve their performance in future responses.

TOP TIPS

Remember that students will be apprehensive with the PBL process when they first experience it, regardless of whether they are first- or final-year students. Assurances from the facilitator are crucial at this stage. Expect teething problems while students adjust to what is expected of them. Use the first task to build rather than destroy student confidence. Bear this in mind when assessing a group's response to the first task. Consider using **formative** assessment only for the first task.

4.2 Summative assessment

In summative assessment the same mark could be given to each member of a group or individual members could have an opportunity to gain different marks. I adopt the latter approach by combining tutor and peer assessment. See, however, Savin-Baden (2004, *A briefing on assessment in PBL*, listed in the web links provided in Section 6.1) for a summary of the various assessment tools that may be used in a PBL context.

After some trial and error, I have adopted a method of assessment in which the tutor provides an initial total mark for the group response (either a presentation or written report). The maximum mark to be awarded by the tutor is 100 multiplied by the number of group members. A group with six members therefore earns a maximum of 600. The mark awarded to the group is accompanied by written and oral feedback. If the tutor rates the group's response as worthy of 60 per cent (using assessment criteria contained in the PBL handbook given to students), the group is awarded a total of 360 marks.

The group then has to decide how to allocate the 360 marks amongst the members of the group, with the proviso that no member can be awarded more than 100 marks. If the group decides that all members contributed equally, each member gets the same percentage mark provided by the teacher (60 per cent in this case). Groups can withhold marks from non-contributing members (either totally or partially). This could mean that not all marks are distributed within a difficult group. In this way, working members of the group can still earn good marks, but at the expense of non-working members. This assessment process takes place after each task is completed and each individual's mark is recorded. For summative coursework purposes, each student is given an average mark taken over all the PBL tasks for the module.

TOP TIPS

If the PBL response is in written form, I advise groups not to indicate which members were responsible for each element of the final report. This allows the teacher to mark objectively without embarrassing particular group members whose contribution may have been weak.

TOP TIPS

Ensure that non-working members of the team are severely penalised while working members are fully rewarded.

All group work is open to difficulties created by 'free-riders'. In my experience this has tended to arise with first-year students who have yet to establish appropriate work regimes, with the effect that they regularly missed one of the two meetings per PBL task. This, of course, introduced a disruptive element into the PBL group and it is particularly important that non-workers in a PBL environment are severely penalised whilst workers are fully rewarded. My approach to this problem has been to introduce a number of strict conditions that are clearly stipulated in the module handbook. These conditions are:

- attendance is recorded at every PBL session;
- students missing one of the two sessions per PBL task get *no* coursework marks for that particular task;
- students who repeatedly fail to contribute to PBL sessions (perhaps missing 4–5 sessions) are withdrawn from their PBL group and will receive *no* coursework marks for the module as a whole (these students are placed within a 'free-rider' group, to see how 'shirkers' perform within a 'shirker-only' group).

Experience at the University of Ulster suggests that when students are informed about these conditions at the start of their course, poor discipline is largely removed. The problem of free riding has not been apparent with final-year students.

5 Designing a PBL environment

TOP TIPS

Before making serious changes to your teaching approach, have a trial run with PBL by designing and implementing one PBL task only (perhaps having only one of the original tutorial groups complete the task). You can then decide how to proceed after this experience.

This section exemplifies organisational structures for full and partial problem-based learning environments. In each case, the PBL environment is designed for a 12-week semester, although the structure could be adapted for other circumstances. The assumption in this section is that modules organised on a PBL basis are allocated the same resources as an equivalent module organised on a TLS basis.

5.1 Preparing students and staff

For a PBL environment to be successful, staff and students must be aware of what is expected of them and they must be equipped to carry out their designated roles. This section summarises an approach to this preparation.

During the first class students are given a PBL handbook containing the following information:

- A brief description of the PBL *process* as outlined in Figure 2, and the time available for each stage.
- A description of how group meetings are structured, including the appointment and role of task leaders and recorders.
- The required response to PBL tasks, whether presentations, written reports, etc. The minimum requirements for each type of response are also stipulated.

- The assessment process, including the assessment criteria used to grade responses.
- Stipulation of every PBL task, including learning outcomes, reading guidelines, hints for task leaders, etc.
- How 'free-riders' are penalised.

Students can also access the PBL handbook using the online facility for the module. E-mail communication between teacher and students is maintained throughout the teaching period.

Before the teaching period begins, it is essential to have a meeting with members of the teaching team who will be acting as facilitators during PBL sessions. Tutors should also be provided with the PBL handbook that is given to students. Difficulties may arise in PBL sessions because tutors have no previous experience of PBL, interfere too much with student governance of the PBL process, or interpret 'facilitating' as 'doing nothing'. It is therefore helpful to have a preliminary meeting with tutors to explain why PBL is being introduced, the potential benefits (and problems) of adopting PBL, the importance of facilitating student self-directed study rather than inhibiting the process, and how PBL sessions will operate. It is essential that regular communication is maintained with tutors throughout the teaching period so that difficulties are identified and dealt with quickly.

Consistency in approach by all tutors is vital. It is wrong, for example, for one tutor to deal with 'free-riders' while another tutor ignores the problem. Hard-working students are being disadvantaged in the latter case and, inevitably, the PBL environment will collapse. When using PBL on first-year modules, careful monitoring of groups throughout the teaching term is imperative. With first-year students there is a greater likelihood of poor self-discipline, which can lead to a breakdown of the group. Safeguarding against this possibility is a crucial role for tutors.

5.2 Setting up a partial PBL environment

This section discusses the introduction of PBL to replace the standard seminars in the situation presented in Figure 6. Note that the schedule below can be modified to suit the specific learning environment. The number of tasks can be reduced to any number, 1-4, as required.

Each of the original seminar groups of 15–20 students is split into smaller PBL groups of 6–8 members and each of these groups operates independently from other PBL groups sharing the same seminar room. The size of some PBL groups may be reduced to 4–5 students where the original seminar size is relatively small. Each seminar group (2–3 PBL groups) is allocated one tutor who assumes the role of facilitator. The structure illustrated in Figure 6 assumes that two PBL groups have been formed and that there is one week to research the task between group meetings. Sufficient time for research between first and feedback meetings is imperative.

- two hours of lectures per week (either one two-hour session or two one-hour sessions)
- a 1-hour seminar per week
- one tutor per seminar group
- seminar class size = 15–20 students
- 12-week teaching period
- assessment comprises coursework and final written examination

Figure 6 Example organisation of a lecture and seminar format

The partial PBL format depicted in Figure 7 is allocated 1 hour per week (less 5 minutes' wastage due to class changeover, etc). Groups typically have 35 minutes for first-meeting sessions (55 minutes in the case of the first task), during which there is an initial 'brainstorming' discussion, identification of learning objectives and delegation of study tasks to be undertaken by group members during non-contact hours. One week later, each group has a 50–55-minute feedback discussion to formulate a response to the task. At the third meeting, 20 minutes are provided during which one group will formally present their response to both the tutor and the other discussion group using OHP facilities. The latter feature provides an opportunity for general class discussion and tutor feedback (formative and possibly summative). When a group does not have to make a verbal presentation, it must provide a written summary of its response to the facilitator for feedback. Providing opportunities for group presentations works well with first-year students. I tend to rely on written responses at other levels (though see Section 2.3 above, "Extending the limits of student self-governance").

Weeks 1-6	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
		Group A	**Group A**	**Group A**	**Group A**	**Group A**
1st 20 mins	Form	Task 1	Feedback 1	Present 1	Feedback 2	Discuss 2
35 mins	Group A	Task 1	Feedback 1	Task 2	Feedback 2	Task 3
		Group B	**Group B**	**Group B**	**Group B**	**Group B**
1st 20 mins	Form	Task 1	Feedback 1	Discuss 1	Feedback 2	Present 2
35 mins	Group B	Task 1	Feedback 1	Task 2	Feedback 2	Task 3
Weeks 7-12	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
		Group A	**Group A**	**Group A**	**Group A**	**Group A**
1st 20 mins	Feedback 3	Present 3	Feedback 4	Discuss 4	Feedback 5	Present 5
35 mins	Feedback 3	Task 4	Feedback 4	Task 5	Feedback 5	Discuss 5
		Group B	**Group B**	**Group B**	**Group B**	**Group B**
1st 20 mins	Feedback 3	Discuss 3	Feedback 4	Present 4	Feedback 5	Present 5
35 mins	Feedback 3	Task 4	Feedback 4	Task 5	Feedback 5	Discuss 5

Notes:

1. Task = first meeting to discuss new task; Feedback = feedback meeting; Present = formal presentation by group to tutor and other group/s; Discuss = discussion of presentation by whole class.
2. In the last week, both groups formally present their response to the last task.
3. The above structure allows for five tasks to be completed, involving three formal presentations and two written responses, within the 12-week teaching period.
4. A third PBL group would mean that each group made two presentations and three written responses.

Figure 7 'Partial' PBL environment: 12-week module using PBL structured seminars supporting lectures

The structure illustrated in Figure 7 has been used successfully to teach introductory economics to single and joint honours economics students and non-specialists at the University of Ulster. All students undertaking PBL are asked to complete a questionnaire giving their views on their PBL experiences. A sample of both the positive and negative views and perceptions of Ulster students experiencing the partial system outlined above is provided in Figure 8.

Key: E = BA (Economics); LE = BA (Law and Economics); EG = BA (Economics and Government); PT = part-time non-specialist (mature) student

(1)	+	'Each individual contributed different information. Each student learnt from each other. Only at the beginning was it negative. Students found it difficult to converse because we were new – overall no real negative features.' [EG]
(2)	+	'I had never encountered economics as a subject before. I was dreading the subject and did not want to do it. However, I'm glad I did and found it interesting. I now see the advantages of having done the module.' [PT]
(3)	+	'It gave you the opportunity to hear ideas and interpretations on a particular topic from fellow students rather than just from the lecture.'
	–	'It was hard at the start to interact with other pupils considering you had just met them.' [EG]
(4)	+	'Everyone worked well together and everyone got a chance to play a part with the rotation of leader and recorder.' [LE]
(5)	+	'Everyone participated. Lots of ideas were gained.' [LE]
(6)	+	'Got to hear other opinions.'
	–	'It was embarrassing if you did not fully understand the topic and were therefore unable to contribute.' [EG]
(7)	+	'It made you research different topics, thereby getting a better insight into the topics.'
	–	'If somebody didn't research their allocated task the whole group lost out.' [EG]
(8)	+	'A small group meant everyone had a chance to contribute.'
	–	'Group leader needs to keep the group focused.' [PT]
(9)	+	'Group input allowed students to reduce their own personal weakness on a particular topic.' [PT]
(10)	+	'I was able to relate the theory to real-life situations through the topics discussed and researched.'
	–	'There was less opportunity for individuals to ask questions and this could be a problem (not for me as I had done A-level economics).' [E]
(11)	+	'It made the subject more interesting. You were actually getting involved and discussing it rather than listening to someone else discussing it.' [E]
(12)	+	'You had to concentrate all the time (no hiding in the crowd). You had influence working in a small group; it was easier to ask questions outside of large lecture if you wanted to and got more out of tutorials as a result.' [EG]
(13)	+	'It helped you think about topics without losing interest as much as in a normal tutorial.' [E]
(14)	+	'Raised confidence by working in small group and got to know people I would not talk to otherwise.'
	–	'People not turning up and this created problems for others.' [EG]
(15)	+	[Most common positive comments] 'Helped understand topics better by use of real world examples and made to use the internet etc.' 'Work sharing; got to know other people.' 'Hear other people's views.' 'This was interesting team work.' 'Enhanced skills involved with the group.'

Figure 8 Views of first-year students taking Introductory Economics module at the University of Ulster within a partial PBL environment: positive (+) and negative (–) comments

Student perceptions of a partial PBL environment

All the students were in their first year, taking the same introductory economics module. The part-time students were employed in the public sector and were registered on a public sector studies programme. All students completed the UK housing task illustrated in section 3 above. The dominant feature of the positive comments (1 and 3–8, for example) is the synergy that can be generated when students work within small teams in a problem-solving context. The benefits that arise from regular student–student interaction cannot be overestimated, not only in terms of the sharing of ideas, but also in terms of helping to raise confidence (12 and 13) and helping students establish a rapport with their peers – valuable attributes in the case of first-year students. That the experience tends to be enjoyable, relevant and interesting (on the whole), despite the hard work, is suggested by comments 2, 11–13 and 15.

The role of facilitators is crucial in identifying potential problems before they impact upon the process. Team members who do not participate need to be identified earlier rather than later (negative comments at 7 and 14). Despite the negative perception at (10), facilitators are asked to invite questions/queries from students on a regular basis. In addition, students are encouraged to contact tutors via e-mail whenever necessary. Facilitators must also ensure that task leaders keep the discussion going and that all team members contribute (see the negative comment at 8). Poor facilitating can exert a negative influence on the PBL process.

Overall, however, these comments show that the students did actively participate in the learning environment, sharing ideas and helping peers (or receiving help). All this is in sharp contrast to the TLS environment it replaced. The rationale for introducing partial PBL to teach introductory economics at the University of Ulster is discussed in more detail in Forsythe (2002).

5.3 Setting up a full-format PBL environment

Although partial PBL is a valuable experience, the full-format PBL environment is more satisfying for the teacher and students. The reader who has successfully experimented with PBL should aim for the full format. The absence of the lecture removes a constraining feature on the focus and organisation of the problem-based learning environment. PBL is particularly suited to final honours teaching, where the potential for generating focused teamwork is greatly enhanced. Group meetings follow the same procedures as under the partial system, except that groups now meet for 2 hours per week rather than 1 hour. It is also possible to require a more demanding response from students: in the cases described below, students were asked to prepare a written group report of between 1500 and 2000 words in response to each task.

Two examples are discussed in this section, both based on actual teaching experiences with level 3 modules. In both cases, 3 contact hours are provided (giving a 2-hour lecture and a 1-hour seminar under the TLS system). In the first example there are only 15-20 students taking the module, and thus 2–3 PBL groups can be formed. In the second, more demanding example, there are 9–10 PBL groups. The perceptions of students who have experienced a full-format environment are also provided below.

The system depicted in Figure 9 generates an accumulated workload that exerts significant time and work pressure on students – this, one might argue, simulates the real-world working environment. Under this system a much more subtle understanding and development of group dynamics can be developed in students. These are skills that are valued highly by employers. In many instances, students have reported this outcome following job interviews undertaken after completing the module.

In the system illustrated in Figure 9, each PBL group follows the same structure. This organisation assumes that there are seven tasks (this can be varied), a one-week research period and written responses to each task. This seven-task system imposes a hard working regime on

Weeks 1-6	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
1st hour	Form		Feedback 1	Feedback 2	Feedback 3	Feedback 4
2nd hour	groups	Task 1	Task 2	Task 3	Task 4	Task 5
				S-report 1	S-report 2	S-report 3
					Assess-T1	Assess-T2
						Assess-P1
						↓
						Record 1
Weeks 7-12	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
1st hour	Feedback 5	Feedback 6	Feedback 7			
2nd hour	Task 6	Task 7				
	S-report 4	S-report 5	S-report 6	S-report 7		
	Assess-T3	Assess-T4	Assess-T5	Assess-T6	Assess-T7	
	Assess-P2	Assess-P3	Assess-P4	Assess-P5	Assess-P6	Assess-P7
	↓	↓	↓	↓	↓	↓
	Record 2	Record 3	Record 4	Record 5	Record 6	Record 7

Notes:

1. The first hour is used for feedback meetings and the second hour is used for the group's first meeting to discuss a new task.
2. Task = new task (first PBL meeting); Feedback = second PBL meeting; S-report = submission of written report; Assess-T = teacher feedback and total assessment marks awarded for group report; Assess-P = peer-agreed distribution of teacher marks within group; Record = recording of individual summative marks following Assess-P.
3. Assess-T, Assess-P and S-report can be provided during the first or second hourly meeting of PBL groups.
4. If the timetable has provided one 2-hour lecture period, the first and feedback meetings may be back-to-back over the 2 hours, or the third 'seminar' hour may be used along with one of the original lecture hours to separate the two meetings.

Figure 9 12-week final honours module using full PBL format

students. However, a number of 'escape routes' are possible if it is felt that students are under too much pressure. First, the system illustrated does not use the third hour timetabled each week. This can be used to provide additional time for PBL activities, including longer group discussions or quite separate activities. In my own case this hour is used as a teacher-led weekly 'journal-shop'. Each week one journal article is selected to demonstrate the methodology it uses to address a particular issue in labour economics. Secondly, there are 7–9 unused hours (at the start and end of the teaching period) which can be used for mini-lectures, workshop activity, revision or further PBL time. Finally, the teacher can decide to set only five or six tasks, giving more time to complete each task.

Student perceptions of a full-format PBL environment

The comments in Figure 10 were provided by final honours students taking an optional module in labour economics. The comments have been grouped according to key aspects associated with small-group activity. It is important to note that students were not prompted to provide comments corresponding to these headings. The comments were only grouped after the views had been received.

A number of perceptions are dominant. The full-format PBL experience is no easy option and requires hard work throughout the teaching period (this is the main thrust of the negative comments, 39–41 and 45). The synergy generated within final-year PBL groups is a particularly rewarding experience for the teacher as well as for students. The comments under 'group dynamics' (1–9) and elsewhere convey an extremely healthy, relaxed and enjoyable atmosphere, yet the work rate progresses, as evidenced by the comments under 'benefits of PBL' (14–30) and 'skills developed' (31–38). Although the 'free-rider' problem tends not to be an issue with final honours students (13), I was impressed that when it did surface (10–12), team members resolved the issue without involving the facilitator. The externality effect of PBL, whereby non-PBL modules benefit from the skills acquired by students on PBL modules, is also noted (21). It is, of course, important to be aware that some students cannot adjust to a PBL environment, and prefer a conventional lecture-based approach (43).

Overall, the views of final honours students tend to be strongly supportive of the PBL approach to teaching. It is particularly pleasing to have students themselves admit that they have developed key subject-specific and general skills on the module (31–38, 17, 20 and 21, for example). While a teacher may presume that appropriate skill development has occurred, one can never be sure this has been the student experience. Although designing and maintaining a full-format PBL environment is hard work for the teacher, one senses that one is going in the right direction and doing the right thing.

Team dynamics

(1) 'Everybody was willing to put in a lot of effort and wanted to do well in the set tasks. At the beginning we established a routine of how to do the tasks and it worked very smoothly every week.'

(2) 'Everyone pulled their weight. If people were going to be absent, they let the other team members know and prepared their work in advance.'

(3) 'Everyone was motivated to get as much information as they could for the group. Nobody wanted to let the team down. '

(4) 'Everyone in the group participated and each did their part. We all learnt from each other as everyone submitted different ideas and information, and so we were able to cover a lot of ground in each topic.'

(5) 'There was a relaxed attitude, so people felt they could speak out and give an opinion. Everyone was willing to research as none of us knew anything about the topic.'

(6) 'Everyone worked very well together, it proved an enjoyable experience for everyone involved.'

(7) 'Group members could rely on each other and were prepared to meet outside class times to get things done well.'

(8) 'Everyone shared information. There was a high degree of trust.'

(9) 'Everyone exchanged contact numbers and so we had support if needed.'

Coping with free-riders

(10) 'I don't feel that we had any free-riders. We did have teething problems initially, but we discussed them as a group and were able to improve the way we worked as a team.'

(11) 'We confronted the person involved to try and understand and discover what problems he was facing.'

(12) 'They were confronted and asked to explain themselves. The situation was resolved by listening to their problems and then helping them to overcome these problems.'

(13) 'We didn't have any free-riders.' [This was the response of 92 per cent of PBL students.]

The benefits of PBL

(14) 'It gave me a chance to meet new people. Also to see how different people take different approaches to the one question.'

(15) 'Confidence, shared information, different opinions.'

Figure 10 Students' evaluations of full-format problem-based learning *(Continued overleaf)*

(16) 'I learnt where to find various sources of information. I also learnt how to participate in a group and work within a team.'

(17) 'The information gathered was up-to-date. It was easier to digest and remember information obtained this way as opposed to reading lecture notes. The group was able to cover a wider scope when looking for information than one person working alone.'

(18) 'Better than sitting in a lecture. We learnt more because we had to find the information ourselves. We also became much more aware of information sources.'

(19) 'Each team member had different skills to bring to task discussions and I picked up very valuable information from each of them.'

(20) 'Merging individual views into a joint document was an excellent learning process.'

(21) 'The problem-solving skills I developed on this module will help me study my other modules next semester.'

(22) 'I learnt more about the subject researching it myself rather than being lectured.'

(23) 'Apart from the social aspect of meeting new people and having a bit of "craic", it was a very valuable experience working in the group. I am a quiet person and group work made me provide an input to team effect.'

(24) 'I was shown by another group member how to access journals etc. and I experienced a wide range of skills.'

(25) 'It gave me experience in researching data sources. This was an area in which I had little experience. It also helped me develop a professional approach to tasks.'

(26) 'Given a lot of responsibility – introduced me to independent learning.'

(27) 'Group morale was high. Knowledge gained was more extensive and better than lectures.'

(28) 'The fact that the majority of people did the work meant it was easier to learn the material.'

(29) 'It benefited my organisational and interpersonal skills. Also my diplomacy was tested with certain members of the group.'

(30) 'It forced us to do the research ourselves.'

What skills do you believe you developed?

(31) 'Research methods, communication skills, leadership, selection of quality data from a vast range of data.'

(32) 'The ability to select relevant data and dispose of rest.'

(33) 'Communication, reporting, negotiation, data selection, leadership.'

(34) 'Team working, research methods. I also gained self-confidence with this method.'

(35) 'Time management, meeting deadlines, interpersonal skills.'

(36) 'Delegating, researching, organising and summarising issues (through the written response part of the set task).'

(37) 'More in-depth research skills and applying data and economic models to real-world situations.'

(38) 'I feel that this method of teaching developed my problem-solving skills.'

Negative aspects – not all students like active learning! Also, some students who enjoyed the PBL experience overall had reservations with certain aspects.

(39) 'It put us under a lot of pressure to complete the work on time. I did not enjoy it at all.'

(40) 'Meeting outside of scheduled classes.'

(41) 'Too much hard work **every** week – the pressure did not subside.'

(42) 'You had to depend on others for vital information, and you have to trust their input to the process.'

(43) 'I would have preferred more lecture-based teaching.'

(44) 'On occasions we all wanted to be leader which led to confusion.'

(45) 'It was quite time consuming. I spent a lot of extra time researching and meeting up with other members of the group outside of class hours.'

Figure 10 Students' evaluations of full-format problem-based learning *(Continued)*

6 Where next?

6.1 Websites

There are thousands of PBL related sites. The focus here has not been to detail its historical development, but to direct readers to useful information sources that will help one decide whether PBL is for them and, if so, how to take the initial 'plunge'. Most of the PBL applications included below provide some sort of 'ad hoc' evaluation, in addition to highlighting some of the practical benefits and problems encountered by practitioners.

The resources listed here provided free access at time of writing. Sites requiring payment for downloading articles have been excluded.

What is PBL?

Learning Materials in a Problem Based Course. Contains a PBL guide produced by the Department of Materials, Queen Mary College, University of London. Includes information on structuring PBL sessions, assessment and other issues.
http://www.materials.ac.uk/ guides/pbl.asp

Problem Based Learning – Wikipedia. Provides useful web links.
http://en.wikipedia.org/wiki/Problem-based_learning

Higher Education Academy Imaginative Curriculum Guide: Problem-based Learning.
http://www.heacademy.ac.uk/assets/York/documents/resources/resourcedatabase/id362_Imaginative_Curriculum_Guide_Problem_Based_Learning.rtf

A Briefing on Assessment in PBL. HEA Generic Centre Assessment Series, No. 13 (2004).
http://www.heacademy.ac.uk/resources/detail/id349_A_Briefing_on_Assess

Sharing Ideas and Research in Social Sciences Learning and Teaching: Problem-Based Learning. HEA Subject Centre for Sociology, Anthropology and Politics (C-SAP).
http://www.c-sap.bham.ac.uk/resources/project_reports/ShowOverview.asp?id=4

Relevance of PBL for employability skills

The Skills and Knowledge of the Graduate Economist (2007). Employer survey conducted on behalf of the Royal Economics Society and the Economics Network to identify employer understanding and requirements of economics graduates' skills and knowledge.
http://www.economicsnetwork.ac.uk/projects/employability2007full.pdf

Economics students' employability profiles (2005).
http://www.economicsnetwork.ac.uk/themes/EconomicsSEP.doc

Economics Students Survey (2006). Updated regularly.
http://www.economicsnetwork.ac.uk/projects/employability2006.htm

Employment Skills within an Accessible Curriculum (ESAC). Student Support and Development Service (SSD), University of Leicester. ESAC is a HEFCE funded project exploring how employability skills can be developed in a way that benefits all students equally (i.e. student disability catered for).
http://www.le.ac.uk/ssds/esac/index.html
http://www.le.ac.uk/ssds/esac/employability_problemsolving.html

Using PBL to teach economics

All available at the HEA Subject Network for Economics.
http://www.economicsnetwork.ac.uk/showcase/approaches.htm

Teaching Structuralist Economics Using Problem Based Learning and Weblogs
Stephen Kinsella, University of Limerick, Ireland (Jan 2008)

Problem Based Learning in final year (year 3) module Economic Growth
Guglielmo Volpe, London Metropolitan University (Oct 2007)

Using Problem Based Learning (PBL) to teach Industrial Economics
John Sedgwick, London Metropolitan University (Jan 2007)

Introducing Problem-Based Learning to a First Year Economics Curriculum
Frank Forsythe, University of Ulster (October 2007)
Includes a number of PBL tasks designed for a first year microeconomics module

Developing a PBL course in Economics: a sceptic's diary (Introduction)
Judith Piggott, Oxford Brookes University (Oct 2002)

Developing a PBL course in Economics: a sceptic's diary (Part 2: Report on Maastrict Visit)
Judith Piggott, Oxford Brookes University (Feb 2003)

Developing a PBL course in Economics: a sceptic's diary (Part 3: Implementation)
Judith Piggott, Oxford Brookes University (May 2004)

Developing a PBL course in Economics: a sceptic's diary (Part 4: 4 years on)
Judith Piggott, Oxford Brookes University (Aug 2006)

Using Problem Based Learning and a Business Game in Teaching Managerial Economics
Pierre Picard, University of Manchester (Dec 2002)

Using Problem Based Learning (PBL) to Teach Economics
Frank P. Forsythe, University of Ulster at Jordanstown (Oct 2001)

The evolution of PBL in 'Economics for Business' (ECQ450) from 2004 to 2009
Denis McGrath, University of Westminster.
This is PBL on a mega-scale, using the intranet facility to organise and run PBL for large numbers of Year 1 students. A reflective piece that is well worth reading.
http://www.economicsnetwork.ac.uk/events/pbl10510

Promoting Problem-Solving Based Independent Learning in Macroeconomics
David McCausland, University of Aberdeen (April 2001)

Problem Based Learning
Peter Pierpoint, University of Plymouth (Feb 2001)

Other economics applications of PBL

Making Sense of Economics: Designing Educational Scenarios for problem-Based Learning. Paper presented at conference 'Creativity or Conformity? Building Cultures of Creativity in Higher Education', at the University of Wales Institute, Cardiff in collaboration with the Higher Education Academy, January 2007.
http://www.creativityconference07.org/presented_papers/Arul_Experiencing.doc

Implementing Problem Based Learning in a Science Faculty. University of Western Australia (2008). This application relates to a module in Resource Economics.
http://www.iier.org.au/iier18/pepper.html

General Sources

Coventry University / HEA PBL
Use 'PBL' keyword in the 'search the site' facility. This site has a variety of resources, details upcoming events, and has an insightful reserach paper by Savin-Baden and Wilkie.
www.coventry.ac.uk

Project on The Effectiveness of Problem Based Learning (PEPBL)
This site details a current systematic review and evaluation into the efficacy of PBL within the Nursing curriculum.
www.hebes.mdx.ac.uk/teaching/Research/PEPBL

Centre for Instructional Support, University of Colorado
www.uchsc.edu/CIS/PBL.html

University of Maastricht PBL
A founder of the PBL model in Europe, with a wide variety of resources available.
www.unimaas.nl/pbl/

Australian PBL Teaching and Research Network, University of Newcastle
A comprehensive PBL bibliography.
www.newcastle.edu.au/services/iesd/learndevelop/problarc/

Health Sciences and Practice
http://www.health.heacademy.ac.uk/sig/problembased/whatispbl

Notes

1 At the University of Ulster, for example, introductory economics is taught on a wide range of programmes, including business studies, accounting, engineering, building, sports studies and health sciences.

2 In a TLS environment, lectures facilitate teacher-led information while seminars provide an opportunity (in theory at least) for teacher–student and student–student interaction.

3 Interestingly, it is suggested in Becker and Watts (1996) and Becker (1997) that teaching methods dominated by traditional 'chalk and talk' lectures with rare use of small-group interactive teaching methods may be a contributing factor in causing the decline in applications for single-discipline economics in the USA.

4 The terms 'partial' and 'full-format' to describe different PBL environments are the author's own. Under 'full-format' PBL there is provision for the occasional mini-lecture if required (see section 5).

5 For an excellent detailed discussion of the role of facilitator, see Woods (1996), ch.2, 'On being a coach/facilitator' at: http://chemeng.mcmaster.ca/pbl/pbl.htm

6 Thus PBL is less likely to generate 'redundant' questions that are avoided by students in the final examination.

7 These results are consistent with those cited by Longuevan (2000) when using PBL to teach economics at University of California, Irvine (at: www.pbl.uci.edu/winter2000/ss10csurvey.html).

8 After accessing Bized at www.bized.co.uk, select 'learning materials' followed by 'economics'. This site contains useful level 1 material on a range of topics, including market failure, costs and minimum wages.

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Appendix

PBL EXEMPLARS FOR A FIRST YEAR ECONOMICS MODULE

The exemplars provided in this section have been used, either wholly or in part, as PBL tasks in the teaching of first-year economics at the University of Ulster. They are included here as suggestions, or prompts, to help first-time users of PBL to design their own PBL resources to suit their particular learning environment.

Note the following PBL design features:

- Each exemplar can be used in full, or sub-divided into smaller components if time is limited (i.e. the tasks are flexible)

- The element of variability in the tasks, in terms of:
    - the required student responses – presentations, written reports, 'university challenge' type quiz
    - the learning resources to be accessed – media articles, websites, reports, data, text, online tutor notes

- The application of theory to real-world situations (i.e. realism)

- Each exemplar is supported, in that all supporting information necessary to complete the task is provided:
    - advice for task leaders
    - learning resources stipulated, including all Web links
    - learning outcomes stipulated

The above design elements are crucial if PBL is to meet the needs of both students and teachers. Realism and variability in PBL tasks help retain student interest and commitment; flexibility and supportiveness allow tutors to control the learning environment, particularly the pace and direction of student learning.

EXEMPLAR 1

1 of 2

Core Concepts	Elasticity, Commodity Taxes
Applications	New Cars, Dairy Products, Pesticides
Response Required	Written Report

1(a) From the data you have obtained (see below), choose the GDP measure you think appropriate and calculate the income elasticity of demand for new cars for (i) 1989-1991 (ii) 1994-1998

(b) Explain briefly your choice of GDP measure in (a)

(c) How would you categorise "new cars" from your results in (a) – 'normal' or 'inferior' products?

(d) Using supply & demand diagrams, illustrate what happened in the UK market for new cars in each of the periods noted in (a). What evidence is there in support of your conclusions for the earlier period from the article available at http://www.iht.com/articles/1991/07/04/ford.php ?

(e) With the aid of the article available at the address below identify 4 ***conditions*** of demand for new cars: http://cfit.independent.gov.uk/pubs/2000/ebpt/ebptgerman/04.htm

2 "*The elasticity was found to be less than 2*." Explain why this statement is ambiguous, and make any modification you think necessary to give it economic meaning.

3 Using the publication, *Desktop Study into Demand for Dairy Products*, Section 2, pp3-12, Provide evidence in support of the view that market forces do not favour farmers. *You should illustrate your answer with supply and demand diagrams.* http://www.defra.gov.uk/foodfarm/food/industry/sectors/milk/pdf/agraceasreport.pdf

4 Draw ONE supply and demand diagram that illustrates the general pattern to emerge from the PESTICIDE DATA in Table 1 attached. Explain briefly why you would expect the values depicted in the last column

.

LEARNING OUTCOMES - AFTER THIS TASK STUDENTS WILL BE ABLE TO:

- Understand the influence of market forces on product prices.
- Define and calculate different measures of elasticity.
- Assess how the impact of changing market forces depends upon market elasticities
- Understand the relevance of elasticity for government policy and firms
- Assess the relevance of elasticity for farm incomes
- Illustrate and assess the impact of a commodity tax on market outcomes
- Understand how environmental and other public policy objectives can be attained via the use of commodity taxes

EXEMPLAR 1 (contd) 2 of 2

Notes for Task Leader:

You may need to prompt the group to encourage discussion in the following areas:

Key concepts: Elasticity of demand & supply (price elasticity of demand & supply, income and cross elasticity of demand); related markets; price elasticity and sales revenue; the relevance of time for price elasticity of supply; the rationale for protecting farm incomes; supply and demand representation of a commodity tax; the incidence of a commodity tax.

Learning Resources

TEXT	Demand elasticities	TEXT REFERENCE (essential)
	Supply elasticities	TEXT REFERENCE (essential)
	Elasticity and farm incomes	TEXT REFERENCE (essential)
	Sales taxes and elasticity	TEXT REFERENCE (essential)

INTRANET	Market Elasticities	Lecturer's online presentation (optional)
	Elasticity and Farm Incomes	Lecturer's online presentation (optional)
	Commodity Taxes	Lecturer's online presentation (optional)

INTERNET

"Ford Lands Price Blow in U.K. Car War", *International Herald Tribune*, 4 July 1991, at http://www.iht.com/articles/1991/07/04/ford.php

European best practice in transport - the German example: why is car ownership higher in Germany than in the UK? UK Commission for Integrated Transport (2000), at http://cfit.independent.gov.uk/pubs/2000/ebpt/ebptgerman/04.htm

Desktop Study into Demand for Dairy Products, Section 2, "Factors affecting consumer demand for milk and dairy products", at http://www.defra.gov.uk/foodfarm/food/industry/sectors/milk/pdf/agraceasreport.pdf

DATA REQUIRED FOR Q1, EXEMPLAR 1

Using the World Economic Outlook (WEO) database find the GDP for the UK, 1980-2009, at (i) current prices and (ii) constant prices, available at http://www.imf.org/external/pubs/ft/weo/2009/01/weodata/index.aspx .

Using the source at http://www.autoindustry.co.uk/statistics/sales/index find the UK new vehicle registrations (in units) for the years 1980-2006

PESTICIDE DATA

Table 1 provides information on the impact of a 30% commodity tax on each unit of pesticide produced under different demand elasticity and incidence assumptions.

TABLE 1 PESTICIDE DATA

Scenario	Price Elasticity of Demand	Price Increase %	Change in Sales Reveue for UK producers (£m)
Base Case (no tax)	n/a	0%	n/a
Inelastic, 30% tax, 30% of tax absorbed by manufacturers	-0.2	21%	168
Inelastic, 30% tax, 15% of tax absorbed by manufacturers	-0.2	26%	175
Less inelastic, 30% tax, 30% of tax absorbed by manufacturers	-0.5	21%	159
Less inelastic, 30% tax, 15% of tax absorbed by manufacturers	-0.5	26%	164
Inelastic, 100% tax, 30% of tax absorbed by manufacturers	-0.2	70%	121
Inelastic, 100% tax,15% of tax absorbed by manufacturers	-0.2	85%	144
Less inelastic, 100% tax, 30% of tax absorbed by manufacturers	-0.5	70%	103
Less inelastic, 100% tax, 15% of tax absorbed by manufacturers	-0.5	85%	120

Source: Table derived from *Design of a Tax or Charge Scheme for Pesticides,* report by ECOTEC for Department of the Environment, Transport and the Regions, March 1999

GENERAL NOTE

Producers of pesticides are legally responsible for paying the tax. The primary users of pesticides are farmers and local councils. Although manufacturers of pesticides are responsible for the tax, they can pass on some of the tax burden to buyers. How much of the tax that can be passed on will depend on the price elasticity of demand. The incidence of tax refers to how the tax burden is shared between producers and buyers.

EXEMPLAR 2

Core Concepts	Production, Costs and Revenue
Applications	Economics of Wind Power
Response Required	Group Presentation

SUBMIT PRESENTATION FILE ONE WEEK BEFORE PRESENTATION

Formal group presentations (20 MINUTES EACH)

1 (a) Complete Table 2
(b) Are the MC and AC data consistent with the basic theory you met in the TEXT?
(c) Do the data in Table 2 depict a short-run or long-run scenario?
(d) Using the source, *Wind Power Economics* (EWEA, 2005), available at:
http://www.ewea.org/fileadmin/ewea_documents/documents/publications/factsheets/factsheet_economy2.pdf
(and/or any other source you have found), identify the likely sources of economies of scale in the production of wind power energy.

2 Identify the economic and environmental arguments FOR and AGAINST the use of wind power to generate electricity

LEARNING OUTCOMES - AFTER THIS TASK STUDENTS WILL BE ABLE TO:

- know the importance of the distinction between the short and long run in the analysis of production costs
- understand the determinants of unit costs in both the short-run and long-run
- be able to apply their knowledge of production costs to analyse specific industrial situations

EXEMPLAR 2

2 of 2

Notes for Task Leader:

You may need to prompt the group to encourage discussion in the following areas:

Key concepts	Total costs and total sales revenue, marginal and average cost; marginal and average revenue; profit maximisation; short run and long run production costs; fixed and variable factors; fixed and variable costs; law of diminishing returns; economies and diseconomies of scale; U-shaped unit and marginal costs in short and long run.

Learning resources

TEXT	The firm's supply decision	TEXT REFERENCE (essential)
	Short run production costs	TEXT REFERENCE (essential)
	Long run production costs	TEXT REFERENCE (essential)
INTRANET	Production Costs	Lecturer's online presentation (optional)
INTERNET	*Wind Power Economics*, European Wind Energy Association (2005), available at http://www.ewea.org/fileadmin/ewea_documents/documents/publications/factsheets/factsheet_economy2.pdf	
	"The cost of Wind Power", in *Windletter*, The American Wind Energy Association, May 2003, at http://www.awea.org/windletter/wl_03may.html	

EXEMPLAR 2 WIND POWER DATA

The electricity produced by a wind turbine over one year is measured in kilowatt hours/year (kWh/year). The maximum yearly output of a wind turbine will depend upon the power producing capacity of the turbine (measured in kilowatts, kW) and the number of hours/year at which the turbine operates at full capacity. The latter is clearly dependent upon wind conditions, with coastal and upland areas offering the best sites. The maximum yearly output of a wind turbine is given by:

OUTPUT (kWh/year) = **TURBINE POWER** (kW) * **TIME** (hours /year at full-load)[1]

TABLE 2: WIND POWER OUTPUT and ESTIMATED COSTS per kWh

Wind Strength	**TIME** Full-Load Hours / year (1)	**OUTPUT** [kWh/year] (2)	Average Cost [c€/kWh] (3)	Total Cost [c€] (4)	Marginal Cost [c€] (5)
LOW	1500		7.6		
LOW	1700		7.0		
MEDIUM	1900		6.5		
MEDIUM	2100		6.0		
MEDIUM	2300		5.6		
HIGH	2500		5.2		
HIGH	2700		4.9		
HIGH	2900		4.7		

Source: Data in Column (3) derived from European Wind Energy Association (2005), *Wind Power Economics*, Fig. 1, available at http://www.ewea.org/fileadmin/ewea_documents/documents/publications/factsheets/factsheet_economy2.pdf
Also available from the module WebCT

NOTE: **Turbine capacity** = 1,000kW; c€ = Euro cents; Average Cost data in Column 3 assumes that capital costs and O&M costs are discounted at 7.5% discount rate [see discussion in above publication re. Figs. 1 & 2].

[1] The definition of kWh is available from http://www.gcse.com/energy/kWh.htm

EXEMPLAR 3 1 of 2

Core Concepts	Perfect Competition and Monopoly
Applications	Competition Policy, Regulatory Bodies, Consumer Council, Transport and Energy
Response Required	Team Quiz

'UNIVERSITY CHALLENGE' QUIZ

Questions will focus on the following

1 The perfectly competitive industry in the short and long run
2 The profit maximising monopolist in the short and long run
3 The price discriminating monopolist
4 Natural monopoly
5 The Internet sources listed below

LEARNING OUTCOMES - AFTER THIS TASK STUDENTS WILL BE ABLE TO:

- Distinguish between normal and supernormal profits
- derive and illustrate the revenue and cost conditions that generate maximum profit/minimum losses for PC firms and Monopolists in the SR and LR
- assess the outcome of competitive structure (and lack of it) for consumers, producers and society as a while
- understand the role of consumer groups and regulating bodies in controlling the market power of monopolists
- apply their knowledge of market structure to specific industries

Notes for Task Leader:

You may need to prompt the group to encourage discussion in the following areas:

Key concepts	Total, average and marginal revenue concepts; profit maximisation; normal and supernormal profits; perfect competition (PC); short and long run equilibrium of firm and industry in PC; profit maximisation under monopoly; discriminating monopoly and natural monopolies.

EXEMPLAR 3 2 of 2

Learning Resources

TEXT	Revenue, profit, perfect competition, monopoly	TEXT REFERENCE (essential)
INTRANET	Perfect competition , Monopoly	Lecturer's online presentation (optional)

INTERNET

Phoenix Gas [sole supplier of natural gas in Northern Ireland]

http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/2773243.stm
http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/3561873.stm
http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/3525416.stm
http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/3602786.stm
http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/4626912.stm
http://www.phoenix-natural-gas.com/
http://www.consumercouncil.org.uk/publications/?id=110

Translink Services [sole supplier of bus and rail services in Northern Ireland]

http://www.translink.co.uk/enterprisefares.asp
http://www.consumercouncil.org.uk/publications/?id=81 This paper relates to 'transport poverty'

Questions involving OHP facility. See "Competition & Monopoly" at the following link: http://www.economicsnetwork.ac.uk/projects/mini/forsythe_pbl.htm

- *All OHP questions will involve partially completed diagrams (i.e. no labels and missing schedules) relating to the theory of the firm under varying competitive conditions.*
- *Diagrams may contain deliberate errors, such as wrongly positioned equilibria, wrongly labelled schedules ……. etc.*
- *Teams winning the 'starter' question for a particular diagram have an opportunity to earn additional points by completing the diagram and correcting any deliberate errors in the process.*

EXEMPLAR 3

General Questions (intended for rapid Q&A session, not using OHP facility)

1. What is the profit maximising condition for a PC firm?
2. List the conditions necessary for PC
3. What is 'normal' profit?
4. Why is the distinction between firm and industry important in PC?
5. Define marginal revenue (MR)
6. Define marginal cost (MC)
7. Average revenue (AR) always equals ……
8. In PC, a firm is a price ……..
9. What is the significance of AR > AC?
10. Why does MR fall as monopolist raises output?
11. In PC, P …… MC, but in monopoly, P …… MC
12. If AC < AR, what happens in PC?
13. If AC < AR, What happens in Monopoly?
14. In Monopoly, the distinction between the LR & SR is …….
15. In the LR a PC firm will earn …….. ?
16. In the LR a monopolist will earn …….?
17. Why are normal profits treated as a cost?
18. In PC why will the firm NOT sell BELOW the market price?
19. Name the market: AR > AC; P = AR; MC = MR; MC = P
20. What type of firm can exercise price discrimination?
21. What conditions are necessary for price discrimination?
22. Identify THREE monopoly services within NI
23. Can MR & AR schedules ever coincide in monopoly?
24. Why does MR normally lie below AR in monopoly?
25. Why does MR =AR in PC?
26. How does a 'natural monopoly' arise?
27. What does OFREG stand for?
28. In PC, if AC < AR what profits are being earned?
29. In PC, if AR > AC, what will happen to market price?
30. Define the short run in a PC industry
31. In PC, if AC < AR what will happen to the industry supply curve?
32. In PC, if AC > AR what will happen to the industry supply curve?
33. From consumer viewpoint, what makes PC attractive?
34. From a firm's viewpoint, what makes PC unattractive?
35. From efficiency viewpoint, what makes PC attractive?

Questions based on Internet Sources (Q&A session testing teams' research effort)

36. What evidence is there of price discriminating behaviour in NIR?
37. What evidence that Pheonix Gas exercises monopoly power?
38. Identify THREE ways that have been used to control Pheonix Gas
39. What stance does the NI Consumer Council take in relation to Pheonix Gas?
40. How does Pheonix Gas project itself?
41. What case does Phoenix Gas present for raising prices?
42. What stance does the NI Consumer Council take in relation to Translink?
43. The MC of a journey made by public transport is (***more*** or ***less***) than by car
44. What is the 'transport trap'?
45. What are the advantages of a 'hail & ride' bus service?
46. Re. Phoenix Gas, what does 'revenue recovery period' mean?
47. Why should extending the RRP help stabilise gas prices?
48. How many increases in gas prices occurred between 1996-2002?

EXEMPLAR 4 1 of 2

Core Concepts	Comparative Advantage, Trade Policy &Tariffs, Exchange Rates
Applications	Somalia, UK, Germany, Ethiopia,
Response Required	Written Report OR Group Presentation (groups are free to choose response format)

1 Explain how the theory of comparative advantage could account for the data in Table 1.

2 Explain why it is necessary to distinguish between :
(i) differences in factor endowments, and
(ii) market structure when accounting for the data in Tables 2 and 3.

3 (a) Using Tables 4-6 calculate Israel's terms of trade for 2004, 2005, and 2006.
(b) Which price movements most influenced its terms of trade since 2004?

4 Identify the arguments for tariff protection implied in, "Ethiopia on the track of joining WTO", *Ethiopian Reporter,* Saturday 8/10/2005.
What are the arguments against Ethiopia using tariffs as a policy instrument?

5(a) Outline the protectionist measures associated with the rise of economic nationalism highlighted in the 2009 *Financial Times* article, "Rising protectionism", *Financial Times*, Friday 3/2/2009
(b) Explain the main arguments against the use of protective trade measures?

6(a) Using supply and demand diagrams explain (i) how the equilibrium value of the pound in terms of euros is determined in the foreign exchange market, and (ii) why a rise in UK interest rates relative to eurozone rates could strengthen the pound against the euro.

6(b) Evaluate the view that a fall in the value of the pound benefits the UK economy, referring to the *Daily Telegraph* (2008) and *Financial Times* (2008) articles below.

LEARNING OUTCOMES - AFTER THIS TASK STUDENTS WILL BE ABLE TO:

- Apply and appraise the principle of comparative advantage using real data
- Evaluate the use of restrictive trade policies, including tariffs
- Determine and discuss the terms of trade using real data
- Use basic supply and demand analyses to analyse the foreign exchange market
- Evaluate the impact of a depreciating pound on the UK economy

EXEMPLAR 4 2 of 2

Notes for Task Leader:

You may need to prompt the group to encourage discussion in the following areas:

Key concepts	Absolute and comparative advantage; terms of trade; trade policy, including tariffs; exchange rate determination; impact of a depreciating / appreciating currency on export and import prices – here you should also consider the relevance of price elasticities of demand for exports and imports.

Learning resources

TEXT	Relevant sections /pages	TEXT REFERENCE (essential)
INTRANET	Appropriate resources	Lecturer's online presentation (optional)
INTERNET	The following provided information on the trade-related issues forming this task. Use the search facility in each site as appropriate.	

http://en.ethiopianreporter.com/
http://www.telegraph.co.uk/
http://www.ft.com/home/uk
http://www.intracen.org/countries/ (International Trade centre)
http://unstats.un.org/unsd/trade/imts/analyticaltradetables.htm (UN statistics division)

The following are relevant for Question 6b

"No help in sight for the falling pound", *Daily Telegraph*, 15/12/2008
"London and tourists enjoy weak pound", *Financial Times*, 19/12/2008
"Ground down by the pound", *Financial Times*, 25/11/2008

EXEMPLAR 4 IS CONTINUED OVER THE NEXT TWO PAGES

TABLE 1 SOMALIA TRADED GOODS 2004

Product	Ranking[1] Export Rank	Import Rank[2]	Product	Ranking[1] Export Rank[2]	Import Rank
Live Sheep & Goats	1	n.a.	Sugar Cane or Sugar Beet	n.a	1
Wood Charcoal	2	n.a	Vegetable products	n.a	2
Animal Products	3	n.a	Cigars & Cigarettes	n.a	3
Wood Pulp	4	n.a	Rice	n.a	4
Live Bovine Animals	5	n.a	Wheat or Meslin Flour	n.a	5

Source: International Trade Centre (ITC)
Notes: (1) ranking is based on the value of exports and imports in US $million.
(2) n.a. for export/import rank means product is not exported/imported

TABLE 2 UNITED KINGDOM TRADED GOODS 2004 (US £billion)

Product	Export Rank	Export Value	Import Rank	Import Value	Net Exports[1]
Cars	1	18.6	1	30.9	- 12.3
Medication Mixtures	2	16.2	4	11.0	+ 5.2
Crude Petroleum Oils	3	15.1	5	9.7	+ 5.4
Turbo Jets & Other Gas Turbines	4	12.2	10	6.7	+ 5.5
Automatic Data Processing machines	5	9.5	2	15.2	- 5.7
Motor Vehicle Parts	10	6.9	3	11.5	- 4.6

Source: International Trade Centre (ITC)
Notes: (1) net export value is *plus* when value of exports exceed the value of imports and *minus* when value of exports is less than the value of imports. All values in terms of US $billion.

TABLE 3 GERMANY TRADED GOODS 2004 (US $billion)

Product	Export Rank[1]	Export Value[1]	Import Rank	Import Value	Net Exports[2]
Cars	1	91.5	1	32.8	+ 58.7
Motor Vehicle Parts	2	24.9	5	15.0	+ 9.9
Medication Mixtures	3	16.2	9	8.5	+ 7.7
Automatic Data Processing machines	4	12.5	3	17.8	- 5.3
Aircraft	5	11.5	10	8.5	+ 3.0
Crude Petroleum Oils	n.a	n.a	2	23.3	- 23.3
Petroleum Gasses	31	3.6	4	17.0	- 13.4

Source: International Trade Centre (ITC)
Notes: (1) n.a. for export rank and export value means product is not exported.
(2) net export value is *plus* when value of exports exceed the value of imports and *minus* when value of exports is less than the value of imports. All values in terms of US $billion.

Table 4 The relative value of Israeli imports, and exports, as a percentage of the total in the year 2000

imports:				exports:			
fuels	other raw materials	other imports	total imports	agriculture	diamonds	other manufactures*	total exports
15.1	51.6	33.3	100	2.4	37.6	60	100

* other manufactures include low-, medium-, and high-technology manufactures (excluding diamonds)

Table 5 Israeli import price indices (2000 = 100)

	fuels	other raw materials	other imports	total imports
2004	128.2	113.4	107.6	111.8
2005	176.2	125.4	111.0	120.0
2006	208.0	135.9	126.2	127.1

Table 6 Israeli export price indices (2000 = 100)

	agriculture	diamonds	low technology manufactures	medium technology manufactures	high technology manufactures	total exports
2004	125.2	113.0	106.1	111.9	98.0	107.4
2005	124.1	134.4	110.0	126.8	95.3	116.2
2006	124.2	143.6	113.7	139.0	95.1	121.1

Note: A 'base year' price is valued as 100 (the base year here is the year 2000). Price indices for other years show how a price differs from the base year. For example the price index for diamonds in 2004 was 113.0, which means that the price of exported diamonds was 13% higher in 2004 than in 2000. In 2006 it was 43.6% higher than in 2000. Comparisons with non-base year prices can also be made, by calculating the relevant percentage. For example, the price rose between 2004 and 2006 by 27%, since (143.6 / 113.0) x 100 = 127.

The Handbook
for Economics Lecturers

Simulations, Games and Role-play

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Edited by Dr Peter Davies, University of Staffordshire

1 Introduction

The use of games and simulations in economics is well established, with a well-developed body of literature to support their use in the teaching environment (see the section 8 for a list of key sources). Role-play, as an educational approach, is often referred to in the same context as games and simulations. However, the use of role-plays in teaching has received far less attention. Collectively, simulations, games and role-play (SGRP) provide students with some form of imaginary or real world within which to act out a given situation. Beyond this, however, each is quite distinct.

The aim of a simulation is to deepen students' conceptual understanding by working within, and reflecting upon, a representation of a real environment. For example, simulations of the macroeconomy may be used to train economists by requiring them to devise economic strategies to achieve policy objectives. The dynamic of a simulation may be competitive, whereby students are encouraged either to outperform other students or to achieve a high rating according to criteria set by the simulation. In these cases the simulation is also a game. However, students might also be encouraged to explore a simulation, to investigate its behaviour and discover its assumptions. For example, they might be asked to set their own criteria for 'successful performance' within a simulation and then to investigate how best to achieve that performance. In most cases, it is the way in which a simulation is used that determines whether or not it is effectively a game. This choice has important implications for the way in which a simulation may contribute to learning.

Games may be distinguished from other forms of simulation by the rules that dictate what it means to 'win' the game and the sense of competition they engender. Games tend to have winners and losers. For example, a typical form of business game requires students to compete with others in buying and selling shares on the stock market. Such games operate with clear rules for the process and timing of share trading, and they encourage students to compete on the basis of achieving the highest level of profit through their trading.

Simulations become role-plays when the student is expected to act as they imagine appropriate to a given role. For example, they might be asked to act as a stockbroker in a share-dealing simulation or as the Chancellor of the Exchequer in managing the economy. The opportunity for the student to act out the role is bounded by the rules of the simulation and the degree to which the simulation is constructed as a game. As games usually require tight rules, role-plays are likely to give more scope for the student to exercise their own interpretation of the role when the simulation is not constructed as a game.

This chapter explores the world of SGRP. Sections 2 and 3 examine basic principles in using SGRP in teaching. Following a review of the major strengths and weaknesses of using SGRP in teaching and learning in section 2, section 3 examines the rationale for using SGRP at different points in a programme of teaching. Much of the chapter is taken up with three case studies of practice presented in section 4. These case studies have been chosen because they are easily available and can be adapted for different circumstances. Section 5 reviews some of the key issues to be considered in designing SGRP and section 6 examines the growing impact of new technology on using SGRP in higher education. The chapter ends with brief conclusions and suggestions for further reading.

2 Why use simulations, games and role-play?

In this section we will review the main arguments both for and against the use of SGRP as a teaching and learning strategy. Although, in many respects, simulations, games and role-play offer distinct strengths and weaknesses, in a majority of cases arguments both for and against their use are the same. This section will therefore evaluate SGRP in general terms, making specific reference to a particular approach only where necessary.

Supporters of the use of SGRP as a teaching strategy are frequently found to argue that its greatest virtue is that students are encouraged to reflect on their knowledge and draw together the various dimensions of their course of study (Alden, 1999; Oberhofer, 1999). It is, however, also recognised (Alden, 1999) that there is always a threat of simplification, where students fail to draw upon or make optimum use of the knowledge they have been taught. The issue for the tutor is whether sufficient safeguards can be initiated to minimise such simplification, such as the construction of clear guidance notes (see below).

In addition, SGRP often require the tutor to relinquish some control over the process and outcomes of learning. Are students reflecting upon their knowledge in the most effective way? Francis and Byrne (1999) suggest that this drawback in using SGRP might in fact be turned into an advantage. They argue that one of the greatest benefits they found when using SGRP in their teaching programme was that it helped reveal 'sticking points in student understanding' (p. 209), in the light of which they were able to rectify the design of their course.

As well as encouraging students to reflect upon their theoretical understanding of economic concepts and arguments, SGRP is an excellent approach by which to develop in students a greater appreciation of role and responsibility. As a teaching method, SGRP can encourage students to empathise with the position and feelings of others and to look beyond their immediate assumptions and expectations. As Freeman and Capper (1998) remark following an evaluation of their Web-based simulation role-play, students 'achieved a deeper understanding of their own views and those of others' (p. 12). When evaluating issues of role and responsibility, it is important for the tutor to recognise that roles might also be distorted and stereotyped, and might in certain cases fail to reflect an accurate perception of those whom it might claim to represent. In such cases, careful debriefing is essential.

Many studies (Francis and Byrne, 1999; Oberhofer, 1999) have claimed that SGRP, especially when group based, have contributed to a positive change in classroom dynamics. It has been suggested (Francis and Byrne, 1999) that they help break down barriers and stimulates a greater level of long-term interactivity between students. Problems, however, might arise if students fail to take the SGRP seriously, seeing it merely as a break from 'real' teaching. Oberhofer (1999) remarks upon this issue when devising a history of economic thought class based totally upon role-play. He notes that when devising the course he had to consider not only whether those studying the course would have the ability to make the role-play work, but also whether they would be willing to take on the responsibility such a course would demand and fully 'engage in the enterprise' (p. 113).

Supporters of SGRP (Neral and Ray, 1995; Lowry, 1999) claim that such an approach to teaching and learning can give life and relevance to academically descriptive material. Remote theoretical concepts can be given life by placing them in a situation with which students are familiar. For example, understanding the workings of the market might be far more effectively

relayed to students through a simple game rather than a theoretical discussion of the principles of demand and supply.

Neral and Ray (1995), in discussing the merits of teaching costs and production via a game, remark that 'many of the students in our introductory courses have difficulty in dealing with the high level of abstraction that permeates economic theory, [and] it can be extremely helpful to provide these students with concrete examples of the phenomena that the theories attempt to describe' (p. 170). They dismiss simply giving real-world examples as illustration, claiming that students have different experiences and many will be unable to relate to the examples given. However, the use of classroom games, they claim, 'ensures that all students have at least some level of common experience upon which to base their understanding of the relevant theory, [and second] it actively involves the student in the learning process' (p. 170).

As well as knowledge and roles, SGRP can contribute positively to the development of key transferable skills, particularly in terms of communication and social skills. Depending upon the organisation of the activity, it may be possible to develop skills in recognising and presenting arguments, presenting to an audience and working collaboratively in a group. The literature on SGRP (Francis and Byrne, 1999; Alden, 1999; Gremmen and Potters, 1997) suggests that the typical use of SGRP involves group work, and as such draws upon its relative strengths and weaknesses. Most SGRP, such as those highlighted in the case studies in section 4, require students to solve problems through analysis, synthesis and evaluation: all high level skills.

The final issue to raise in this section concerns the development and running of SGRP. Preparing, running and debriefing SGRP often requires more time and effort from the tutor than a traditional approach to teaching. Oberhofer (1999) and Lowry (1999) both remark on the high start-up costs that SGRP can sometimes generate. The issue that requires resolving is whether SGRP improve learning sufficiently to justify this additional effort. Evidence suggests (Gremmen and Potters, 1997; Rodgers, 1996) that where evaluations have been considered in this respect, the gains from using SGRP have been found to justify the costs that such teaching methods often entail.

3 When to use SGRP

Simulations, games and role-play may be used to serve different purposes at different points in a course. This section briefly reviews reasons for using SGRP in the beginning, middle and final stages of a programme of teaching. Given the similarities and overlap between SGRP, I have assumed they will perform similar functions at the various stages of a course of study. Admittedly, games are more likely to be effective as icebreakers than role-play, and simulations and role-play are more likely to be effective teaching strategies when reviewing a programme of study. However, the key issue as to when to use SGRP is the degree to which prior student knowledge is crucial to its success. This will largely determine when SGRP ought to be used.

SGRP create learning environments in which students talk to each other, solve problems and work collaboratively. Francis and Byrne (1999) found that one of the greatest benefits from conducting a role-play exercise amongst undergraduate astronomy and physics students was

that it changed classroom dynamics into a 'noticeably more interactive and friendly' environment (p. 209). They felt that the role-play they used broke down barriers. Consequently, SGRP may be used as icebreakers at the start of a course and may be used to develop a culture in which students learn from each other. For this reason, they might be regarded as contributing to the development of an effective learning community. The International Trade Game (section 4.2) is an excellent example of a game that can be used to perform such a task. The game introduces some key principles of trade theory and policy, focusing especially on issues of efficiency and equity, and prompting questions about the fairness of the trading environment.

SGRP may also be used within the teaching of a module to deepen understanding by placing theoretically remote ideas in real-world situations. However, such potential gains need to be balanced against any additional tutor time that may be required in implementing SGRP (Gremmen and Potters, 1997) and the prior knowledge that students will require. According to Rodgers (1996), this is particularly important for role-plays, for which students will require 'background information and appropriate economic tools to play their roles effectively' (p. 219). The importance of background knowledge explains why tutors may regard the end of a course or theme as the most appropriate point at which to use SGRP. At this time SGRP may be used to help students to pull ideas and concepts together, clarifying connections between different aspects of their study. This should help them to recognise the interconnected nature of economic ideas.

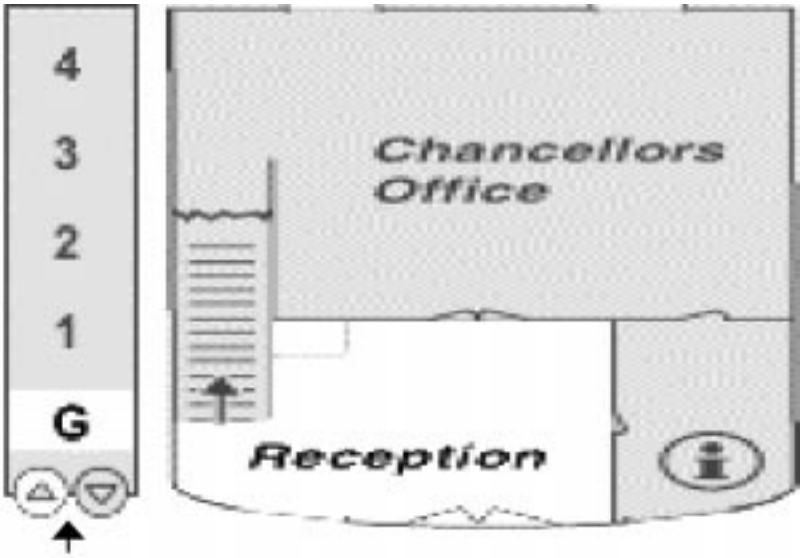
4 Case studies in how to use SGRP

The three case studies in this section have been selected to exemplify a simulation, a game and a role-play in current use. I have used the simulation and the game for a number of years, and their impact upon the teaching and learning process has been evaluated over a long period. The role-play is new. In this case study I will explain why and how I devised it, and what I hope it will deliver within my teaching programme.

4.1 Case study 1: The Virtual Economy[1]

The simulation

The Virtual Economy is a sophisticated online Web-based model of the UK economy with extensive supporting materials. It was developed jointly by the Institute for Fiscal Studies and the Biz/ed group at the University of Bristol with the support of the Nuffield Foundation. The model is based on the home of the UK Chancellor of the Exchequer. Many macroeconomic policy simulations have been devised as games. However, the Virtual Economy is not a game. It is designed to encourage students to explore the operation of a macroeconomic model and does not have the structure of 'rounds' and 'point scoring' typical of macroeconomic games. The simulation presents a virtual '11 Downing Street', which is split into five floors, and the



'Lift' to navigate between floors

Ground floor – Chancellor's office with an introduction to the Virtual Economy and an information bureau with teacher's guide, student's guide and details of the model.

1st floor – Case Studies – this floor has case studies about the impact of changes in the economy on people, business and governments.

2nd floor – Economic Policy – a whole floor dedicated to the different economic variables in the model. Here you'll find advice, explanations, worksheets and relevant economic theories about everything in the Virtual Economy.

3rd floor – Library – you can browse here for all sorts of help. There are details on famous economists, all types of economic theory and a full glossary of all terms in the Virtual Economy.

4th floor – The Model – on this floor is the model itself. Try changing anything you like and see the effect on the economy.

Figure Visual display from 'Virtual Economy'

navigation allows the user to jump from floor to floor. Each floor contains a number of virtual rooms that contain various resources. The home page lists the contents of each floor as shown in Figure 1.

The model of the UK economy at the heart of this package is similar to that used by the Treasury and the Bank of England to model the effects of policy changes. Students can see the macroeconomic and microeconomic impact of changes in various macroeconomic instruments. Analysis of microeconomic effects is prompted by the inclusion of several business case studies and family types (found on the first floor). The simulation calculates the impact of policy changes on each family type. Teacher's and student's guides are given on 'the ground floor' and these suggest various ways in which the package can be used.

The package contains various printable worksheets (on the second floor). All worksheets are designed to guide students' experimentation with the model. The teacher's guide suggests that

The materials could be used for self-paced study. Students could gradually work through sections researching relevant theories, doing worksheets and experimenting with different policies on the model. Lecturers may want to use the model for classroom experimentation. If

there is an Internet connection, then it would be possible to use the model as a basis for discussion with classes. Students could suggest policies and try to predict the outcome of them. The policies can then be tried on the model to see how good their predictions were. Students could do this individually or in groups as well. Different groups could be set different targets, and they could see how easily they can meet them. This also should help to provide a basis for discussion.[2]

Main learning outcomes

The main subject learning outcomes from running the Virtual Economy simulation focus upon developing students' understanding of the macro economy, the interaction between the main macroeconomic variables and the ability of government, via economic management, to shape economic performance. With suitable focus, students can also learn about the relationship between business and the macro economy, and the impact that changes in the macro economy have upon families and wider issues of social welfare.

As well as such subject-related learning outcomes, the Virtual Economy simulation also develops other skills. For example, given the assignment brief for students at the University of the West of England (reviewed below), students are encouraged to spend time on refining presentation skills (20 per cent of the assignment mark is dedicated to such considerations). The simulation also helps develop higher-level cognitive skills such as analysis and evaluation, where students are asked to apply macroeconomic outcomes generated by the simulation to a business and its future performance. Depending upon the focus of the lecturer, the Virtual Economy simulation can be used in a number of ways, developing a wide range of learning outcomes.

Using the Virtual Economy for assessment: an example from the University of the West of England

The Virtual Economy was used as the basis for an assignment given to 900 first-year undergraduates at the University of the West of England. These students are studying for a 3-year honours degree in business studies. They take six modules per year, and Economic Principles is compulsory as one of the six in the first year. The Virtual Economy assignment accounts for 40 per cent of the students' marks (the other 60 per cent being from an exam (50 per cent) and a test (10 per cent)).

The students first explore the model and the supporting information on their own. Following this they are asked to select two policy stances and a business that will be affected by those policies:

- The two policy stances must be chosen from four options – deflationary, reflationary, supply-side and redistributive – which are described on the first floor (http://www.bized.ac.uk/virtual/economy/studies/business/policies.htm).
- The business is chosen from five case studies also presented on floor 1 (http://www.bized.ac.uk/virtual/economy/studies/business/).

Students then move to the model and input changes consistent with the first policy approach (as directed by the selected policy approach). A summary of the results then appears, which can be transferred to a spreadsheet and printed out. The procedure is then repeated for the second policy approach.

After they have completed their investigation of the model, students are asked to write a report, reviewing the impact of their policy changes on their chosen business. They are asked to answer the following questions in their report:

- What impact are the policy changes likely to have on the level of demand for the company's product? Why?
- What impact are the policy changes likely to have on the company's costs? Why?
- What impact are the policy changes likely to have on the company's profitability? Why?
- What impact are the policy changes likely to have on other aspects of the company's financial situation? Why? (In this area you might like to consider: the level of liquidity, the level of inventories, the level of bad debts, any income on investment, interest payments, etc.)
- What strategies could the firm adopt to counter the effects of the policies?
- Should they change their marketing strategy? If so, which aspects: their pricing strategy, their advertising, the nature of the product itself …?
- What policies should they lobby the government to carry out?

The tutor evaluates the report according to the following criteria:

- structure (25 per cent);
- argument (25 per cent);
- originality (10 per cent);
- style (10 per cent);
- presentation (20 per cent);
- sources (5 per cent);
- spelling, grammar, etc. (5 per cent).

A review of using the Virtual Economy

To use the simulation effectively, students need to look at the relevant information and to plan their analysis of this information. The tutor has to decide how much guidance to give to students in each of these tasks. There is a tension here between providing sufficient guidance to enable the exercise to run smoothly and giving students sufficient opportunity to develop their own ideas and to work independently. As a general rule, it is a good idea to make sure that the students are carefully guided through the available information. Less able students could very easily get lost in the sheer volume of material provided by the Virtual Economy. However, too much guidance on distinguishing between more and less relevant information and on planning the course of the investigation will deprive the students of the opportunity to work independently.

Independent learning can be encouraged by asking students to identify and articulate factors that they regard as relevant and to express lines of reasoning that they believe can account for the predictions provided by the model. Final-year students, who might be expected to possess a broad and reasonably deep understanding of economics, might be asked to construct their own policy framework, given the current state of the economy, and to evaluate the reasons for their policy choice and its outcomes. They might also be encouraged to construct and justify their own criteria for evaluating the outcomes for business.

First-year and less confident students will require more guidance, but a list of points that they might consider in their investigation should be sufficient. The quality of work produced by first-year students has been very good. The average mark was above that awarded in previous years when a student's understanding of this topic was assessed through an essay without any use of the simulation. However, although the general standard of the assignments was good, there was a tendency for students to provide an insufficient theoretical basis for the arguments they advanced. We interpreted the general improvement in students' work as a reflection of the

amount of time that students had devoted to their analysis. Students who worked harder on the review gained higher marks.

The author's current work in progress suggests that students who were familiar with the operation of the macro economy prior to running the Virtual Economy model felt that the module had helped deepen their understanding of the economy and its operation and performance. This may go some way to explain the higher standard of work achieved. It has also been suggested by this work that students' efforts in the Virtual Economy assignment reflected the fact that they found the assignment medium interesting, and subsequently were more engaged with their study.

Even for experienced markers, the assessment of students' reports proved difficult. Students approached their assignment in many different ways and this made it difficult to devise a mark scheme that adequately compared the quality of their work. The reliability problems were highlighted by early attempts at double marking prior to devising a marking scheme. In 10 per cent of cases, marks diverged by more than 15 per cent. Tutors then met to negotiate marks. Following these negotiations the assessment team met to compile a set of marking criteria. These criteria were made available to students alongside their marked scripts and comments on the reasons for the mark awarded to their script. Even though this process was time consuming, it was necessary to ensure reliability and transparency in the assessment. Even using the final assessment criteria, markers took an average of 30 minutes to mark each script. It is difficult to judge whether marking will continue to take this long once tutors are more experienced with this format of assessment and the criteria being employed.

Prior to using the Virtual Economy assignment, we had anticipated that students would prefer assessment in the form of an essay. To our surprise, the reaction of students to the new assignment was very positive. Many students commented that, although they found the assignment very challenging, they also found it very rewarding. A number of students commented that they needed access to fewer books to complete the assignment and that this created less pressure on library resources.

In the second year of using the assignment, we introduced several changes. First, the percentage of coursework marks devoted to the assignment was increased from 30 to 40 per cent. We felt that students spent many hours investigating and writing the assignment and that this should be reflected in the weighting of the assignment. Second, we replaced a second element of coursework with a multiple-choice test in order to reduce the marking load on staff. Third, the macroeconomic section of the course was linked more closely to the themes of the Virtual Economy assignment, in order to link the policy aspects of the assignment more closely to the theory presented in lectures. In this way, we aimed to improve the theoretical underpinning of the policy arguments that the students offered in their assignments.

The course team who developed and marked this assignment have found it a rewarding experience, and the evidence so far suggests that students appreciate its value. It is felt not only that the assignment develops skills in it own right, but that it enables students to build and articulate skills that they have been encouraged to develop, such as analysis and evaluation., as well as key skills in presentation.

4.2 Case study 2: The International Trade Game[3]

The game

This game is a version of the International Trade Game developed by the Third World development charity Action Aid. It has been amended to be suitable for students beginning a course in economics, economic development or international trade, although it could be used with students studying related subjects.

Students are divided into teams, each of which acts as a separate 'country', with between four and ten students in each team. There are five or six countries in a game. Countries compete against each other to 'manufacture' paper shapes (circles, triangles, rectangles, etc.) and sell them to an international commodity market trader at posted prices, which vary with supply and demand. The objective for each country is to make as much money as possible.

There are three types of country in a game:

- two rich industrialised countries;
- one or two middle-income countries;
- two low-income countries.

Students are not told this; they find out as they play the game.

The game requires a large flat room, with loose tables and chairs. Each game can be played with between 20 and 60 students and, with sufficient space, two games can be played simultaneously. Only one lecturer is required as game leader even if more than one game is being played, but one additional person is required to act as a 'commodity trader' in each game. This person could be a student. It is also useful to have one or two 'observers' for each game. These too can be students. Experienced game leaders could handle up to four simultaneous games (i.e. up to 240 students) if the room is appropriate.

The game takes between 45 and 90 minutes to play. This is followed by scoring, reporting by students and adjudication by the lecturer, who will probably want to draw various economic lessons from the game. This all lasts a further 20–45 minutes. Students find the game enjoyable and rapidly enter into its spirit.

The game is very simple to set up. It needs no computing facilities and uses only very basic equipment, such as scissors, pencils, rulers and paper. All the necessary instructions can be given to the participants within 2 minutes. Preparing the materials for the game usually takes about 20–30 minutes and, except for paper, all the materials used for the game can be reused. The resources required are shown in Figures 2–5.

The resources for each type of country are placed in envelopes so that they can be allocated quickly to each team at the beginning of the game. The large templates (see Figure 4) should be displayed in a location that is easily visible but out of reach of students. A recommended room layout is shown in Figure 6. If you are playing two or more games (or 'worlds') simultaneously, you will need to separate them with a line of tables or some other barrier, as students must not cross from one game to another.

The game requires minimal, but clear instructions immediately that students have entered the room (Figure 7). The dynamic of the game requires that there is no preamble explaining the purpose of the game and certainly no summary from the lecturer explaining what the game is supposed to illustrate. It is important for the students to work out what they should do. Once the instructions in Figure 7 are understood, it is time for the lecturer to tell students how long they have to play the game (usually 45 minutes) and to announce the start of manufacturing.

At the beginning of the game there will be a lot of confusion and students will have many questions, such as 'Where can I get scissors?', 'Why have we only got paper?', 'Can we buy things off other countries?', 'Can we combine with other countries?', 'Can we have a loan?' Resist all temptation to answer these questions. Just repeat what you said at the beginning. After a minute or two they should begin moving around the room and trading, but the initiative should come from them, not you. The rich countries (A1 and A2) will probably begin making shapes, as they have all the materials and equipment that they need, but they will soon run out of raw materials and will probably try to buy some paper from other groups.

Use the observers to report back to you on what is going on. This will help to give you information for the debrief session at the end. For example, get them to find out what is

Rich countries: A1, A2

2 pairs of scissors

2 rulers

1 compass

1 set square (the exact size of the large triangular shape)

1 protractor (the exact size of the semi-circular shape)

2 pencils

1 sheet of A4 paper

6 × £100 notes (or e100 or $100). A money template can be found on the Economics LTSN website in the International Trade Game case in the Good Practice Showcase (www.economics.ltsn.ac.uk/showcase).

Middle-income countries: B1, B2

2 pencils

1 ruler

10 sheets of A4 paper

3 × £100 notes (or e100 or $100)

Low-income countries: C1, C2

2 pencils

4 sheets of A4 paper

2 x £100 notes (or e100 or $100)

Figure 2 Resources for each type of country

Template of shapes with their prices (see Figure 4)

Banknotes: 30 @ £50; 60 @ £100; 20 @ £500; 40 @ £1000

Pencil and rubber for marking changes to the prices of shapes

Large envelope for keeping completed shapes 'secure'

Figure 3 Resources for commodity trader

happening to the scissors – the one crucial implement that has to be used for all shapes and is possessed initially by only two countries. Do the rich countries form a scissors cartel? Do they sell one pair to another country; or do they hire them out?

Observers should watch how groups negotiate the prices of paper and other materials. They should note the formation and operation of any alliances and deals and any cheating that takes place. Observers should also report to you any malpractice, such as stealing other countries' paper, implements or shapes. It is up to you to decide whether you should ignore the problem, thereby encouraging countries to do their own policing, or whether you should impose a punishment, such as suspending them from making shapes for 5 minutes, confiscating certain materials or fining them.

The trader must be careful in measuring the shapes and reject any that have not been cut out. Alternatively, if they have been torn carefully against a ruler, or are only slightly too large or small, a reduced price could be given. You could leave this to the trader to decide, or you could agree a policy in advance. The trader must keep a close eye on the money to prevent students stealing it, preferably keeping it out of their reach. Shapes that have been sold should be put into an envelope or box, again out of reach of students.

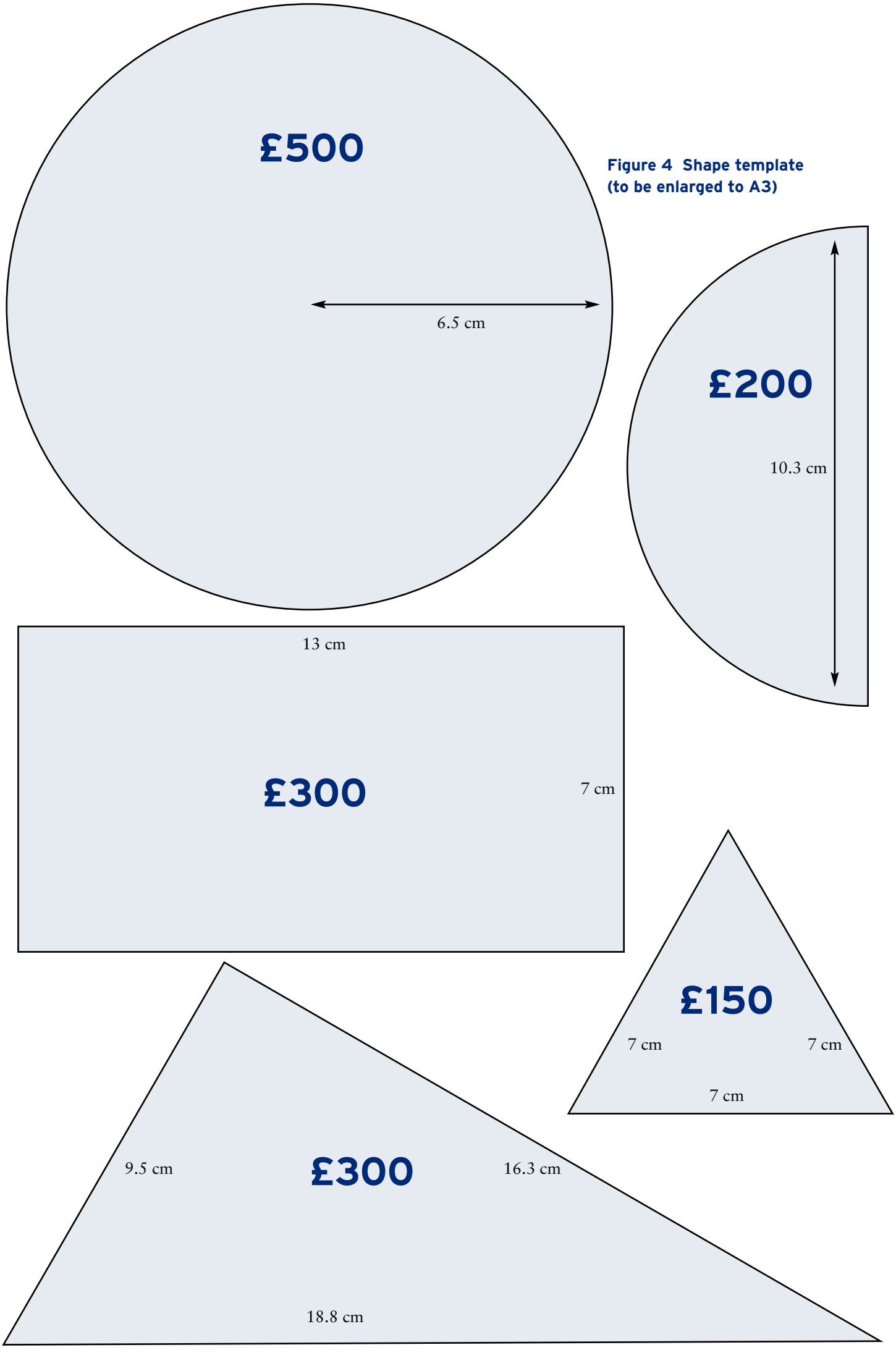


Figure 4 Shape template (to be enlarged to A3)

Two enlarged copies of the shape template (Figure 4) with opening prices. (These are to stick on the wall so that the players can see the required shapes and their sizes and values. These templates should have the measurements (in cm) of each of the shapes.)

Whistle

6 small coloured sticky shapes per game

10 sheets of A4 paper per game

Pencil sharpener

Rubber

Figure 5 Resources for the game leader

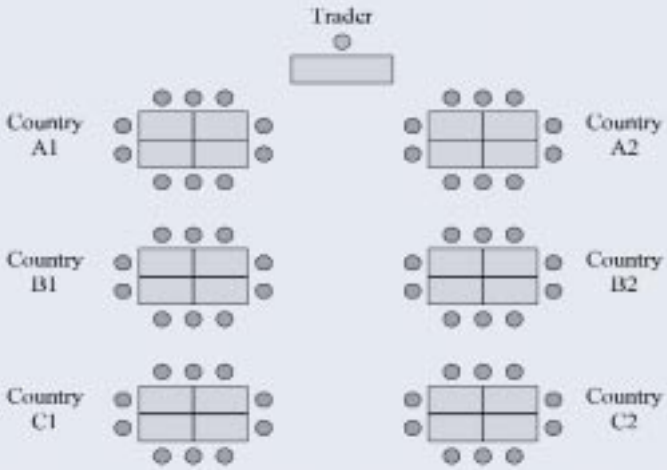


Figure 6 Room layout

Tell the students to leave all bags and any equipment (e.g. paper or pens) at the front and then to sit themselves around the clusters of tables (see Figure 6).

Distribute the envelopes to each of the countries.

Give the following instructions about the game:

Each of the groups is a team and represents a country. The objective for each country is to make as much money for itself as possible by using the materials in the envelope. No other materials can be used. Use the materials to manufacture paper shapes. You can choose to make any of the shapes shown on the diagrams on the wall.

All shapes must be cut with clean, sharp edges using scissors and must be of the exact size specified on the diagrams. The shapes can then be sold in batches to the trader, who will check them for accuracy and exchange them for cash. Inaccurate shapes will be rejected. You can manufacture as many shapes as you like – the more you make, the richer you will become. You must not cut up your envelope!

*You can move around the room (but must not cross into the neighbouring world(s), who are playing a parallel game).**

If you hear me whistle [demonstrate], you must immediately stop what you are doing and pay attention. If there is any dispute, I will settle it. My word is final! No physical force is to be used in the game.

*If applicable.

Figure 7 Instructions for starting the game

Traders should not normally give loans, unless you want to build this in as a feature of the game, in which case you should decide in advance what interest rate to charge – probably a high rate, such as 50 per cent. If loans are allowed, the trader should keep a record of them. In such cases, it might be a good idea to allocate an assistant to the trader. It is easiest for loans not to be repaid, but at the end of the game, when money is totalled, the trader will simply announce how much has to be deducted (outstanding loan plus interest) from each team.

You will need to keep in regular contact with the trader. Find out which shapes are being sold in large quantities (probably the triangles and rectangles) and which are hardly being sold at all (probably the circles and the protractor-sized semi-circles). Then blow the whistle and announce that, owing to the forces of demand and supply, the prices of certain shapes have changed. You can choose how much to change the prices, but a dramatic change stimulates more interest and provides a stronger focus for later discussion. For example, when the students are debriefed after they have finished the game, it is easier to refer to the importance of price elasticity of demand and price elasticity of supply when the price changes have been dramatic. For similar reasons, it is better to change prices very infrequently. The price of particular shapes will also affect the value of particular tools. If circles go up in price, this will affect the demand for compasses. This relationship can be identified later in the debriefing.

Extra dimensions can be introduced into the game by simulating the emergence of new technology, new raw materials or new equipment. It is important to make sure that the observers are primed to focus upon the reactions of groups to each change. The debrief will depend heavily on the quality of the information they are able to provide.

The development of new technology can be simulated by giving about 8 coloured small sticky shapes to one of the low-income countries, without indicating the possible use of those shapes. The game leader then goes to one (or both) of the rich or middle-income countries and informs them that the value of a standard shape is trebled if it has a coloured shape attached to it and that one of the low-income countries possesses coloured shapes. This scenario could also simulate the discovery of raw materials in a developing country, which are then developed by a multinational corporation investing in the country and bringing its expertise and technology with it.

You could also increase the stock of capital by selling a further pair scissors by auction. This will need to be done relatively early on in the game and you will need to announce your intention 5 or 10 minutes before you do so. Although the poor countries would dearly like to buy a pair, one of the rich countries is more likely to be successful at the auction. It might then hire out the scissors to a poor country.

As the game progresses, paper will rapidly run out. Trade in paper is likely to take place, with the price of paper rising to meet its value in terms of the shapes that can be made from it. The game can be prolonged by introducing more paper (simulating the discovery of new raw materials). You can do this in two ways. First, you may give some to one or both of the low-income countries. The second way is to sell more paper. A good way of doing this is to hold a paper auction, where you sell about 10 sheets, one at a time. Announce that in 5 minutes' time you will be holding an auction and ask for one representative from each country to attend. The two issues are:

- How will the price at the auction reflect the value of shapes that can be made from it?
- Will the bidders collude to drive down the price?

You can draw lessons from this in the debrief session at the end.

The students should be given a 5-minute warning of when the game will end. There will probably be a flurry of activity as students rush to make shapes with their remaining paper and bring those shapes to the commodity trader. When the game ends, the game leader should ask all the students to return to their countries and to answer three questions:

- What was in their envelopes when they opened them?
- What implements do they currently own?
- How much money do they have?

Collating results and debriefing students

A whiteboard or flip chart can be used to record the results. The answer to the first of the questions (what was in the envelopes?) is known and it is helpful if this information has already been recorded on the flip chart or whiteboard. The answers to the other two questions can be gathered quickly so that the groups can easily compare their experience with that of other groups.

It can be helpful to organise the debriefing into three stages:

Stage 1. Draw students' attention to similarities and differences between the results from different groups. Did the groups that started with the same resources perform in a similar way? How much of the difference between the groups was due to strategies pursued and how much to the initial endowment? It is also appropriate at this stage to pose questions that prompt students to describe how they felt about the game as it developed. For example, the tutor could ask students in the different types of country how they felt when they opened their envelopes. Some further suggestions for questions to ask in this first stage are presented in Figure 8.

Stage 2. The second stage consists of asking the students to indicate ways in which they believe the game simulates the real world and ways in which they believe it is unrealistic. The capacity for simulations to affect students' thinking depends a great deal on whether they believe that the world is reflected in the simulation. It is quite usual for some students to dismiss as unrealistic aspects of a simulation that the lecturer is hoping to use to illustrate a theoretical idea.

One of the strengths of this game is that the inherent inequality in resource endowment that gives the game its distinctive character is hard to contest as a reflection of the real world economy. Students are more likely to question the way in which the game simulates the opportunities that these endowments create for different countries and how those opportunities are exploited.

Stage 3. In the third stage of the debriefing, the tutor aims to help students to compare the way they have analysed their experience in the game with the insights derived from economic ideas and the evidence that economists have assembled. This part of the debrief should be focused on those ideas that have been selected in the desired learning outcomes for the activity. The debriefing naturally begins as a large discussion group led by the tutor. However, if this format

(To more successful countries) How did you achieve your success? What problems did you experience and what strategies did you use to overcome them?

(To less successful countries) What factors limited your success? What strategies did you pursue? Which strategies failed and why? Now that you have learned how to play the game, what would you do differently next time?

(To countries that formed alliances) Why did you form the alliance? How well did it work? What prevented it from breaking up?

Compare the strategies of successful A countries, which probably involved exploiting their clear advantage at the beginning of the game, with those of relatively successful B and C countries, which probably involved clever negotiation and perhaps combining with other countries.

Figure 8 Questions to pose in the first stage of the debriefing

The International Trade Game can be used to illustrate the following economic topics:

- *Specialisation and division of labour*. How did teams divide up the tasks? Was it more efficient to have some students cutting out the shapes, while others queued to sell the shapes, while others negotiated, and others scouted around to see what other teams were doing and whether there were opportunities that could be of benefit.
- *Opportunity cost*. What was the cost in terms of lost time, value from shapes, lack of access to equipment, etc. of particular decisions?
- *Supply and demand and the determination of price*. Why did prices vary as they did in the game? What determines the magnitude of commodity price changes in the real world?
- *Prices as signals and incentives*. How did teams respond to price changes; how elastic was their supply and why? Did anticipated price changes affect the production of shapes or when they were taken to the trader?
- *Derived demand and the price of inputs*. How did the prices of shapes affect the price of various pieces of equipment or their rental value? Do the same principles apply to pencils (in relatively plentiful supply) and scissors (in relatively short supply)?
- *Cartels and oligopolistic collusion*. What cartels did form? What cartels could have formed, and how would they have affected the balance of advantage in the game?
- *Game theory: strategy, bargaining, trust, etc*. What incentives were there for sticking to agreements and for breaking them? How would the number of people in a team or the number of teams involved in an agreement affect the likelihood of sticking to or breaking an agreement? How did risk attitudes determine strategy?
- *The law of comparative advantage*. Why do countries specialise in particular products? How does this depend on their resources? How does it relate to opportunity cost?
- *Terms of trade*. What determines the relative price of shapes and how does this relate to resources? Can countries influence the price of shapes?
- *World inequality*. You could refer to the distribution of resources in the world and ownership patterns. What determines whether inequality is likely to increase or decrease over time?
- *The importance of market power in international trade*. What is the role of multinationals? How do they control markets? Is there anything that developing countries can do to create countervailing power?
- *The importance of resources and technology in determining trade patterns*. Certain equipment is best designed to produce certain shapes. You could show how control over this equipment affects the pattern of trade and can influence prices.
- *Imperfect information and acting on expected prices*. How do price expectations influence production and the timing of sales? On what basis are price expectations formed? Do people learn from experience?
- *Risk and uncertainty*. There are several aspects of the game which involve uncertainty. These include the likelihood of obtaining equipment, future prices, the outcome of the paper auction, the role of the coloured sticky shapes, the effects of negotiations between other countries on their behaviour, and whether and what punishment will be imposed by the leader for 'malpractice'.
- *Bidding and auctions*. What determines the price at auctions? What determines whether there will be any collusion between bidders and what would be the outcome of that collusion?

The game may also be used to illustrate a number of more general development issues, such as the powerlessness of poor countries. It gives participants the opportunity to experience various emotions concerned with production and trade in an unequal world: emotions such as envy, greed, frustration and the desire to escape poverty by any means. In so doing, it can help students to gain a greater empathy with development and trading issues. To that extent it encourages students to move away from a typical textbook account of the embedded ideas and prompts them to consider alternative motives that might prompt economic behaviour.

Figure 9 Learning outcomes and the International Trade Game

is maintained for more than 10–15 minutes, some students will get restless and there will be pressure for the tutor to end the session.

Given that the debriefing represents the tutor's main opportunity to develop students' thinking, it is important to find ways of avoiding a short and rather low-level discussion. The debriefing session needs to be planned as carefully as the activity. Typically this will involve asking students to discuss a couple of questions and arguments (during stages 2 and 3) within their 'country' groups. In stage 3, when the focus is on economic ideas and evidence, it can be useful to have a small piece of evidence for each group to consider before returning to the whole-group discussion.

Learning outcomes

The International Trade Game has a wide range of potential learning outcomes, and with suitable focus, especially during the process of debriefing, a number of economic topics might be identified and developed more fully. These topics range from elementary trade theory to issues of imperfect information and even debates surrounding international inequality and first and third world relations. A comprehensive list of these economic topics can be found in Figure 9.

As well as the subject-related learning outcomes listed in Figure 9, the International Trade Game helps develop a number of key skills. Group working and interacting with others are amongst the most significant. The process of negotiating is also a very strong element within this game.

4.3 Case study 3: The Press Briefing

The case study below outlines a role-play designed for first-year undergraduates undertaking a business studies degree. Students' reflection on the role-play is assessed within a module entitled Global Business Context. This module replaced a more traditional course in introductory economics and seeks to inform students about competitive aspects of the global environment for business. The module places a strong emphasis on understanding the motivation of stakeholders and the implications of their actions for business. It is straightforward to identify stakeholders in international trade: governments, businesses, consumers, workers in different countries, NGOs, etc., and contrasting viewpoints on the benefits of international trade are often presented in stark terms. For these reasons it was decided that a role-play would help students to investigate issues in international trade in an interesting way.

The detailed instructions given to students are presented in Figure 10. Students are asked to work in groups. Each group chooses one issue in international trade as their focus and the group as a whole is required to research that issue from the standpoint of a specified stakeholder. They are required to provide a press release and a press information pack and to make a presentation as if they were that stakeholder.

The role-play takes the form of a press conference, where the conference presentation must be given in role, and the relevant supporting materials must also reflect the presenting group's perspective. The press release provides an abstract of the group's position. It is to be given out at the time of the press conference and students are told that the media will base their choice of headline on the content of the press release. The press pack contains the detail, and offers an in-depth analysis of the group's standpoint. Students are encouraged to use a variety of resources within the pack, including material written by the group, supporting articles from other sources, statistics, and suggestions of sources of further information (such as websites). Students are informed that the strength of the press pack is in how it adds to the relevance of the group's argument. The presentation, no longer than 15 minutes in length, needs to articulate the press briefing. As with the briefing and the press pack, the presentation must be in role.

Introduction

I am sure most of you have at some point in your life seen a press conference on TV. Well, for this assignment you have the opportunity to give one. You will, in groups, be expected to consider an issue in international trade with each of you delivering a presentation to the rest of the group. The twist is that you will be expected to present to the rest of the group from the perspective of a given stakeholder, whose views may be fundamentally different from your own.

A detailed assignment brief is set out below, *please read it very carefully.*

What is being assessed?

This assignment consists of three assessed components.

- a press release (10%);
- a press pack (40%);
- a presentation (50%).

The press release. The press release should take the form of a single side of A4, which is to be given out at the press briefing. The release should identify the main issues you support and the policies you propose, as well as giving the media a headline!

The press pack. The press pack should offer the reader an in-depth analysis of your views and standpoint. It should include a wide variety of resources, which you feel help to make your case. Such a press pack will include material written by the group, articles from other sources, statistics and research sources. The press pack should be well structured and organised. It should include no more than 2000 of your own words (articles, statistics and research sources are in addition to this). The key to a good press pack is relevance and how it adds to your argument.

The presentation. The presentation must be no longer than 15 minutes in length. In this time you will be expected to outline your position on your given issue and make a case for your policy suggestions. The presentation must be in PowerPoint (a laptop and data projector will be provided). The presentation you make must be in role. It is not expected that you will present a balanced argument, but an argument from a particular viewpoint, expressing particular concerns and offering particular policy suggestions based upon these concerns.

Additional: group diary. Together with the submission of the press pack, each group must present a group diary. This should include a list of all group members, and a list of their responsibilities in the group work. The diary should also include a schedule of all group meetings, who was in attendance, who was absent and why. The diary must be signed by all group members as recognition that its contents are accurate, and submitted along with the press pack.

Groups

Groups will be selected at random prior to your first meeting and will be no larger than five students. At your first meeting you will be given a Blackboard chat room password, unique to your group. This will enable you to keep in easy contact with one another throughout the assignment. You are advised at this first meeting to schedule meeting times, devise a work schedule and provisionally allocate work tasks. You might wish at this stage to appoint a team leader to oversee the group's efforts, and to ensure that the team is moving in the same direction and that deadlines are kept. Alternatively, you might have a more devolved group structure in which all group members supervise every one else. The choice is very much up to each group concerned. If you do adopt a group leader approach, this may well require some additional rewards come mark time (see below).

You most also decide, as a group, what is likely to be the most effective strategy in completing this assignment. This will invariably involve some division of labour following the initial phase of information gathering. Remember, your group will be more effective if you work together as a team. The assignment is run to a very tight and short deadline. This is intentional. You are being put under pressure to turn the work around fast – a phenomenon that you will invariably experience throughout your working lives. You have in effect only 2 weeks from your allocation into groups to your presentation. It is crucial that you are well organised and have a clear focus as to who is going to do what and by what deadline.

Please note: it is the responsibility of students who fail to turn up in the week that groups are allocated to contact either me or their workshop tutor to discover who their group is, and then to contact their group. Failure to do so will result in a zero mark, unless extenuating circumstances can be proven. One final point regarding group work: in your group you must *respect* all group members, and treat others as you expect to be treated yourself. Threatening behaviour of any sort will not be tolerated.

Figure 10 Instructions to students on the Press Briefing role-play

Topics

There are six topic areas identified that are currently big issues in international trade. Each topic area *must* be considered from the perspective identified.

- Free trade and the environment: from the perspective of an environmental pressure group, such as Greenpeace.
- Child labour: from the perspective of a pressure group advocating its abolition, such as Save the Children.
- Genetically modified food: from the perspective of the EU.
- Trade-related intellectual property (Trip's): from the perspective of a lobby group representing the interests of western business, such as the pharmaceutical industry.
- Bananas: from the perspective of an African, Pacific and Caribbean (ACP) banana producer country, such as the Windward Islands.
- Trade and less developed economies: from the perspective of the World Trade Organization (WTO).

On Blackboard there will be a discussion room set up for each topic. You are strongly advised to visit and contribute to the ongoing debates. This would be an excellent forum for exploring issues surrounding the role-play element of this assignment. What values and views would inform a perspective from Greenpeace, or the EU? How does this fit with your understanding?

Marking scheme

The following marking scheme should be considered when completing this work.

The press release	
Clarity and organisation	50%
Headline potential	50%
The press pack	
Content	40%
Organisation	20%
Presentation	20%
Resources used and sources discovered	20%
The presentation	
Use of PowerPoint (visual)	30%
Clarity of presentation including content/organisation and communication	40%
Role-play	30%

Marking and mark allocation

At the end of this assignment, each group of students will receive a pool of marks. The pool of marks will be derived by totalling the marks from the three assessment elements of the assignment: press release, press pack and presentation. This total mark will then be multiplied by the number of group members. It will then be the group's decision to allocate such marks amongst group members as they see fit. The allocation of marks should reflect effort and the volume of work done. The allocation of marks must be confirmed to your group tutor within *1 week* of the assignment pool mark being returned.

Failure to agree on a mark allocation will involve a process of arbitration by other students in the class. In the event of failing to reach an agreement after such arbitration, then marks will be allocated in the final instance by me. Hopefully this will not be necessary.

One point of clarification on deriving the group's pool mark: if the group has five members, but one does not attend, then the group will be classified as having only four members. You will only be able to claim marks for the number of members that actually took part in the group work.

Figure 10 Instructions to students on the Press Briefing role-play *(continued)*

Student feedback will take two forms:

- in the tutor's written comments regarding the press release, presentation and press pack;
- a meeting of each group with their course tutor to discuss the issues that the assignment raised both in content and in conduct. This will help inform future years of this assignment.

Learning outcomes

The learning outcomes from this assignment are as much skills based as subject based. Students will be expected to analyse and evaluate a current issue in international trade, and identify alternative viewpoints regarding the nature of the issue and its potential resolution. They will be expected to identify the difficulties in resolving trade issues and how the political nature of international trade shapes economic arguments. Given that the cohort sitting this assignment are business studies students, a further element that this work will develop is the relationship and interaction between business and other stakeholder groups.

This assignment also offers the opportunity to develop a wide range of skills: group work and interaction, information retrieval and analysis, and presentational skills. The presentation skills include the use of PowerPoint, which is mandatory for the group presentation.

The assignment also attempts to promote independent learning and encourages students to take personal responsibility for and control of their own learning. With the support of a Blackboard virtual learning environment, each group has its own chat room, and there are discussion boards for all the topic areas.

Future review

The reasons for selecting role-play as a teaching strategy is that it gives the student an understanding and appreciation of alternatives. It will hopefully encourage students to reflect on their own views and, as a result, to understand more fully the position of others. Many of the arguments surrounding the issues that the students are asked to investigate have a moral or ethical dimension. This is far more likely to be understood if the student is forced to evaluate such an issue from a distinct point of view, as students will be forced to look beyond their immediate assumptions and expectations.

In order to maintain a measure of control over student learning, the confined nature of presentation and the specification that the press pack is focused on a distinct point of view should prevent students from deviating too far from the main focus of the assignment brief. It should be anticipated that more problems are likely to arise from group working and mark allocation than from the subject matter and its approach.

A full review of the assignment will be conducted at the end of 2003.

5 Devising your own SGRP: some points for consideration

This section provides guidance for the design of simulations, games and role-plays in economics. Six key issues are introduced and discussed. The first four points are relevant to simulations, games and role-plays, whilst the last two points focus particularly on role-plays.

5.1 Devising clear guidelines

Clear guidelines are crucial to successful SGRP. If students are to learn independently, they must feel secure and certain in what they are being asked to do. The guidelines should certainly describe the main stages in the assignment and the criteria that will be used in assessment. The assignment briefs for the Virtual Economy and International Trade case studies illustrate the type of guidance that is required. Briefing guidelines are even more important for role-play than for games and simulations. This is because the tutor relinquishes more control in role-plays and it is important that students are able to work within a structure that generates a worthwhile experience for learning. Guidance notes for a role-play might take the form of outlining a character profile or identifying key aspects of knowledge that the role-player needs to consider in role. The detail included in the guidance notes may be varied according to students' prior attainment and skills, and their familiarity with this way of working.

5.2 The importance of debriefing

The process of debriefing students is crucial for ensuring its success. It allows the tutor and the student to reflect upon what has taken place, analysing the consequences of actions and the quality of arguments. It is also an opportunity for the tutor to correct errors, probe simplifications and expose assumptions. Consequently, debriefing is an essential part of the process of consolidating new knowledge and deepening understanding. Without it, students might walk away uncertain of the lessons they have learned. Debriefing frequently takes far longer than expected and needs to be carefully planned (as in case study 2). As a general rule, it is advisable to plan to spend 30 minutes debriefing for an hour's activity.

Debriefing begins with helping the students to articulate their perceptions of their experience during the SGRP. This provides a basis for helping them to analyse those perceptions, looking for similarities and differences, causation and argument. Only in the final stages of the debriefing are students ready to examine how their interpretation of their experience can be related to standard reasoning in economic theory. This approach to developing students' thinking reverses the traditional order of 'present theory and then follow up with applications of the theory to practice'. A rationale for teaching economics in this way is presented in McCormick et al. (1994). It can also be helpful to think of this approach to debriefing in the terms used by theorists of 'experiential learning' (e.g. Kolb and Allen, 1984). Students are also more likely to develop a considered and reflective evaluation if they write up their experience, either as a formative exercise or as part of a summative assessment process.

5.3 Realism

If students regard a simulation as 'unrealistic', they are unlikely to regard its predictions as relevant to their understanding of the real world. In developing this argument, Bartlett and Amsler (1979) suggest that to be considered realistic a simulation must first be realistic in appearance. As Lowry (1999) argues, a successful SGRP depends upon 'Creating a realistic setting [which] changes the mood of the class and allows students to feel more comfortable adopting a role' (p. 125). Bartlett and Amsler (1979) also argue that a simulation must be realistic in its internal process – that is, it must imitate how the real world works in practice and produce realistic outcomes.

This poses an inherent problem in using simulations in teaching and learning. If the objective of teaching is to help students to recognise that the current way they interpret the world is inadequate, then teaching must present students with ways of thinking about the world that are different from the way they currently think. If this objective is pursued through a simulation, the simulation must present a model that is inconsistent with students' current thinking and there is a danger that students will dismiss the new model as unrealistic (Davies, 1994).

5.4 Assessment

The case studies in this chapter illustrate ways in which SGRP can be used in assessment. A key principle followed in these case studies is that the assessment focuses on students' reflection on their experience rather than on their performance in the simulation, game or role-play. For example, in the Virtual Economy simulation, students are asked to reflect upon the problems facing the Chancellor of the Exchequer. In answering this question, students are drawing upon their experience with the simulation, but they are not limited by their success in achieving particular outcomes in the simulation. Students' learning through a role-play might be assessed by asking them to identify what they believe they have learned from their experience in the role-play.

When roles are more controlled, a wider range of assessment strategies become possible. This is exemplified in case study 3, where the role-play does not involve participating in a debate, but using the role to provide a structure for analysing a problem. When this approach is adopted, it is also useful to ask students to provide a critique of the way they have acted out the role. Students' ability to step out of role in their analysis is important to the development of their understanding of the subject.

5.5 Role-taking and role-playing

In role-plays, students attempt to increase their understanding of circumstances and roles that are beyond their immediate experience. However, the capacity of a student to enter into these new circumstances in a way that generates a useful stimulus for learning depends on the *relevance* of their prior knowledge and experience. Role-plays are much more likely to be successful if they place students in settings with which they have some familiarity through their reading or general knowledge. The more diverse the role you are asking someone to play, the more detail concerning the role you will be forced to give. For example, student knowledge of a trade union representative in a collective bargaining role-play is likely to be limited and require far more guidance than if you were to simply ask the student to play the role of a worker. Students also need clear guidance through sharply defined scenarios and roles.

5.6 Using scripted role-play

Each role-play defines a setting and characters (or roles) through which a story will be developed. What happens when the students take on their roles is uncertain. One solution might be to script the role-play in a more formal and ordered way. It is possible, for example, to specify who speaks when, and identify the ideas, arguments and information that will be conveyed in each speech, without providing the exact words of each speech. The task for each student is to articulate the ideas, information and argument in a way that they feel is consistent with the role. Within such a framework the tutor maintains strong control over the focus of the role-play, while at the same time allowing the student to explore the role through their control over the exact language of the speech. According to Alden (2000), 'The benefit of this form of role play is that it gives scope for students to reflect on their learning, while giving the instructor security from the fear that the activity would "get out of hand" and wander from the desired focus of the role play' (p. 128).

6 New technology and SGRP

'Technology alone will not provide an adequate framework for innovation. It might be described as a missile looking for a target.'
Freeman and Capper, 1998, p. 2

With the development of conferencing systems and Virtual Learning Environments such as Blackboard and Web CT, the opportunity to use such technology to aid teaching and learning is growing. The conferencing systems, e-mail and the internet are generating new possibilities for the design and use of SGRP (Freeman and Capper, 1998; Ip *et al.*, 2001). As yet, online technology has generated less innovation in simulations and games than in role-play. Whilst there are a number of simulations (e.g. the Virtual Economy) and games currently available via the internet, this mode of access does not affect the dynamic of their use (unless access to the internet is lost part way through a teaching session). In role-play, however, the internet does change the nature of students' interaction.

The Web houses the virtual space for the role-play, enables communication and collaboration among students, and between the students and the lecturers. The Web also enables access to 'just-in-time' resources by making available to students resources (such as up-to-date news from electronic newspapers and web-sites etc.), from all over the world as and when they need them. Without this capability the content of the role-play would be significantly weaker.
Ip et al., 2001

Freeman and Capper (1998) suggest that, as well as enriching SGRP, technology is likely to improve the learning outcomes from such an approach. For example, they suggest that the value of face-to-face role-play is limited by fear of appearing foolish in front of peers. In addition, real-time role-play might require the individual or group in role to respond to a situation or question immediately. Under such pressures, answers may be ill conceived or incorrect. With online technology it is possible to minimise the impact of such conditions. Online discussions via e-mail groups and 'chat rooms' can provide anonymity (as users do not need to use their real name) and time for greater reflection. Freeman and Capper conclude that in their experience online role-play helped students to develop more and better ideas than face-to-face role-play.

Online role-play seems likely to improve information and communications technology skills at the expense of social skills relevant to face-to face interaction. There will also be more emphasis on written communication and less on oral communication. If students participate anonymously, the scope for developing a learning community is also diminished. E-mail and Web-based communication might also fail to create a learning community. Consequently, it might be best to use online role-play in conjunction with a face-to-face approach to role-play.

7 Conclusions

This chapter has argued that SGRP have an important role to play in teaching and learning economics and has suggested a number of ways in which lecturers can develop the effectiveness of their use of these resources in teaching. Effective use requires recognition of potential problems and working to overcome these through careful design, preparation and organisation. In economics we are blessed with a discipline that is rich in material suitable for an SGRP teaching strategy. With some investment of time it is possible to extend our repertoire of teaching skills and to engage students more fully in the process of learning.

8 Where next?

The richest source of material concerning the use of SGRP in economics can be found in the *Journal of Economic Educatio*n. Regular articles appear where authors review their experience of using SGRP in their teaching programmes. An extensive bibliography of articles relating to SGRP can be found at http://www.people.virginia.edu/~cah2k/teaching.html. This is Charles Holt's Economics Games page. Charles Holt is a leading US exponent of the use of SGRP in teaching economics.

An extensive and regularly updated review of websites that offer games and simulations can be found at the LTSN Economics website. In many cases, the games and simulations are offered free of change.

Notes

[1] Case study 1 was devised by Mark Sutcliffe and John Sloman.

[2] This can be viewed at: http://www.bized.ac.uk/virtual/economy/ve/info/teachersg2.htm.

[3] Case study 2 was devised by John Sloman.

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