Chapter 2  Designing courses: the practice

Graham Gibbs

Overview

This chapter focuses on the design of individual courses (or modules, or course units) rather than the design of whole programmes made up of a number of courses. It shows what course design consists of, both by looking at complete courses and their overall design and by looking at the individual components which make up course design.

- Section 2.1 introduces each of the components of course design separately and identifies issues to be taken into account when considering each aspect of design. Your course does not operate in isolation or in an ideal environment, but in a context that has many constraining features and characteristics that you need to take into account.

- Section 2.2 is intended to help you identify the main characteristics of the context which have implications for course design.

- Section 2.3 is concerned with the process of designing a course, or, more commonly, redesigning an existing course. It considers whether you should start with content, aims, assessment or learning activities.

- Section 2.4 is concerned with documenting your course -- for course approval purposes and to explain to students how your course works and what you expect of them.

- Section 2.5 contains five case studies of courses and their redesigns set in two different contexts. The case studies show how the same topic area and similar aims can be addressed by very different course designs that take very different amounts of teaching time to deliver. These case studies attempt to show course design as an integrated process bringing many components together, hopefully in a coherent way so that everything pulls in the same direction.

One difficulty in writing this practice-based chapter has been that course designs differ so enormously between discipline areas. Some of these differences are rooted in the fundamental nature of disciplines and differences in the aims of courses. Courses in history and accountancy often ought to be designed differently because they are trying to achieve such different things. Some of the differences in course design between disciplines, however, are based on traditional beliefs and practices that can be challenged. Two of the extracts in Chapter 2 illustrate how course designs from one discipline area can be successfully transferred to another. They provide evidence of the superiority of some course designs over others, regardless of the discipline. By contrast, there is rarely any empirical evidence to justify traditional course designs. This practical chapter encourages you to think rationally and rigorously about course design and not be cramped by the traditions of your discipline.

It is also the case that institutions and departments differ widely in the design of their courses, across all disciplines. For example, the design of courses at Oxford Brookes University bears almost no resemblance to the design of courses in the same subject areas at the other Oxford University just down the hill. Some of these differences have coherent rationales behind them and a few even have evidence of effectiveness to back up their rationales, but much in both institutions is nothing more than tradition or habit, and there is nothing unique about Oxford in this. Some
institutions adopt the same basic course design for all courses, and I am not referring to the dominant lecture-based course designs in the UK. For example, Roskilde University in Denmark uses a group project-based approach and Maastricht University in Holland uses a problem-based approach. Most other universities hardly use these approaches at all. There is clearly scope for more variety within institutions than teachers normally exploit.

Courses designed for part-time students, or for those learning at-a-distance or in the workplace, need to have special features. 'Designing for mature students' and 'Designing for part-time students', in Section 2.2 do address some of these issues, but most of the examples used here are from full-time courses. The design of resource-based and open- / distance-learning courses are addressed in Chapter 6 of this pack.

Innovation and the politics of change

Innovation and change are not always embraced with open arms in academic life. Changes to traditional teaching methods, and to conventional assumptions about assessment or student learning, may be challenging to other teachers, especially senior teachers who have not been trained as teachers and who have not, themselves, innovated in their teaching. They may poke scorn, block you, or be unhelpfully critical once your course is in operation, hoping that you will fail so they can say 'I told you so'. In view of this, it may be wise to:

- make sure you have any necessary formal approval before you start;
- go gently at first, not trying to change the world overnight;
- start with small-scale change which is less risky, until you have confidence in what you are doing;
- avoid changing ten things at once: even if it works, you will not be able to tell what made it work;
- find allies who support what you are trying to do and who, preferably, are trying to do the same things either on your course or on other courses;
- explain the rationale for your course design and methods; whether this includes theory or evidence from the literature, or is simply a clear argument, write it down;
- treat your innovations as experiments rather than as solutions, until you have strong evidence that they are working;
- collect evidence of effectiveness to back up your arguments;
- get students on your side, by explaining what you are doing differently, and why; seek their active engagement in trying to make it work and in trying to understand, alongside you, why it works (or does not); try to do it with them rather than to them.

Using this chapter in practice

This chapter is divided into five sections. Rather than simply reading through the sections from beginning to end, it may be helpful to skip back and forwards between the case studies in Section 2.5 and the other sections.
Activities are offered to help you to apply new approaches to the design of your own course. They may be more enjoyable and enlightening if you discuss them with a colleague or mentor. Several of these activities are substantial and together they will take you through much of the course-design process. The list below shows where in the chapter you can find the activities, and the nature of each activity. You are particularly encouraged to tackle Activities 2.1, 2.4 and 2.6.

**Activity**

2.1 Identifying the characteristics of the students for whom you are designing your course

2.2 Working out what you want your students to do with their study time

2.3 Selecting teaching methods and reviewing their pros and cons

2.4 A checklist of questions to see if your course design is coherent or incoherent

2.5 Identifying the courses students will be taking before, alongside and after your course, and the implications of this for your course design

2.6 Summarising the implications of the context of your course for its design

2.7 Planning the availability of the resources you need to run your course

2.8 Costing your own course

2.9 Reviewing the design of three different versions of the same course

2.10 Considering the potential of course design ideas in a case study for your own course

2.1 Course-design components and issues

This section addresses each of the main components of course design in turn, starting with who your students are. It then goes on to show how to link these components together to make course design coherent.

**Aims and outcomes**

Why is your course included in the overall programme at all? What are you trying to achieve with your course? Most other course-design decisions follow on from your answers to these two questions. For example, if you want students to be able to analyse texts, then:

- you are probably going to have to use teaching methods which involve showing students how to analyse texts;
- their learning activities are going to have to involve practice in analysing texts;
- your assessment is going to have to measure how well they can analyse texts.

If this seems blindingly obvious, it should be pointed out that, in the past, course design has not necessarily connected outcomes to methods, even at this basic level. Case Studies 1 and 4 (see Section 2.5) illustrate the lack of
clarity of outcomes and an absence of linkage between outcomes and methods.

Some would object and say that what they are trying to achieve is not so simple that it leads so directly to decisions about teaching and learning methods and to assessment methods. My response to this is to suggest that this could appear to be true where the outcomes have not been analysed or expressed clearly, or where overarching aims have been lost sight of among the supporting details. Courses often end up assessing the details. For example, I once encountered a psychology degree programme whose most important outcome was claimed to be that psychology graduates could design studies involving human performance. However, not a single exam for any module included even one question that tested students’ ability to design such a study. Presumably, the teachers were so preoccupied with testing students’ acquisition of the detailed content of specific modules that they had lost sight of the main aim.

When considering aims and outcomes, it is important to distinguish between what you want the course to do (for example ‘cover topics’, ‘introduce students to ideas or techniques’ or ‘inspire interest in the discipline’) and what you want the students to be able to do by the end of the course (for example ‘design and analyse questionnaires’, ‘advise a client appropriately with reference to the law of X’ or ‘undertake an independent field study’). What you want to do is concerned with inputs, while what you want students to be able to do is concerned with outcomes. Inputs are often closely associated with teaching methods, while outcomes are associated with learning methods and assessment. It is usually better to start thinking about outcomes before deciding what the appropriate inputs should be (see Section 2.3). At first, the choice of potential outcomes might seem bewilderingly wide. However, you will soon encounter many external influences on what your course is trying to achieve which guide (or constrain) your choice, for example:

- traditions within your department about what is normally taught in your ‘slot’ in the curriculum;
- outcomes required by subsequent courses; for example, if you are teaching a first-year module, a second-year module in a related area may be relying on you developing in students particular knowledge or competence on which they need to build;
- competences required by professional bodies such as the Royal College of Nursing or the Teacher Training Agency;
- time spent on specific topics or in specific activities such as laboratory work, as required by professional bodies such as the Law Society, the British Psychological Society or the Engineering Council;
- overarching goals of the degree programme of which your course is a part, such as the development of transferable skills or familiarity with information technology;
- what it is realistic to achieve in the time available, with the resources at your disposal, and with your particular students;
- the mission of your institution, for example to develop students as potential researchers.

It is common for new teachers to have unrealistically high aspirations for what can be ‘covered’ and what students can achieve. Check out your draft
aims with an experienced colleague who will have a good feel for what is practicable.

Section 2.4, below, is concerned with the formal documentation you will have to write to describe your course. The conventions of this documentation will determine, to some extent, how you formulate your aims.

Who are your students?

One of the most important things to consider when planning a course is who are your students. Some of the things to bear in mind are:

- Age: mature students may study differently, and have different preferences for teaching methods (see Section 2.10 below).
- Background: students without conventional educational backgrounds might find your teaching and learning processes unfamiliar, while those with conventional backgrounds might be used to being 'spoon fed'.
- Background knowledge: what courses have they already taken and what standard have they achieved? What are they likely to know from their life experience?
- Aspirations: why are they studying your course and what courses (or career) will they go on to next?
- Interests: what are they likely to find easy, relevant to their concerns and engaging, and what are they likely to find difficult, irrelevant or boring?
- Expectations: how will they expect the course to be taught and assessed?
- Commitments: what else is going on in their lives that might compete with the demands you will make, such as work, family or other course commitments?
- Competence: what study skills or competences are they bringing with them? What skills are they likely to need to develop to cope with your course?
- Motivation: how hard are they likely to work – in hours per week out of class – and what will they neglect?
- Gender: will it matter what the mix of gender is and what your gender is?
- Cultural background: what expectations will they have about the social processes of your course and what assumptions will they be making about your status and the status of the knowledge you convey?
- Special needs: do you have students who are partially sighted, with a hearing loss, a physical disability, or with dyslexia?
- Diversity: how varied is the student group, in terms of their background knowledge, experience and ability?
Activity 2.1 Identifying the characteristics of the students for whom you are designing your course

Draft a thumbnail sketch of two contrasting students on a course you teach, in an attempt to paint a picture of the range of your students. (If you don't already know your students, imagine two at either end of a continuum.) Use the headings in the table below and add any other information you think important.

<table>
<thead>
<tr>
<th>Description of student</th>
<th>Implications for your course design</th>
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<tbody>
<tr>
<td>Student 1: Age, background, etc.</td>
<td></td>
</tr>
<tr>
<td>Student 2: Age, background, etc.</td>
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</tbody>
</table>

If you think you will have students with very varied background knowledge you might need to:

- make your expectations about prerequisite knowledge explicit, by giving a short diagnostic test so that students who will need to work harder know this from the start;
- provide some 'catch-up' handouts or refer to background literature which some students should study as early as possible;
- construct student groups carefully to mix experienced and inexperienced students;
- make use of opportunities for peer learning so that experienced students can help others;
- provide plenty of opportunities for asking (and answering) questions, in case you have pitched the level or pace of your teaching wrongly for some students.

Assessment

As Pack 3 in this series of materials makes clear, there is much more to assessment than just allocating marks to pieces of work. It drives everything else and determines the dynamics of courses. Assessment can be seen as having six main functions.

1 Capturing student time and attention so that students put sufficient time into the right things. For example you will find that if you do not assess an assignment, many students will simply not do it.
2 Generating learning activities that are appropriate and productive in terms of bringing about learning. For example if you take essays out of a course because you cannot afford the time to mark them, you will find that the kind of ‘reading around’ that students do when writing essays simply stops. They may still read, but not in the same focused and productive way.

3 Providing timely feedback so that students have some sense of their progress, strengths and the areas they need to pay attention to. This is so important that some course designs are built around frequent assessment as the main vehicle through which students learn.

4 Developing in students an understanding of the standards and criteria of your discipline so that they can supervise themselves and improve their own work until it is good enough – just as you do with your journal articles. Without this, students can never become independent learners.

5 Allocating marks to student work for the purpose of deciding whether they have passed, what grade, or degree classification they have got and, in some cases, ranking students to identify any that have excelled.

6 Quality assurance: providing external examiners and others with examples of student work to show that your standards are comparable with those of other institutions.

Attention is often focused on functions 5 and 6. The systematic approach to course design outlined in Chapter 1 emphasises the importance of having reliable and valid tests so that you can see if your aims have been achieved. But it is functions 1 to 4 that support the learning that produces the achievement. Concentrating on rigour and reliability in marking may help to measure your standards, but students are unlikely to achieve good standards unless learning has taken place. The main course design task concerning assessment, from a learning point of view, is to ensure that functions 1 to 4 are supported frequently and comprehensively. Functions 5 and 6 may need to be performed only once per course.

Learning activity

The question of what students do in order to learn is missing from most course designs. Yet it is learning activity that produces learning, not teaching activity. If you want students to be able to translate text into German, then the best learning activity is almost certainly translating text into German. If you want students to learn to design experiments, then they need practice in designing experiments.

One of the most important learning principles is ‘time on task’ (Chickering and Gamson, 1987); if you want students to learn something, then you have to plan for them to spend time on it. Planning learning time may at first seem like nannying, but unless you think about this carefully you probably won’t get the study effort you were hoping for. Students study several other courses as well as your own and, increasingly, can be expected to work in McDonald’s and play hard as well. They may study out of class less than you believe.

One way to plan learning time is to account for all of it in hours. Your course will almost certainly be ‘rated’ in terms of CATS credits – a kind of currency of credit transfer between courses and institutions. Full-time students normally study 120 credits a year, and this is often made up of eight 15-credit courses, each of 150 hours duration. This 150 hours includes student learning hours (such as independent study, assignments, work-
based learning, field trips, group work, revision – everything), not just
teacher hours or class contact hours.

**Activity 2.2** Working out what you want your students to do with their study time

Write down the various things that you expect students to do with the hours allocated to your course, so that they add up to the total available. (Course design Case Studies 1, 2 and 3 in Section 2.5 provide a model of how to do this.)

Taking each of these learning activities in turn, are you confident that:

1. students understand the purpose of this activity and know what and how much is expected;
2. students have adequate access to the resources (such as books or computers) necessary to support this learning activity;
3. if students put in this amount of time they will learn all they need to learn;
4. students will actually put in this time.

Do any of these learning activities have fewer than four ticks against them? (It would be surprising if some did not!) What could you do to ensure that more productive learning activity takes place?

There may be many reasons why students fail to do the work that lecturers expect, and in most cases the solution is self-evident:

- if the activity is not assessed directly or even linked to assessment, students are quite likely not to bother;
- if students cannot find the references, or cannot get access to resources such as the studio, language lab or computer when they need them, they may give up;
- if they are unclear about what exactly they are being asked to do, for example if they missed the lecture at which the activity was explained, or if the handout associated with it is brief and ambiguous, they may not even get started;
- if students cannot see the point of the activity or if they find it unproductive (for example because it is poorly conceived) they may give up;
- if no one will be able to tell whether they have done the work or not (for example, if they are never asked about it in class and do not discuss it with other students), they can get away with not doing it.

There may be other entirely practical reasons:

- there is too much else to do, such as when other activities or other courses make heavy demands (for example by assessing everything);
- there are practical constraints, such as library opening times, timetable clashes, coursework deadlines on other courses, inability to meet up with other students for group work, etc.
In maths and technology courses students are often given 'problem sheets' containing a list of problems they are expected to tackle, and which will be discussed in a subsequent class. It is obviously in students' interests to work on these problems because similar ones may appear in the exam. However, this degree of specification of out-of-class learning activity is not all that common. On many courses students are expected to 'read around' or 'refer to the textbook' or 'practise', without any clear specification of exactly what learning activities might be involved or what the purpose is. Inexperienced students may have a great deal of difficulty with such nebulous advice. For example a course on Western civilisation described by Walvoord and Breihan (1997) simply listed the topics the lecturer covered, such as Renaissance/Reformation; Seventeenth-century Crisis; Absolutism; Age of Reason; French Revolution; Burke and Paine. Even with accompanying references this gave students very little clue what they should be doing out of class, and so they actually did rather little. The solution was to list 'exercises' to be undertaken by students, each linked to twice-weekly classes. Each exercise was designed to develop a specific skill and was accompanied by a detailed handout that explicitly stated what was expected. For example in one week students were asked the question: 'Was Burke or Paine more correct about the French Revolution?' They were given a structured way to tackle the topic and the accompanying reading material, and it was explained that this was in order to develop the skills of 'using sources of evidence; stating and defending theses; defending against counter-arguments' (Walvoord and Breihan, 1997). The next class was designed to make use of what students had done with the exercises, making it more likely that students would take these activities seriously. Extract 1.3 in Chapter 1 describes an English course that adopts a similar if less structured approach, with weekly learning tasks modelled using short activities during a lecture and then discussed in small groups the following week.

How much detail to go into when specifying the nature and duration of learning activities is a matter of judgement – experienced students will need far less of this kind of guidance – and also a matter for evaluation. You can find out how much students are actually doing, and why, and ask them if they would like clearer guidance.

Designing productive learning activities and ensuring that students actually undertake them may be more important than the design of your teaching and, accordingly, is worth your time and attention. If you have five hours a week to prepare your teaching, don't allocate it all to writing your lecture or preparing for other classes!

**Access to content and learning resources**

On my first day as a fresher at a redbrick university in 1968 I was told, along with all the other new students, that I was at university 'to read for a degree'. The notion that the primary source of knowledge from now on was going to be the library rather than my teachers struck me very forcibly. While students often get at least some of their information from lectures or from teachers in other contexts, they will need to get access to most of it from other learning resources. I was usually given reading lists and either bought my own books or found them in the library. Today, few students buy many books because books are so expensive and students are so broke. But on courses with more than about 50 students, they may find that the books and journals on the reading list are out of the library when they need to use them. If your students regurgitate your lecture notes in their exams, this may be because they are unable to locate any other
sources. Students' access to the necessary learning resources is a major issue and requires careful attention if your course is to work effectively.

In recent years, there have been three main developments in ways of providing access to learning resources. First, the use of textbooks has increased considerably. The UK still does not approach the USA in the extent of the reliance on textbooks. For example in the most popular American book about teaching in higher education, Teaching Tips (McKeachie, 1998), the chapter on course preparation includes sections on choosing and ordering your textbook. It is taken for granted that undergraduate courses use textbooks. In contrast, Extract 6.1 in Chapter 6 of this pack 'Learning resources', is part of a journal article justifying the adoption of a textbook for a UK geography course. The article led to a heated debate in the next issue of the journal about the pros and cons of such a foreign tactic!

Secondly, drawing on developments in open and distance learning, and particularly on the Open University, it is now common for lecturers to write their own learning material for students or to put copyright-cleared material together in the form of 'readers'. By the mid-1990s, lecturers at Oxford Brookes University had produced print-based learning packages of some kind for the majority of its 2,000 modules, putting learning material directly in the hands of students rather than relying exclusively on the library. Some universities, such as Luton, and Lincoln and Humberside, have made the use of resource-based learning a central component of their learning and teaching strategy and have provided the technical infrastructure to support it. Improvements in information technology have made it much easier for teachers to write and produce their own learning materials, to print attractively designed products at modest cost, and to update them annually with minimal effort. Electronic production of such learning materials has also led to shared ownership within departments, pooling of materials on organised intranet sites, and much easier access by students to materials that would previously have been hidden in lecturers' filing cabinets. For example computing science students at Kingston University can undertake keyword searches on an intranet site to find lecture handouts on any topics they are interested in, whichever course they come from and whether or not that lecture is actually being given that year.

Thirdly, and probably most important in the long term, has been the development of communications and information technology (C&IT) to give access to remote information sources, online journals and the like. In some subject areas, students already access information predominantly via computers. In subjects such as law, where access to legal cases and reports has traditionally been a major difficulty, C&IT has made learning substantially easier and students can be set assignments that previously were logistically impossible. For example it is now possible for 50 students simultaneously to search a US database for legal cases on a particular topic, where in the past only one student at a time would have been able to undertake the laborious searching of (expensive) printed material. It is becoming more common for course designs to identify learning resources by internet addresses rather than library codes. The full implications of these developments for course design have not yet been fully absorbed, but lectures and libraries are likely to become less important as the possibilities for flexible independent learning increase. The mixed quality of internet material, restrictions on internet access due to the cost, and the guidance and structure necessary to avoid students wasting their time aimlessly surfing, will limit the rate at which these possibilities can be exploited. Putting key
internet resources on CD-ROMs is now a practical and economical possibility which overcomes some of these problems (but raises copyright issues).

Teaching methods

Many courses use a limited range of teaching methods and sometimes every course that a student takes in a programme is taught in an almost identical fashion. Given the number of available teaching options and the wide range of aims of courses, this can only be because local conventions are better developed than local knowledge of what is possible. There are literally hundreds of options and each teaching method can take an almost infinite variety of forms. The 'Interesting Ways to Teach' series of books contains titles such as 53 Interesting Things to Do in Your Lectures (Gibbs et al., 1992). Teachers are given 53 options to choose from for each teaching method in the series. It would be impossible to even list all the alternatives here, let alone their pros and cons – that would require a separate book. But we can illustrate the kind of thinking that needs to go on when selecting teaching methods, by comparing two alternatives: lecturing and project-based learning. There is extensive empirical evidence from research studies about the relative effectiveness of different teaching methods for achieving course aims. For example some of the statements in Table 2.1, below, about what aims lectures are suited to achieving, are based on evidence presented in Chapter 1, in which the choice of methods such as problem-based learning (PBL) and the personalised system of instruction (PSI) are discussed with reference to research evidence. The authors of these extracts are lecturers who read the literature in order to make decisions about teaching methods.

Table 2.1  A comparison of lectures with projects as teaching methods

<table>
<thead>
<tr>
<th>Question</th>
<th>Lectures</th>
<th>Projects</th>
</tr>
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<tbody>
<tr>
<td>What aims is each best suited to achieving?</td>
<td>Acquisition of factual information</td>
<td>Understanding</td>
</tr>
<tr>
<td></td>
<td>Demonstration of the structure and discourse of a discipline</td>
<td>Acquisition of intellectual skills and transferable skills</td>
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<tr>
<td></td>
<td></td>
<td>Application</td>
</tr>
<tr>
<td>What aims is each less well suited to achieving?</td>
<td>Motivating students, understanding, skills, problem solving</td>
<td>Acquisition of a tightly defined area of knowledge</td>
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<td></td>
<td></td>
<td>Breadth of coverage</td>
</tr>
<tr>
<td>How economical is each?</td>
<td>Potentially very economical for large groups, less so for small groups due to the preparation time required</td>
<td>Varies greatly depending on extent of students’ independent learning skills and the level of supervision required</td>
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<tr>
<td></td>
<td></td>
<td>Economical for group projects</td>
</tr>
<tr>
<td>How well does each suit a diverse group?</td>
<td>Poorly; both level and pacing difficult to judge, and fixed at one level</td>
<td>Potentially well as level and pace are set by individual students</td>
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<tr>
<td></td>
<td></td>
<td>Especially well with group project work</td>
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<tr>
<td>What equal opportunities issues are involved?</td>
<td>Potentially very difficult for visually and hearing impaired students, though technical solutions are available. Potentially difficult for those not first-language English speakers if level and pace assume students' first language is English.</td>
<td>Individual project work difficult for the visually impaired as learning resources are diverse and difficult to make available. Difficult for hearing impaired students in group project work. Potentially good for integration of minority students.</td>
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<tr>
<td>What consequences does each have for how students study?</td>
<td>Can provide structure within which students can learn independently. Provides notes for subsequent study but little motivation to do so. May result in passivity and keeping narrowly to the lecture content.</td>
<td>Usually motivating and captures student time well. May lead to confusion and unproductive study if guidance is not available. May encourage creativity and develop diverse interest.</td>
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<tr>
<td>What teaching accommodation does each require?</td>
<td>For small groups, a standard classroom.</td>
<td>Flat-floored space for ‘workshop’-type briefing sessions.</td>
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<td></td>
<td>For larger groups, a tiered lecture theatre with good acoustics and AV equipment.</td>
<td>Individual or group study space.</td>
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<td></td>
<td></td>
<td>Office for supervision meetings.</td>
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<tr>
<td>What learning resources are needed to support each?</td>
<td>Commonly student notes, handouts and textbooks; sometimes a reading list. Usually easy to specify in advance and plan for. Student competition for key resources at peak times is problematic.</td>
<td>Very varied, especially where there is a choice of project topic. Potentially difficult both to identify and provide appropriate resources, but there is unlikely to be competition for resources. Project guide.</td>
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<td></td>
<td></td>
<td>Project reports: potentially time-consuming to mark and difficult to mark reliably, but very revealing about quality.</td>
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<tr>
<td>What assessment method is usually associated with each?</td>
<td>Coursework: tests, problems or essays. Exams: short-answer questions, problems or essays.</td>
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</tbody>
</table>
**Activity 2.3** Selecting teaching methods and reviewing their pros and cons

Given the aims of your course, what are the two most viable alternatives to the teaching methods used at the moment?

Using the same questions as in Table 2.1 above, compare a current method with two alternatives. You are likely to have to do some reading and asking around in order to answer some of these questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Current method</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>What aims is each best suited to achieving?</td>
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<tr>
<td>What aims is each less well suited to achieving?</td>
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<tr>
<td>How economical is each?</td>
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<tr>
<td>How well does each suit a diverse group?</td>
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<tr>
<td>What equal opportunities issues are involved?</td>
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<tr>
<td>What consequences does each have for study?</td>
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<tr>
<td>What teaching accommodation does each require?</td>
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<tr>
<td>What learning resources are needed to support each?</td>
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<tr>
<td>What assessment method is associated with each?</td>
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</table>
Student interaction and creating a learning community

Increases in class sizes have tended to reduce the amount and quality of interaction that takes place in courses. The modularisation of curricula has tended to break up cohorts of students and scatter them across many different modules so that students no longer study alongside colleagues they know and socialise with to the extent they used to. And reductions in one-to-one teaching mean that students are less likely to know their teachers as people than in the past. All these factors have weakened learning communities. Students may discuss their studies less, collaborate less and feel less part of a joint scholarly enterprise than they used to.

There are two important and related ideas here. The first is that talking is crucial in order to negotiate and create meaning. Discussion is a flexible and powerful way for students to make sense of what they are learning. It may not always be easy to design talking into classes, especially large classes, but it is usually possible to design it into out-of-class activity. The second idea is that learning is primarily a social activity, undertaken in what are sometimes called 'communities of practice'. People are motivated to learn what their community does (for example 'being historians' and 'doing history') and what it values (for example truth, being logical). If they do not feel part of this community of practice, they are less likely to want to learn and less likely to find themselves in positions where social learning takes place.

The unsupportive wider learning climate in which you may find yourself may seem beyond your ability to influence, but the following simple steps can all help to create a learning community within your course in which interaction happens more easily and frequently:

- help students to get to know each other right at the start of your course;
- take early action to establish talking with other students as a legitimate and useful activity, for example by using a 'buzz group' in the first half of the first lecture;
- make it clear that students are encouraged and expected to help one another, and that this is not looked on as cheating;
- encourage collaboration rather than competition, for example by arranging the sharing of books, working two to a computer, or designing seminars that benefit from joint preparation by students beforehand;
- redesign some individual learning activities as team tasks, or at least ensure that they can be undertaken in pairs;
- make learning public and visible, rather than private or even secret, for example by displaying students' experimental work on posters, as at conferences, or by swapping student work for comments before or after it has been marked;
- make standards public by discussing criteria and marks or by getting permission from students to copy and circulate outstanding (but anonymous) work;
- mix formal and informal learning by arranging social gatherings outside the classroom, or by planning coffee breaks into extended classroom sessions;
- use the potential of electronic communication and computer conferencing to create virtual communities;
• show students that you are a learner too, and engage them with your
learning community by inviting them to departmental research
seminars, giving tours of your laboratory or studio work, or
encouraging them to come to local conferences.

When designing your course and its teaching methods, learning activities
and assignments, try to think how modifications might make the social
dynamics of your course work better.

Student support mechanisms

The best designed courses still suffer from hiccups: you may have to cancel
a lecture due to illness, the computer network may go down when
everyone needs it, the library resources turn out to be inadequate, rooms
are double-booked, hordes of students register late, handouts are delivered
late from the print room, and so on. If things can go wrong, they will, and
you need to have mechanisms in place to support students when this
happens. Students appreciate good organisation above almost anything
else about courses.

Students themselves also present problems. They miss classes because they
are sick, take up part-time jobs to pay off debts, discover your course is at
a much higher level than they expected, ask for extensions to deadlines,
appeal against grades and make cases for special circumstances to be taken
into account by examiners. Students with special needs may well need
additional technical and personal support, and less mature students may
need emotional support.

And of course students will have many questions about the course itself –
about concepts they have not grasped, assignments they don’t understand,
references they cannot find, and so on. They seek guidance and support
and expect to get it. Although student guidance and support are complex
processes covered elsewhere in the materials, here is a minimal checklist of
student support matters to consider when you are designing your course
and preparing to teach it:

• provide a written guide to your course and how it works so that as
  many student queries as possible are already answered (see Chapter 4,
  Section 4.2, ‘Explaining your course to students’);

• provide additional information about matters such as re-scheduled
  sessions, or how to get handouts for missed lectures; if this kind of
  response to student queries is organised through a departmental office,
  you need to provide the office with the relevant information; you can
  also make this information available using web or intranet sites;

• make yourself available at the start and end of sessions for quick queries;

• publish ‘office hours’ when your students know they can turn up
  unannounced and expect you to be in and available, or when you can
  provide appointments for ten-minute tutorial slots;

• establish a functioning means of communication so that students can
  contact you if there are problems and you can contact them;

• devise a record-keeping system that prompts you to find out what is
  going on if a student has regularly missed sessions or assignment
  deadlines; make a special point of monitoring the progress of students
  with special needs;
• find out enough about any specialist support agencies on campus that deal with course choice, accommodation, dyslexia, drugs problems, logging on to the computer system, debt, study skills, and so on, so that you can refer students effectively and quickly; the Student Union may have welfare and education officers who can be supportive: find out who they are and what they can do to help.

Effective student support mechanisms may have more impact on average student marks than a brilliant lecture.

Teaching and learning roles and course design rationales

This section and the one that follows are concerned not with course components but with two crucial course design issues: how your conception of teaching links to your course design, and whether your course design is coherent.

Course design rationales are underpinned by lecturers’ conceptions of teaching. This is very evident in the case studies in Section 2.5, and particularly in the difference between Case Study 1 and Case Studies 2 and 3. Two common conceptions are contrasted in Table 2.2, below.

Table 2.2 Two contrasting conceptions of the teacher’s role

<table>
<thead>
<tr>
<th>1 Teaching involves the transmission of knowledge to students</th>
<th>2 Teaching involves helping students to conceptualise the subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of the teacher is to select and present material and to test whether it has been transmitted successfully.</td>
<td>The role of the teacher is to support the active construction and reconstruction of meaning and to aid reflection and self-awareness.</td>
</tr>
<tr>
<td>Course design features associated with such a conception might be expected to include a syllabus listing content to be transmitted, a programme of lectures for the transmission of this content and tests or an exam (see Case Study 1 in Section 2.5).</td>
<td>Course design features here might include independent learning, problem-based tutorials (see Extract 1.1 in Chapter 1) and assessment that involved demonstrating understanding, perhaps through project work.</td>
</tr>
<tr>
<td>The teacher might have a quantitative conception of success concerned with how much of the content students acquire.</td>
<td>The teacher might have a qualitative conception of success concerned with the nature of students’ understanding.</td>
</tr>
<tr>
<td>In a design studio this might involve ‘sitting next to Nellie’, an approach in which the teacher’s ideas and techniques are transmitted to the student by observation and imitation, and tested by students presenting products resembling the teacher’s.</td>
<td>In a design studio students might be encouraged to explore their own ideas. Assessment might involve the student explaining the ideas underlying the development of their work, illustrated in a portfolio, rather than just presenting a product.</td>
</tr>
</tbody>
</table>
Other conceptions of teaching and other associated course design rationales are, of course, also possible. The point here is that course design features mirror beliefs about what teaching and learning consist of. The role of the teacher associated with the two conceptions outlined above is clearly very different. In the first, the teacher is central, deciding what content to teach, transmitting this knowledge and then testing its transmission: a ‘teacher-centred’ role. In the second, the role of the teacher is more facilitative. Knowledge is perceived as constructed by each student in unique ways and while the teacher can guide the student, making conceptualising easier or more interesting, in the end, students have to do it for themselves. This is often described as a ‘learner-centred’ role.

The match between teachers’ conceptions of teaching and the way courses are designed and taught is not always perfect. Murray and Macdonald (1997) have described lecturers whose explanations of their conception of teaching were somewhat more learner-centred than the teaching methods they actually used in their courses.

When you are designing your course, your choices and decisions will be strongly influenced by your underlying beliefs about teaching and learning. Unsophisticated conceptions of teaching are likely to constrain the range of course design features considered and used.

Coherent and incoherent course design

A course design is coherent when all the course design components described above pull together in the same direction to achieve the desired aims, and the achievement of the aims is assessed effectively. Such coherence is surprisingly rare.

**Activity 2.4** A checklist of questions to see if your course design is coherent or incoherent

Answer the following questions about aspects of the coherence of your course design.

1. Are your aims and outcomes explicit and unambiguous?
2. Are these aims appropriate for, and relevant to, your particular group of students?
3. Does your assessment system measure the achievement of your aims in a valid way?
4. Are your teaching methods well targeted to achieve your aims?
5. Are student learning activities well targeted to achieve your aims?
6. Are learning resources readily available to support students’ learning activities?
7. Does the assessment result in students engaging in appropriate learning activities?
8. Is the teacher’s role consistent with the rationale of the course?
9. Are there built-in student support mechanisms that support the achievement of your aims?
10. Do student feedback and evaluation mechanisms address the central design issues of the course?
It would be an unusual course where the teacher could confidently reply 'yes' to all these questions! What aspects of your course design might it be sensible to focus on, in order to increase the coherence of its design?

2.2 Designing courses to fit contexts

You will not have a free hand to design the 'perfect' course. You will need to fit its design into your context. If you are designing courses that are to fit into the standard undergraduate curriculum, this section will help you to identify the most important features of the context that you will have to take into account.

Level

Institutions vary in their definitions of academic levels. In the UK a common, although by no means universal, pattern is to have one level which includes the first year of an undergraduate programme, a second level which includes years two and three of an undergraduate programme, and a third level which includes all postgraduate taught courses. The Quality Assessment Agency is attempting to standardise what levels mean; there is an emergent framework to view at http://www.qaa.ac.uk/ Sometimes level one includes access courses, the first two years of '2 + 2' degrees which are spent in Further Education, and Higher National Diplomas. Sometimes institutions distinguish between years two and three or even a year four. Postgraduate levels are complex and inconsistent both within and across institutions. The Scottish Vocational Education Council (SCOTVEC, which validates most sub-degree level courses in Scotland) defines levels in its own way and has quite explicit expectations for the balance of different kinds of aims and the associated methods and assessment for each level. Frameworks for NVQ and GNVQ qualifications are also specified in terms of levels. You need to find out what general characteristics your institution or any external agency specifies for the level of your course.

The academic level of your course should be reflected in its design in a variety of ways; in the:

- nature of your learning outcomes;
- level of learning skill you could reasonably assume;
- level of associated skills such as being able to give seminar presentations or manage an extended project;
- level of familiarity with the form of discourse in the discipline which can be assumed;
- balance of in-class to out-of-class time that students are likely to be able to manage, given their level of independence;
- type of learning activity and assignment of which students are likely to have experience;
- extent to which guidance is necessary, for example in reading lists or briefs for projects;
- size and duration of assignments students could tackle;
rate at which the course can progress, given the background knowledge of students and their degree of familiarity with the teaching and learning processes involved;

- amount of support and supervision students are likely to need;

- type of learning resource students are likely to use, progressing from secondary sources and textbooks to primary and specialist sources; and

- degree of complexity of the tasks students undertake.

Note that I have not said that aims should be different at different levels. It is common for first-level courses to have low-level aims such as acquisition of terminology or sub-skills, and to progress to use of this knowledge and integration of skills on second- and third-level courses. However, some course designs, such as problem-based learning, can from the outset involve high-level aims such as analysis and integration, but in less sophisticated and complex forms than occurs in second- and third-level courses.

Level is a slippery concept. What is high level for one student might appear introductory to another, depending on their backgrounds. For example, language teaching for a business student in higher education may resemble what a student of languages experienced at school at the age of sixteen, and first-level statistics for maths students might resemble postgraduate-level statistics for a social scientist. Postgraduate courses may be either 'broadening' or 'deepening'. Level is particularly difficult to define for generic skills; for example, how do second-level teamwork or IT skills differ from first-level skills?

What are the implications of the level of your course for its design?

Size, credit weighting and learning hours

The size of your course has rather important implications for how much you can fit in and what you can hope students get out of it. The UK uses a standard credit weighting system that, in principle, allows students to transfer easily from one institution to another, taking their course credits with them. A full-time undergraduate year is rated at 120 'CATS credits' and an undergraduate degree usually amounts to 360 credits. A 'year' is also often defined in terms of learning hours, though the number of hours that make up a year varies surprisingly widely between institutions, from about 800 to about 1,200 hours. Institutions also have different length terms or semesters, varying from eight to about fourteen weeks. Each course unit has a specific credit weighting. If a full-time student usually takes eight one-semester modules, then each module should normally consist of 1,200 hours divided by eight = 150 hours (as in the case studies in Section 2.5 below). However, I have encountered courses as small as 30 hours and as large as 600. The 150 hours of a 15-credit module might mean anything between 11 and 16 hours per week of student time for you to incorporate in your plan, depending on the length of the semester or term. There is little consistency, and you need to check how many student hours you have to play with as you design your course. It helps to get an impression of how many other courses – and how many other hours – your students are studying in parallel with your own course.

You may also discover restrictions on the way you use weeks. While a semester may last 13 weeks, you may find that week 1 is unusable in the first semester, due to registration complexities and the arrival of new students. Week 7 may be allocated as a reading week, and teaching may be
expected to stop in week 10 to allow students time to revise for exams (even if you do not use an exam). You may therefore have as few as eight teaching weeks. Again, check local conventions and patterns before designing your course in detail.

A further complexity about 'size' is the proportion of marks your course contributes to students' overall qualifications. This may not matter in terms of how much time you have, but it does affect the seriousness with which students will treat your course in relation to other courses which may have a heavier assessment weighting. First-year or 'level 1' courses may not contribute to students' final degree classifications, and even if marks are allocated, they may only be pass/fail courses.

Timetables and classrooms

Some departments use an absolutely standard weekly pattern of teaching (such as two lectures and a lab session, one lecture and a seminar, or six studio hours) and the classroom space you need was booked ten years ago to accommodate this pattern. You may even be told: 'If you are teaching S100 that means three hours in the Science Lecture Theatre on Friday afternoons, bad luck!' However, if this is not the case you need to think about:

- the pattern of teaching methods you want to use and the implications of this for teaching space;
- the type of classroom accommodation you want to do this teaching in (for example the kind of furniture and layout, the amount of 'slack' space to allow reorganising the furniture or moving around, the kind of audiovisual facilities you need, access to computers and communications, where the rooms are in relation to the library, studio, the lab or your office, and so on);
- the weekly pattern of sessions, for example lectures on Monday and Tuesday and a related problem class in a computer lab the following Friday, or a large, flat-floored room for a two hour 'workshop' immediately followed by a number of small seminar rooms for student groups to work in for one hour, at any point in the week.

Check if there are limits on how much accommodation you are allowed to use – your department may be paying for rooms by the square foot and by the hour!

There is enormous pressure on teaching accommodation in most institutions and the best rooms (and the plum weekly timetable slots) will have been booked by experienced lecturers long before you get to the Timetable Officer. You may find yourself having to modify the pattern of teaching you want to do to fit what is available. For example you may find that exactly what you want is available only in the evenings. Rather than waste time devising a scheme you will not be able to implement, check what is likely to be possible at an early stage, such as the year before. Making friends with the Timetable Officer may help enormously – they suffer much abuse doing an impossible job and need all the friends they can get!

Assessment regulations

Although assessment is the most powerful course design tool you have, you are unlikely to have complete freedom to use it. Assessment
regulations will determine much of what is possible in designing your course. Perhaps only one piece of coursework will be allowed; perhaps at least 50 per cent of the marks have to come from an unseen exam. The external examiner may have to be able to see any and every piece of student work that is given a mark. Marks may have to be withheld from students who are only told their grades. Grading schemes – and even criteria for marking – may be specified and imposed on you, whether or not they fit what you are trying to do. Double marking may be required for some assignments, but optional for others. Graduate Teaching Assistants may be allowed to mark lab reports but not exams, and so on.

Some of these regulations will have been invented within your department, by your colleagues; some will have been derived from your institution’s quality assurance system or course approval committee; and some will have come from professional bodies or other external validation agencies. Some are not regulations at all, even though your colleagues behave as if they were.

The best way to find out about these regulations is to ask an experienced colleague. However, there are many myths about such regulations. If someone tells you something ‘simply isn’t allowed’, do check for yourself. Often regulations use the expression ‘normally’ and this allows considerable scope for innovation, but check with the person responsible for quality assurance in your department before you make any changes to assessment, however modest. Assessment is the component of course design which is most likely to require formal approval for change, perhaps through a succession of committees in your department, faculty and institution, and probably including the external examiner. This may require you to plan a very considerable time ahead.

Prerequisites, co-requisites, foundations and capstones

Your course is unlikely to operate in splendid isolation – it will be surrounded by other courses that feed into, follow on from, compete with or complement it. Recognition of this need to think programatically is behind encouragement to institutions from quality agencies for programme-wide thinking, with clearer connections between individual courses, modules and units.

Prerequisites

Your course may already specify prerequisites: courses students must take and pass before they can take your course. Find out what these courses teach, who teaches them, and what the actual (as opposed to the designed) learning outcomes of these courses look like. Let the people teaching these courses know whether what their students bring with them to your course is adequate. The prerequisites may not be necessary or helpful, or you may need tougher prerequisites if students are to cope with your course. Some subject areas have much tougher rules about prerequisites than others.

If your course is a prerequisite for other courses, the people running those courses have a stake in your course working effectively. Talk with them about what they want you to achieve, and do not make changes without discussing them first. Find out from these colleagues how well past students have been prepared for these other courses, what problems there have been, and what changes they would like you to make. They may be happy to work with you to design an appropriate exam and may even offer to contribute classes or materials to help you to achieve the ends they need.

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Whether or not there are formal prerequisites for your course, it is useful to specify what you expect students to know and be able to do when they arrive on your course. As well as being a good design discipline, it will help students to select your course more appropriately.

Co-requisites and excluded combinations

Co-requisites are pairs of courses students must take together: they may operate in parallel or in sequence but make up a coherent whole. If you teach a co-requisite course then you need to establish a close working relationship with the teacher of the other course to ensure that your courses work well as a pair, do not overlap and complement each other well in both content and process. Bear in mind that co-requisites can make it very difficult for part-time students to enrol.

Excluded combinations are the opposite of co-requisites: students are not allowed to study both courses. This may be because the courses have overlapping content aimed at slightly different audiences.

Foundations

Foundations may take the form of entire first-year programmes that are designed to put a solid foundation of knowledge and skill in place for all subsequent courses. This will help you by enabling you to rely on basics you will not have to develop yourself, for example lab report writing skills, statistical methods, the ability to undertake a literature search, a familiarity with the broad field of which your specialist course forms a part, or whatever. You may be able to influence what such foundations consist of.

Capstones

Capstones are courses that build on everything that goes before and hold it all together – synoptic courses in history or final year fieldwork mapping projects in geology, for example. They provide a long-term goal for your students, who may see your course as a building block rather than as an end in itself. Being aware of what a capstone course is trying to achieve can give you a broader understanding of the appropriate outcomes for your own course.

Options

Options allow students to choose – for example, whether to specialise or to apply knowledge – and are neither required nor relied on by other courses. They lie outside any core of required courses, but this does not mean that the overall context or the other courses your students take can be ignored. For example, you will need to consider what background knowledge you could rely on from prior compulsory courses, and what combinations of options students commonly select.

Following courses

It is important to know where your students go after they have studied your course and how they use what they have learned in your course. What are other teachers relying on you achieving? It may be that success on certain following courses is heavily dependent on how well your course achieves its outcomes.

And beyond following courses, how do students use the outcomes of your course in their subsequent working life? What is most useful to them, and what is forgotten or redundant? Teachers rarely know the answers to these
questions, and it may take some effort to find out, for example by undertaking (or drawing on) a survey of graduates.

**Modular structures and programmes**

Figure 2.1 shows a modular programme spread out over three terms and three years. It shows which modules take place in the same term (though, in many institutions, courses span semesters), the sequence of modules, which modules are compulsory, recommended or optional, which modules from other subject areas are acceptable, and so on. Such diagrams may also show the structure of the programme – whether there is a core, a foundation or a capstone, the sequence in which students will address topics, and the scope they have to address topics in different orders. There will be rules about how many modules students have to take in all, how many or how few they can take in a semester, which modules students can take from outside their own subject area, and so on. All of these characteristics of the overall programme will provide a context for the design of your own module. It will give clues about what else students will have studied and what they are likely to go on to study. It will highlight the diversity of backgrounds and interests of your students and the variety of uses to which they might put your subject.
Figure 2.1  The structure of a complete programme

In many institutions, students will combine modules from two or even three programme areas, all of which have diagrams like this one displaying their structure. Your students might come from any one of twenty or so such programmes in addition to studying within your own programme area. This gives you wonderful opportunities to draw on the breadth of student knowledge and interest – but also substantial problems in creating a coherent focus and in establishing an appropriate level of starting point.
Activity 2.5 Identifying the courses students will be taking before, alongside and after your course, and the implications of this for your course design

Find the equivalent of the diagram in Figure 2.1 for your own subject area and familiarise yourself with it. Answer the following questions (you may need more information to answer some of them).

1. What can you expect students to have studied before they start your course?
2. What can you expect them already to know and be able to do?
3. What are they likely to be studying alongside your course?
4. What are they likely to go on to study?
5. Which courses are relying on outcomes from your course, and what are their priorities for what your course achieves?
6. What are the implications of your answers for the design of your course?

Student numbers

The number of students taking your course will have a profound effect on how you can and should teach and assess it. Methods that are manageable with small groups can become both unsustainable or very tedious for the teacher when groups are larger: for example when courses involve many repeated seminar groups each week on the same topic, or huge numbers of similar assignments to mark. Some course designs become logistically impossible to run with large numbers; for example if total available studio space is exceeded or the number of work placements available is insufficient. Some methods may look sustainable to the teacher but feel inadequate to the student, for example when the library simply cannot cope. The main problems students experience in larger classes flow from the fact that resources, including the teacher's time, are spread more thinly, and that more formal methods have to be adopted in order to avoid:

- difficulty in gaining access to the learning resources at the time when they need them due to competition for scarce resources;
- infrequent and insufficient feedback on their progress, so that they do not know whether they need to improve, let alone how to go about doing so;
- social isolation and anonymity (feeling lost in the crowd, a number on a lecturer's marking list);
- lack of opportunities for discussion;
- finding that the level or pace of the course is much too high (or low) due to the sheer variety of students on the course;
- low motivation due to:
  - lack of contact with teachers
  - the use of more formal teaching methods
  - highly specified study tasks.
A study comparing matched pairs of small and large enrolment modules across a range of subject areas at Oxford Brookes University found that students on large enrolment modules reported that teaching was not so good, that goals and standards were less clear, that assessment and workload were less appropriate, that there was less independence for students, and that they encouraged a surface approach (involving memorising) to a greater extent (Lucas et al., 1997). These problems are not insurmountable, but are clearly a challenge to the design of conventional courses for large numbers.

Designing effective courses for large classes can involve the following tactics:

- making the aims of the course and the requirements for study activities especially clear and explicit;
- putting additional effort into preparing classes so that they are especially well structured and supported by handouts;
- using the assessment system to generate appropriate learning activity (see Extract 3.1 in Chapter 3, ‘Designing assessment’);
- finding ways to provide adequate feedback on students’ progress such as using peer feedback or computer-based assessment;
- finding ways to maintain social interaction and discussion such as collaborative learning;
- making sure that students can get access to the learning resources they need through library facilities or specially produced materials;
- making arrangements to support students with special needs by diagnosing these needs and providing additional support mechanisms (see the course designs in Section 1.2 of Chapter 1).

Case Studies 1 to 3 in Section 2.5 show what happens when course numbers increase from 20 to 80 or 160 students, and how the design can be changed to cope better with large classes, while actually using less teacher time.

Very occasionally, the problem is that student numbers are too low. Methods you are accustomed to using, such as debates between student teams or analysis of data collected by many students, are no longer possible. Departmental guidelines may lay down the minimum number of students for a course to run at all.

Resources

New course designs may have new resource implications and your head of department might be happier about some of these than others. For example saving marking time is likely to be greeted with rapture, and using more classrooms might not matter to your head provided your department is not charged for them, but more student handouts might increase departmental print room costs. Additional teaching and marking time are the main resource costs for which you might have difficulty in getting approval, but you may also have to be careful about consumables, equipment, use of computer facilities and copyright costs. Students end up paying for some new course costs, such as travel costs for trips or out-of-hours events, or photocopying. This may put less well-off students at a disadvantage.
Sometimes the constraint is not to do with extra resources but the way resources are organised. For example if the existing timetable involves regular weekly use of the same classrooms, it can be quite disruptive to start scheduling courses that use classrooms irregularly, or that use different types of rooms at different points in the semester. Once an external examiner system has been set up to look at exam papers, it may be inconvenient if the examiners have to start approving students’ project proposals at a different point in the year. When resources are tight, complex or varied systems may be hard to resource.

A simple ‘back of the envelope’ costing of your revised course design is advisable to check if you need to make a special request for more resources. Requests for resources may be met with immediate oral approval or referred to a committee that meets twice a year with only a 50 per cent chance of success. Once you have a clear picture of the kinds of resources you are likely to need, find out who approves this expenditure and sound them out before doing any detailed development work on the course. You may need to prepare a ‘deal’ offering savings in one aspect of the course design to offset any additional costs elsewhere, or dropping one planned feature in order to get approval for another.

Course approval: what can and cannot be changed

You may find that there are some features of your course that you are prevented from changing. This may be because:

- formal course approval regulations limit the changes that can be made without formal re-approval;
- other courses for which your course is a prerequisite maybe relying on the course staying substantially the same as planned;
- there are institution-wide regulations that rule against your suggestions;
- external bodies involved in validating the programme of which your course is a part would not approve your suggestions, or at least not until the next validation in three years’ time.

You will need to check that you are allowed to do what you want to do. Most course approval regulations are designed to maintain standards or to guarantee that students are delivered the course as described in the prospectus, but they may also result in lengthy delays to perfectly sensible changes. As suggested in Section 2.4 below, there are many myths about what can and cannot be changed so don’t take everything that you are told about course approval at face value.

Small- and large-scale change may require different approval processes – some institutions allow ‘25 per cent change’ without approval. You may need to explore how much change you can introduce in the short term and what you have to plan for over the longer term. Calling a substantial change a ‘pilot’ that you promise to evaluate may help you to gain permission.

Designing for mature students

There is a suggestion that mature students learn differently from eighteen year olds and, with increasing emphasis on widening participation and work-based learning, you are likely to encounter a wider range of age and maturity, even in a traditional university setting.
Mature students may want to:

- draw on their life and work experience and to have this experience taken into account;
- have scope to pursue their interests, for example through choice of topics or open-ended project work;
- learn socially and collaboratively rather than privately and competitively;
- take an active, deep approach to learning rather than a passive, surface approach;
- make the maximum possible use of any learning opportunity, organising their time well but getting impatient with unproductive or slow classes.

They are also likely to work harder and perform better than their younger colleagues. They may also want to learn in groups with other mature students.

Equally, mature students may have more extensive commitments that clash with their studies, for example preventing them from joining in after-hours activities or attending evening classes. They may be less flexible in being able to increase the number of study hours to meet deadlines or to revise.

**Designing for part-time students**

Part-time students may have all the above characteristics and some additional ones, each with implications for course design.

- They are likely to be highly motivated but also highly strategic, making vary careful use of scarce study time. They may have many competing responsibilities at work and at home that make it difficult to find time to study except to meet assessment requirements. Your expectations for the quantity and use of out-of-class study time will have to be especially explicit.

- They are likely to have limited opportunities to use the library or computing facilities on campus, especially if key resources or facilities are not available when they need them – they cannot come back another time and try again. You will need to take extra care to make learning resources available, to put recommended material on short loan, to set up a reservation system for computers, and so on. They may have to choose to skip classes, if library use is essential.

- They may have high expectations for the productiveness of teachers’ input into face-to-face sessions and assessment. This may be accompanied by a consequent lack of trust in student-centred methods such as group work and peer assessment until they experience its benefits. You will need to concentrate on providing ‘value for money’ to a greater extent than for full-time, eighteen year olds, and will need to explain your reasons for using any student-centred methods.

- They are likely to experience isolation as students even if they have good personal support at home. You may need to set up self-help groups so that part-time students can share lecture notes and textbooks, so that they can exchange phone numbers, meet each other off campus and so on.
**Activity 2.6** Summarising the implications of the context of your course for its design

List the main contextual factors influencing the design of your course, using Section 2.2 above as a guide. For each factor, identify the main implication for the design of your course.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Nature of influences</th>
<th>Implications for course design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Size of course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Timetable/classrooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Assessment regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Prerequisites, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Programme structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Student numbers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Course approval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Mature students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Part-time students</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 The process of designing a course

Section 2.1 considered components of course design and Section 2.5 shows complete course designs. But how do you get from one to the other? What are the steps involved? Where should you start and in what sequence should you take the steps? Inevitably, there are differences of view and practice about this, but some starting points are less sensible and productive than others. In this section, you will find some alternative design sequences and some ideas about how you implement a chosen sequence: who can help you; whether it is possible to redesign everything in one go; and what resources and skills are involved.

Sequencing content

The most common course design strategy is to start by listing the topics you want to cover (the syllabus), placing them in a logical sequence, and allocating an equal amount of time to each, probably one topic per teaching session or per week. After a little shuffling to fit in everything you want, the job is done. Assessment is added as an afterthought, perhaps asking an exam question of some kind about four of the ten topics covered, to sample the content. Such a design process takes for granted the fact that teaching methods and the timetable were already in place before anything else was considered. It ignores aims completely (other than the aim of ‘covering the topics selected’) and does not connect logically with assessment methods. What is actually being assessed here is not at all clear. What learning resources are required is an afterthought. What students do with their out-of-class learning time may not be considered at all. While sequencing content is important, it is only one aspect of course design and should not be the starting point.

Working backwards from assessment

An alternative course design sequence is to start by imagining what kind of performance from students you would ideally like to see in the end-of-course assessment, for example an outstanding design for a building, an insightful critique of a theory, a highly professional care plan for a patient, or a correct and elegant solution to a mathematical problem. The next step is to think what it would take for students to get there:

- How much practice will they need?
- Where will they get their models of outstanding performance?
- How will they get expert feedback to improve their performance?
- What sub-skills are involved and how will they be built up?
- What underpinning knowledge is needed, and how is it best made available to students and integrated with the action?
- What would count as a sufficiently good performance?
- How would students come to understand the standard they were aiming at?

Once the perspective of student performance (rather than just knowledge) is put centre-stage, then rather different decisions are likely to be made about how to prepare for that performance – what learning methods, teaching methods and access to resources are likely to be required. These are very different questions from those associated with sequencing content. They take nothing for granted about methods, because that is not where
they start. Course designs arrived at in this way would tend to use much more varied methods.

Attractive though it is, there is still a problem with this approach: it is unclear where the idea for the end performance comes from. Is there a stage even before this?

**Working backwards from outcomes**

The ‘systematic approach to course design’, propounded in Chapter 1, starts by specifying the desired outcomes (after research to find out what these should be, for example by asking employers), then designing the assessment tools to measure these outcomes, and only then deciding how to sequence content and learning activities to prepare students to tackle the assessment. The argument here is that you must know where you are trying to get to, and have a way of telling whether you have got there or not, before designing a route.

**Generating productive learning activities**

None of the above course design strategies guarantees that effective learning activities will be designed. You can have perfectly sensible outcomes, with perfectly logical decisions about teaching and assessment following on from them, and still have a course that is dead on its feet because the learning activities are so dull that students will not engage with them. However, from your experience as a teacher (or as a student) you may have a very good feeling for the kinds of learning activities that are fun or totally captivating and which seem to lead almost effortlessly to powerful and long-lasting learning.

I remember teams of engineering students at my university taking part in a competitive ‘egg race’ (named after the TV science programme presented by Professor Heinz Wolf), designing devices which would land an egg from the top of the teaching block to the car park below as quickly as possible without breaking the egg. They learned about materials, mechanics, practical design, learning in teams, experimentation and many other aspects of engineering while having a jolly good time. They also worked tremendously hard and cared a great deal about the outcome.

What struck me was the difference in the demeanour of these students compared with how they behaved in the (logically designed) lab or lecture theatre. The potential of such learning activities should not be underestimated.

When you have discovered activities that work, it is not sensible to design them out of courses simply because they don’t quite fit a rational plan. Sometimes they work so well that it is tempting to see how a course can be designed around them, harnessing their power to achieve the designed ends. Problem-based learning, as outlined in Extract 1.1 in Chapter 1, can look exactly like this.

**Course teams and peer review**

It is usual for teachers to design courses alone and almost in secret, but one of the most effective ways to design courses is in small teams. The Open University uses course teams for almost all course development and this is a cornerstone of both its quality and its creativity. Its course teams involve not just academic authors but an external reviewer, readers and other categories of academic-related and support staff that contribute to both course production and course presentation.
If your department does not use course teams, you can nevertheless reap some of the benefits of working collaboratively by:

- talking with whoever taught your course last time;
- asking a couple of colleagues to join you in creatively ‘brainstorming’ ideas before the course becomes too developed and fixed;
- discussing an early draft of your course outline with a colleague;
- showing a full outline of your course to several colleagues (and even to students who sat the course last time) for comments and suggestions;
- involving your subject librarian; as well as helping you to locate and organise learning resources, this person may be the first point of contact for your students as they study;
- finding a friendly external reviewer who is experienced in teaching in your field at another institution and asking him or her to comment on your plans;
- checking a complete plan informally with whoever is in charge of the programme of which your course is a part.

Developing a course is seldom a one-stage process and you might want to re-convene some of these colleagues to help review your course after it has run for the first time.

**Incremental and iterative course development**

Course design does not happen all in one neat logical cycle any more than you might write a book from start to finish in one sitting. It is likely to be a messy, multi-stage process with some basic design decisions being reviewed several times before you get it right. Courses often take years to mature, with useful developments, additions (and subtractions) each year as you learn more about what is working and why. In time, you will get on top of some aspects (such as your own understanding of the content) so that you have mental and emotional space left over to tackle other aspects (such as the sheer variety of students you have to teach). Once the basics are in place, you will be able to invest more time in developing learning resource materials, finding better case studies, or writing fuller guides to tackling the assignments. You may discover that your aims are too ambitious or that aims you thought were peripheral are actually central. In your first course design, you may have allocated too little time and attention to the things with which students have most difficulty, and so on. A crucial part of the process of course design is therefore evaluation, in the sense of understanding how students go about learning on your course and why.

One implication of all this is that you may learn more about course design by teaching the same course several times in a row, with improvements each time, rather than by shifting to a new course every year. This may give you the secure base you might need to be a little more adventurous in introducing innovations into your teaching and assessment methods.

**The skills needed to implement new course designs**

You may have all the expertise you need to run a course you have just redesigned. However, you may find that you need new small-group teaching skills or more IT skills than you anticipated. You may need to obtain copyright clearance for teaching materials, or to assess students in
groups, or to write multiple-choice question tests. When you have a new
course design in front of you, go through it identifying all the things you
will need to do that you have never done before. Don’t be afraid to ask for
assistance from support services such as your institution’s educational
development or staff development unit, the library, computer centre or
student services. They may be grateful to be asked and very willing to
help in any way they can.

There may also be others in your department, or a related department,
who could help. You may well be able to send an open e-mail request for
assistance, for example:

Multiple-choice question testing
I am planning to use MCQs next semester, possibly with computer
marking. Could anyone with experience of doing this in a humanities
course please contact me to warn me of the pitfalls.
In anticipation ...

If it looks as though it would take you a while to learn how to do
something, you could always schedule the introduction of your new course
design over more than one year, introducing elements in stages, to give
yourself time to learn how to do it properly.

The resources needed to implement new course designs
You will need to check that your course design is affordable and
logistically feasible and to plan the availability of the resources you will
need to use. If your course is conventional in nature, the system for
allocating these resources may be straightforward but, if it is
unconventional, resources may be surprisingly difficult to arrange. You
may need to plan:

- room bookings for all the classrooms you need;
- library books and journal articles to be ordered or placed in a reserve
collection;
- handouts to be typed, checked, and sent to the print room for copying
(and a porter to bring them back);
- access to computer facilities, software and passwords or basic IT
training for your students;
- booking of audiovisual equipment such as video projectors;
- booking of videotapes;
- copyright clearance for reader extracts;
- booking of laboratory or studio facilities, equipment, consumables and
technician availability;
- postgraduate demonstrators (both their availability and a budget for
their hours) and a schedule for sessions for briefing them;
- part-time teacher support for seminars or marking;
- booking of transport and accommodation for field trips;
- an examination room and invigilator;
and any number of other resources.
Activity 2.7 Planning the availability of the resources you need to run your course

What resources does your course involve? How is each of these resources booked or made available? Use the table below to list these resources and to identify which have been arranged and which require action on your part.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Mechanism for arranging</th>
<th>Action required</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.4 Writing course descriptions

Meeting formal documentation requirements

However you design your course, you will have to document it in order to produce a succinct description of its constituent parts. There is likely to be a convention in your department, or even an institution-wide specification, of what this documentation looks like. The main purpose of this documentation is quality assurance, both for the course to be approved in the first place and later to check that it is running as approved. The headings in Figure 2.2 illustrate the kind of categories of information you may be required to provide, but documentation varies greatly. Some does little more than list the syllabus and provide a reading list.

Course approval may concentrate on checking the content (whether the right topics are included) or the process (whether aims, methods and assessment hang together in a coherent and well-justified way), or both. You need to find out how the course approval system works. This might involve looking at existing documentation and what it concentrates on and asking a colleague who has seen several courses through the course approval system or who actually sits on a course approval committee. There is often a gap between the rhetoric of course documentation and the reality of the way approval decisions are made. For example conventional course designs often seem to require less justification than any alternatives.
<table>
<thead>
<tr>
<th>Course Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Title</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>1, 2 or 3</td>
</tr>
<tr>
<td>Context</td>
<td>How it fits within the overall programme.</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Modules students must have passed before taking this module. Skills or knowledge assumed.</td>
</tr>
<tr>
<td>Required for</td>
<td>Students on specified programmes. Students intending to take specified modules.</td>
</tr>
<tr>
<td>Recommended for</td>
<td>Students on specified programmes.</td>
</tr>
<tr>
<td>Rating/Hours</td>
<td>CATS credit rating/student learning hours.</td>
</tr>
<tr>
<td>Aims</td>
<td>Up to three general educational aims.</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Up to six specific learning outcomes.</td>
</tr>
<tr>
<td>Rationale</td>
<td>Why it is in the form it is, and taught and assessed the way it is.</td>
</tr>
<tr>
<td>Programme/indicative content</td>
<td>Outline of weekly schedule of topics and/or learning activities.</td>
</tr>
<tr>
<td>Teaching and learning methods</td>
<td>List of how students’ learning hours have been planned, including in and out of class activity. Short explanation of purpose of methods.</td>
</tr>
<tr>
<td>Assessment strategy and methods</td>
<td>List of assignments/tests/exams, the size of each and the percentage of marks allocated to each. Identification of which elements of assessment assess which learning outcomes.</td>
</tr>
<tr>
<td>Learning resources</td>
<td>List of resources used, including use of IT and list of required reading.</td>
</tr>
</tbody>
</table>

**Figure 2.2 Course documentation**

**Explaining your course to students**

Students would find the kind of formal course documentation outlined above helpful – it certainly contains more information than was ever provided to me as an undergraduate. However, they will often need more detail and explanation if they are to understand how the course works and why, and what they are expected to do in order to be successful. Lecturers usually expand the course outline into a course guide for students. Increasingly, departments and institutions insist on this. The kinds of information students find useful in such guides include:

- A rationale for the course: why it is important, why it covers what it does, how it fits in with the overall programme, and why it might be valuable to students.

- A more detailed description of the schedule of sessions; this can include a timetable, explanation about what groups students are in, room locations, and a paragraph explaining the topic of each lecture, seminar or lab session, and the preparation associated with it.

- A more detailed explanation of assessment; this could include actual assignment questions or tasks, advice on how to go about these assignments (such as ‘How to write Egyptology field reports’), deadlines, rules about plagiarism and late submission, marking criteria and arrangements for tutorials or feedback associated with assignments. Criteria and an explanation of what counts as a successful outcome and what standard is required can be invaluable.
Detailed information about learning resources; this could include a short manual on using equipment or computer software, an annotated reading list for each week, information about useful websites and electronic literature search facilities, lists of video and other AV sources, the name of the subject librarian, information about other libraries and information sources off-campus. The aim should be to make students as self-sufficient as possible in locating and using a wide range of resources so that they don't get stuck when they find that, for example, 'the book is out on loan'.

Some of the most useful course guides I have seen were quite substantial: 50 pages or more for a one-semester module. They filled out the bald facts with a student perspective, for example asking and answering common questions such as 'What do I do if I have a timetable clash for the field trips?' and 'Can you set yourself a project other than the titles in the handbook?' They also included comments from last year's students about their experience of the course. The most useful prompt for such student comments is 'What advice would you like to give to the students taking this course next year?' Students readily offer such valuable comments as, 'Don't skip the first three lectures or you will never catch up!'; 'All the advice you need for the practical work is in the handouts'; 'You can't get by without doing the reading so buy the books and get stuck in', and 'Have patience, it all comes together in week six and it's really interesting after that'.

2.5 Case studies in course design

This section presents a wide variety of possible course designs. Two different contexts have been chosen:

- a course in social science research methods (see Case Studies 1, 2 and 3);
- a lab-based science course (see Case Studies 4 and 5).

For these contexts, some very different designs have been presented alongside each other. Each has very different aims, assessment, teaching and learning methods, use of learning resources and costs. Each design will be critiqued from a variety of perspectives to show how:

- courses with the same title can have completely different aims;
- courses with the same aims can use completely different methods;
- courses can be designed in extraordinarily different ways with quite different assumptions about the role of the teacher and what students do in order to learn;
- aims, assessment and teaching and learning methods can form a coherent 'package' (though they often do not);
- different course designs involve teachers in very different amounts of work, and not all designs offer economies of scale as student numbers increase.
Costing courses

Your own time has to be one of the most important constraints on what is possible in terms of course designs – it is also likely to be one of the most expensive resources. Using your own scarce time effectively is crucial to making courses work well. The case studies below have been costed to make sure that alternative course designs do not cost more than those they are replacing. In fact the course featured in Case Study 5 costs a great deal less to run than the one in Case Study 4, which it replaces, as well as having many extra educational benefits. It is worth learning how to do rough calculations of the costs of your own course so that you can be more aware of which bits cost most, where there is worthwhile scope to economise and where a little investment might make a large impact. The example below is a costing for Case Study 1, so that you can follow how it is done. It is then suggested that you do the same kind of calculation for your own course, for the sake of comparison with the case studies. Activity 2.8 provides a framework for you to undertake the exercise, following this example.

This costing is for Case Study 1, with 80 students.

Assumptions about preparation time per session and group size:

- It takes a lecturer three hours (including preparation) for each hour of lecturing and one hour for each hour of seminar teaching.
- Assignments are assumed to take 20 minutes each to mark, exam answers 10 minutes each.
- Lectures take place with all 80 students. Seminars involve 10 students.

Teaching costs:

Preparation

2 lectures per week x 3 hours x 10 weeks = 60 hours
1 seminar per week x 1 hr x 10 weeks = 10 hours

Teaching

2 hours lectures x 10 weeks = 20 hours
8 x 1 hr seminars x 10 weeks = 80 hours

Total teaching time = 170 hours

Assessment costs:

Coursework essay x 80 students x 20 mins. = 27 hours
Exam x 3 questions x 80 students = 40 hours

Total assessment time = 67 hours

Teaching time (170 hours) + assessment time 67 (hours) = 237 hours

237 hours / 80 students = 2.96 hours per student

When you do calculations like this a number of interesting features emerge, for example:

- If you take preparation time into account, some methods (such as lectures) will look less cost-effective than at first appeared: in this case the lectures absorbed 60 hours of preparation and the seminars 10 hours.
• There are economies of scale with some course designs. In this case the course costs half as much per student when there are 80 students as when there are 20 (because while assessment hours tend to increase pro rata, teaching hours do not). Such economies of scale can be applied to some teaching methods (such as lectures) without causing major damage to their effectiveness, but this is not true for others, such as seminars. The table below shows how doubling seminar group size from 10 to 20 would save 40 hours, but these larger seminars would probably work a lot less well.

<table>
<thead>
<tr>
<th>Size of seminar group</th>
<th>Number of weekly seminars</th>
<th>Total seminar teaching hours over 10 weeks</th>
<th>Seminar teaching hours per student (80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>8 x 1 hour</td>
<td>80</td>
<td>1.00</td>
</tr>
<tr>
<td>16</td>
<td>5 x 1 hour</td>
<td>50</td>
<td>0.62</td>
</tr>
<tr>
<td>20</td>
<td>4 x 1 hour</td>
<td>40</td>
<td>0.50</td>
</tr>
</tbody>
</table>

• There are fewer economies of scale with assessment methods, where costs often increase in exact proportion to the number of students. In large classes with heavy assessment loads, the assessment costs can exceed the teaching costs, and this tends to result in large classes being assessed less thoroughly in order to reduce costs.

• The most useful measure for comparison of costs with other courses is the number of hours per student (in this case for a course lasting 150 hours or one sixth of an academic year).

• Costs vary widely between courses. In these case studies, the hours per student range from 1.7 to 14, and, in my experience, this range is not unusual. I have seen courses operating at well below one hour per student for courses of this size. In many institutions, some courses are ten times as expensive as others and often the teachers involved do not realise this!

Armed with calculations like these it is possible to start thinking about ways of allocating teaching resources to better effect. For example in Case Study 1, increasing the seminar group size to 16 would save 30 hours, which would allow the introduction of another coursework assignment (costing 27 hours). In effect, you have to decide whether the learning gain from an additional piece of coursework and the accompanying feedback would outweigh the loss to learning due to increasing the size of seminar groups. Whether teachers realise it or not, many of these cost-effectiveness trade-offs are involved in the design of all courses. Whether they are sensible or well-founded trade-offs is an issue for experimentation and evaluation.

There are other costs that these calculations do not take into account. Teaching may involve classroom, laboratory or studio costs. Learning may involve library, reprographics and computing costs. Assessment may involve double marking, exam invigilation and external examination costs. However, up to 70 per cent of university budgets are spent on academic staff time and the above calculation will give you a rough estimate of overall costs unless your course is unusual in its demands on other resources. Staff time is the resource that probably interests you most!
In the case studies, calculations like these have been done for different class sizes (20, 80 and 160 students). The details of the calculations have not been included in order to save space.

### Activity 2.8 Costing your own course

Carry out a costing of your own course and compare your teaching costs per student with the costing tables shown in the case studies. Follow the logic of the example above and insert your own assumptions about class sizes and other details.

Assumptions about preparation time per session:

Assumptions about group size:

<table>
<thead>
<tr>
<th>Teaching costs:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation costs</td>
<td>hours</td>
</tr>
<tr>
<td>Teaching costs</td>
<td>hours</td>
</tr>
<tr>
<td>Total teaching time</td>
<td>hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment costs:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking coursework</td>
<td>hours</td>
</tr>
<tr>
<td>Marking exams</td>
<td>hours</td>
</tr>
<tr>
<td>Total assessment time</td>
<td>hours</td>
</tr>
</tbody>
</table>

| Teaching time (hours) + assessment time (hours) | hours |

| Number of hours per student                      | hours |

If you were to make economies or to redistribute your time to make more effective use of it, where might you be able to save time? In particular:

1. What uses a good deal of your time but, in your view, contributes relatively little to student learning?

2. What might students be able to do for themselves or each other which you currently do for them? You can get some clues to answer this from reading the case studies.
A research methods course

Case Studies 1 to 3 describe three alternative designs for a one-semester, second-year undergraduate research methods course lasting 13 weeks. Costings have been calculated for three sizes of student group: 20, 80 and 160.

Three versions of this course are presented. Each differs in its aims and learning outcomes, in its teaching and assessment methods, in the learning resources used, and in the costs involved. These case studies also embody different conceptions of how learning takes place and, in particular, a different role for the teacher in supporting learning. This role definition is included in the summary. The three courses are summarized in Table 2.3 below. For details of each course, you will need to read the case studies.

### Table 2.3 Summary of Case Studies 1, 2 and 3

<table>
<thead>
<tr>
<th>Case study</th>
<th>Aims or outcomes</th>
<th>Assessment methods</th>
<th>Teaching and learning methods</th>
<th>Learning resources</th>
<th>Teaching role</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lecture-based course</td>
<td>Knowledge of history and theory of research</td>
<td>1 essay (25%) exam (75%)</td>
<td>20 lectures 10 seminars Reading</td>
<td>Library</td>
<td>Presenter, Discussion leader, Assessor</td>
<td>High, but large economies of scale</td>
</tr>
<tr>
<td>2 Academic skills course</td>
<td>Interpret studies, critique methods</td>
<td>3 assignments (100%)</td>
<td>6 lectures 6 workshops</td>
<td>Copies of articles, handouts, library</td>
<td>Trainer, Presenter Assessor</td>
<td>Medium/low Moderate economies of scale</td>
</tr>
<tr>
<td>3 Project-based course</td>
<td>Use research techniques. Design and implement research study</td>
<td>3 group mini-projects (unmarked), Individual project (100%)</td>
<td>7 workshops 3 projects individual project supervision</td>
<td>Textbooks, project guide, statistical package</td>
<td>Project supervisor, assessor</td>
<td>Medium Moderate economies of scale</td>
</tr>
</tbody>
</table>

**Case Study 1: A lecture-based course**

**Rationale**

It is assumed that the discipline has a research tradition into which students should be inducted. The relevant knowledge is widely dispersed in the literature and is technically and conceptually difficult, so it would be helpful for the teacher to introduce it in lectures. It is felt important that students should learn by reading primary sources. The aims concern conceptual understanding, developed through reading and discussion and tested through essay writing. Course design centres around selecting and sequencing content. Methods focus on presenting and testing content.
Aims
1 To explain the historical development of research methods used in the subject (weeks 1 to 6).
2 To discuss the main theoretical issues and problems concerning research (weeks 8 to 11).

Assessment
25 per cent coursework
75 per cent examination
Coursework assignment: 2,000 word essay. Choice from list of ten titles corresponding to seminar topics. Deadline: week 7. Example: ‘Has meta-analysis added to our knowledge of the subject?’
Exam: Three-hour unseen paper with choice of three questions from eight. Example: ‘Empiricism set back the search for truth by thirty years’ (Johnson). Discuss.’

Methods
Twice-weekly lectures. Weekly seminars (ten students) the week following the lecture, on the same topic. Reading.

Role of teacher
Presenter of knowledge, leader of discussions and assessor.

Resources
Reading list referring to books and articles in the main library collection and reserve collection.

Timetable
Week 1 Lecture topic 1
Week 2 Lecture topic 2; seminar topic 1
Week 3 Lecture topic 3; seminar topic 2
Week 4 Lecture topic 4; seminar topic 3
Week 5 Lecture topic 5; seminar topic 4
Week 6 Lecture topic 6; seminar topic 5
Week 7 Reading week; deadline for coursework
Week 8 Lecture topic 7; seminar topic 6
Week 9 Lecture topic 8; seminar topic 7
Week 10 Lecture topic 9; seminar topic 8
Week 11 Lecture topic 10; seminar topic 9
Week 12 Seminar topic 10; revision
Week 13 Exam
Learning activity
Reading for seminars, writing an essay, revising for the exam.

Costs
When student numbers are small, the main costs are generated by the lectures, but when the numbers are large, the main costs are generated by seminars, and essay and exam marking. Assessment accounts for only 13 per cent of costs with 20 students but 35 per cent of costs with 160 students. There are good economies of scale when there are up to 80 students, but little more to be gained after that. Learning resource costs, in terms of library investment, are fixed. Large student numbers might cause problems of access to these resources.

<table>
<thead>
<tr>
<th>Student numbers</th>
<th>Total teaching + assessment hours</th>
<th>Teaching + assessment hours per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>127</td>
<td>6.4</td>
</tr>
<tr>
<td>80</td>
<td>237</td>
<td>3.0</td>
</tr>
<tr>
<td>160</td>
<td>383</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Comments on Case Study 1
There is a considerable amount of teacher input (20 lectures) compared with the other case studies: students might appreciate this. Keeping the size of seminar groups down to ten would be a valuable support to student learning.

While this is a conventional and very common course design there are, however, several potential difficulties associated with it:

- The aims are academic: the course is about knowing about the nature of research rather than about research competence. You couldn't expect students to undertake research as a consequence of this course.
- The aims are stated in terms of the teacher's intentions rather than in terms of what students might learn. No outcomes are stated and so the purpose of assessment is unclear.
- The course design emphasises content and what the teacher does, rather than process and what the students do.
- The course schedule and use of lectures oblige all students to learn at the same pace and level, regardless of individual differences, background knowledge or interests.
- The assessment samples quite a small proportion of the course (one essay from ten topics and three exam questions from eight) so that there is much which is un-assessed or left to chance. Students could take a risk and stop attending seminars or even lectures once they have submitted their essays and about four topics under their belt.
- Students get feedback on their learning just once, on their one essay, probably towards the end of the course.
- This course relies heavily on students undertaking effective independent reading, though it does not say how much reading is expected. Whether this reliance is justified would be a sensible focus for evaluation.
If student numbers are small, this course design is much more expensive than those in case studies 2 and 3. There are very worthwhile economies of scale here.

Case Study 2: An academic skills course in research methods

Rationale
The course is concerned with a sub-set of research skills. Skills are assumed to be acquired by demonstration by someone already skilled (the teacher), practice in the use of the skill by the student, and feedback on the use of the skill by the teacher or by other students. The kinds of skills being acquired are not easily testable under exam conditions and so coursework assignments are more appropriate. Each skill requires a unique form of assessment.

Outcomes
1. Students can interpret and critique research studies that use a range of designs and methodologies.
2. Students can review a field of study, collating evidence from different kinds of research and critiquing the use of these methods.

Assessment
100 per cent coursework: three assignments involving interpreting two individual research studies (1,000 words each) and one review of research in an area of choice (2,000 words).

Methods
The teacher introduces research interpretation skills in six lectures, demonstrating them in action. Students then practise these skills in six workshops (of 20 students) in the following week, after having found and reviewed literature introduced in the associated lecture. They undertake this independent work in learning teams of four, and these teams meet before each workshop to prepare a short presentation that they will give at the workshop.

Role of teacher
Trainer, presenter and assessor: training students to use well-defined skills in a specified way and assessing the standard of competence displayed using explicit criteria.

Resources
Handouts consisting of explanatory notes and practice exercises are provided for use in both the lectures and the workshops. A ‘Guide to learning in teams’ is provided. Copies of articles used as the focus of review activities are reproduced under a copyright agreement. Reference is made to journals in the library.
**Timetable**

Week 1  
Lecture 1

Week 2  
Learning team meeting 1; workshop 1

Week 3  
Lecture 2

Week 4  
Learning team meeting 2; workshop 2

Week 5  
Lecture 3; deadline for assignment 1

Week 6  
Learning team meeting 3; workshop 3

Week 7  
Lecture 4

Week 8  
Learning team meeting 4; workshop 4

Week 9  
Lecture 5; deadline for assignment 2

Week 10  
Learning team meeting 5; workshop 5

Week 11  
Lecture 6

Week 12  
Learning team meeting 6; workshop 6

Week 13  
Deadline for assignment 3

**Learning methods**

Class contact accounts for only 12 hours while work with learning teams accounts for 54 hours and individual work on assignments for 84 hours.

<table>
<thead>
<tr>
<th>Learning activity</th>
<th>Hours</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending demonstration lectures</td>
<td>1 hour/week for 6 weeks</td>
<td>6</td>
</tr>
<tr>
<td>Workshops</td>
<td>1 hour/fortnight for 6 weeks</td>
<td>6</td>
</tr>
<tr>
<td>Practising use of skills in learning teams</td>
<td>4 hours/week</td>
<td>48</td>
</tr>
<tr>
<td>Meeting with learning team</td>
<td>1 hour/fortnight</td>
<td>6</td>
</tr>
<tr>
<td>Work on assignments</td>
<td>2 x 24 hours and 1 x 36 hours</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Total hours</td>
<td>150</td>
</tr>
</tbody>
</table>

**Costs**

Lecture and workshop costs are low but assessment costs are relatively high, accounting for 58 per cent of staffing costs for 160 students. As a result, while overall costs are low, economies of scale are modest.
<table>
<thead>
<tr>
<th>Student numbers</th>
<th>Total teaching + assessment hours</th>
<th>Teaching + assessment hours per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>50</td>
<td>2.5</td>
</tr>
<tr>
<td>80</td>
<td>136</td>
<td>1.7</td>
</tr>
<tr>
<td>160</td>
<td>274</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Comments on Case Study 2

- This course aims to develop academic skills of critique and review (Case Study 3, as we will see, is concerned with skills of conducting research).

- While students undertake much of their learning in their learning teams they undertake their assignments individually, avoiding problems of authorship and fairness in marking group work.

- Students experience 12 hours of discussion (six in workshops and six in team meetings) compared with 10 hours in Case Study 1, and also probably experience additional informal group discussion before their team meetings.

- Students receive feedback on three assignments, but are also given feedback by the tutor and other students on six occasions in response to their presentations in workshops.

- In contrast with Case Study 1, there is very little formal input from the lecturer: the emphasis is on process and practice of skills.

Case Study 3: A project-based course in research methods

Rationale

This course requires students to use the research skills and methods that the course is about: students learn by actually doing research rather than by listening to lectures or reading about research. It has an applied focus and assesses competence. It builds up a range of sub-skills before assembling them in a project. The sub-skills are assessed separately for formative purposes (this involves peer assessment) and in an integrated and applied form in the project, for summative purposes. It is assumed that students will be motivated to learn how to use the skills they need for their project.

Outcomes

On completing this course, students will be able to:

1. analyse a variety of quantitative data using appropriate statistical techniques with a standard software package;
2. analyse qualitative data using a variety of techniques;
3. plan, carry out and write up a small-scale research study involving both qualitative and quantitative data.
Assessment

100 per cent coursework. Two coursework project assignments are compulsory but not marked, one involving the analysis of quantitative data, the other involving qualitative data. The data and analyses are discussed in weeks 4 and 8 and then written up for submission as appendices to the project report.


Methods

The course revolves around work on two mini-projects and one main project, introduced in an overview lecture in week 1. The two mini-projects each last three weeks: one week for briefing, one for independent work and one for reviewing. Mini-projects are undertaken in groups of four. The main project lasts seven weeks, with two supporting workshops, and is undertaken individually. All workshops last two hours and are intensely practical. The two review workshops involve peer review of draft group projects against specified criteria.

Role of teacher

Project supervisor: briefing students on the nature of the task, supervising group and individual project work and assessing the projects.

Resources

Two set textbooks (one on statistics, one on analysing qualitative data).

Project Guide, written by the tutor, with detailed briefings for the two mini-projects and the main project.

Timetable

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview lecture</td>
</tr>
<tr>
<td></td>
<td>Workshop 1: setting up mini-project 1</td>
</tr>
<tr>
<td>2</td>
<td>Independent group work on mini-project 1</td>
</tr>
<tr>
<td>3</td>
<td>Workshop 2: peer review of outcomes of mini-project 1</td>
</tr>
<tr>
<td>4</td>
<td>Workshop 3: setting up mini-project 2</td>
</tr>
<tr>
<td>5</td>
<td>Independent group work on mini-project 2</td>
</tr>
<tr>
<td>6</td>
<td>Workshop 4: peer review of outcomes of mini-project 2</td>
</tr>
<tr>
<td>7</td>
<td>Workshop 5: main project: research design</td>
</tr>
<tr>
<td>8</td>
<td>Independent work on main project: collecting data</td>
</tr>
<tr>
<td>9</td>
<td>Workshop 6: main project: analysing data</td>
</tr>
<tr>
<td>10</td>
<td>Independent work: analysing data</td>
</tr>
<tr>
<td>11</td>
<td>Workshop 7: main project: writing project reports</td>
</tr>
<tr>
<td>12</td>
<td>Independent work: writing up project reports</td>
</tr>
<tr>
<td>13</td>
<td>Deadline for submission of main project report</td>
</tr>
</tbody>
</table>
Learning activity
Students spend most of their time undertaking projects: the two mini-
projects in groups and the main project on their own.

<table>
<thead>
<tr>
<th>Learning activity</th>
<th>Hours</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory lecture</td>
<td>1 hour</td>
<td>1</td>
</tr>
<tr>
<td>Workshops</td>
<td>2 hours/fortnight</td>
<td>14</td>
</tr>
<tr>
<td>Independent project work</td>
<td>10 hours/week</td>
<td>120</td>
</tr>
<tr>
<td>Writing up main project</td>
<td>24 hours</td>
<td>24</td>
</tr>
<tr>
<td>Total hours</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Costs
The workshops can be undertaken with groups of up to 40. As the mini-
projects are also undertaken in groups no supervision time is involved,
and as they are peer reviewed there are no marking costs. The main costs
therefore are associated with project supervision for the main project and
marking of the main project.

<table>
<thead>
<tr>
<th>Student numbers</th>
<th>Total teaching + assessment hours</th>
<th>Teaching + assessment hours per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>59</td>
<td>3.0</td>
</tr>
<tr>
<td>80</td>
<td>177</td>
<td>2.2</td>
</tr>
<tr>
<td>160</td>
<td>353</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Comment on Case Study 3
- Students receive one hour of one-to-one supervision in this course and
  are given more individual attention than in Case Studies 1 and 2.
- Contrary to expectations, this project-based course costs less to run,
  even for very large groups, than the lecture-based course in Case
  Study 1.
- Considerable emphasis is placed on collaborative learning through
  workshops, group work and peer assessment.
- There is investment in developing the project skills necessary for
  students to be able to undertake an extended project with little
  supervision.

Activity 2.9 Reviewing the design of three alternative versions
of the same course
Put yourself in the shoes of a student who might be undertaking
the three differently designed courses that we have examined in
Case Studies 1 to 3.
1 Which set of course aims would you have valued most highly
as a student?
2 In which course would the teaching and learning processes have given you the best learning experience as a student, and why?

3 Which would you have found most challenging?

4 Which of these alternatives would have provided you with the best assessment (in terms of issues such as being clear in its demands, involving engaging learning activities, giving you feedback on your progress, and assessing you in a way you would consider fair and valid)?

5 And now as a teacher, which would you prefer to teach, and why?

6 Comment on the similarities and differences between these case studies in terms of:
   - aims;
   - methods and learning activity;
   - assessment;
   - learning resources;
   - costs.

**About aims**

The three case studies are clearly trying to achieve completely different things, even though they are all titled 'Research methods'. There is an infinite variety of possible aims to choose from, each valued by different interest groups, such as academics, postgraduate supervisors, employers and students themselves.

**About methods and learning activity**

There is a sharp contrast among the methods used. Case Study 1 relies almost entirely on lectures and seminars, while Case Study 3 is based on project work carried out in groups. Case Study 2 is in an intermediate position. Lectures are central, but there is more emphasis on practice and discussion (in workshops), on independent learning activity and on small group work.

The courses described in these case studies involve 150 hours of student learning time, both in and out of class. It would be hard to guess this from Case Study 1, where it would also be difficult for students to tell what was expected of them; Case Studies 2 and 3, however, are quite explicit about what is expected. Out-of-class activity accounts for up to 87 per cent of all learning time in these case studies, and this time needs to be planned as carefully as in-class time. In reality, the number of hours that students put in varies enormously with differences in ability and commitment. However, when designing a course you should still make assumptions about what students can be expected to do in order to learn, and you should make your expectations clear to students. It is not just the total number of hours or the weekly pattern of hours that matters, but what these hours should be used for. If a course expects eight hours of reading a week, but the only specification for this reading is a list of titles that may or may not be in the library, then experience tells me that this reading is unlikely to take place. Students benefit both from clear
task definition and from easy access to the resources they need when undertaking these tasks.

About assessment

The case studies vary greatly in the nature of their assessment. Exams are used in Case Study 1 but not in the other two case studies, which are concerned with skills that are not easy to assess appropriately under exam conditions. Case Study 3 uses assessment as the main learning activity, while Case Study 1 separates assessment almost completely from the main learning activities. There is one coursework assignment in Case Study 1, but three in Case Studies 2 and 3. The impact of regular assignments and feedback on pacing students through courses and guiding their progress should not be underestimated and, to some extent, the more assignments you use, the more you will focus students’ attention on your learning activities. The problem is, then, how to mark and give feedback on these more frequent assignments. Case Study 3 marks and gives feedback on mini-projects on three occasions, but this is not expensive because it relies on peer feedback from other students on all but the final project. The teacher’s marking load is cut down dramatically.

About learning resources

A crucial question when designing a course is ‘where are students going to get new knowledge from?’ Case Study 1 answers ‘from the lecturer’; it is the only course design that makes this decision. Case Study 3 answers: ‘from textbooks and a specially written project guide’. Case Study 3 also involves skills more than knowledge, and the skills are to be found in workshops and project activity rather than in lectures or learning materials. Case Study 2 provides all students with copies of the journal articles they need to work with. Access to useful resources is a crucial issue for students, and time spent planning this access or producing new resources is a crucial aspect of course design.

About costs

Case Study 1 costs about twice as much to run for small groups as Case Studies 2 and 3, but is as economical for large groups. These issues are important when designing courses. The balance of teaching and assessment costs is also very different for the three courses, with Case Study 2 putting far more of its resources into assessment than Case Study 1.

A practical science course

Context

Case Studies 4 and 5 offer two alternative designs for a practically-oriented science course – a second-year, undergraduate, one-semester course lasting 13 weeks. The subject area and detailed content are deliberately not specified in order to make it easier for readers from various science and technology areas to relate to.
Costings have been calculated for three sizes of student group: 10, 40 and 80. It is assumed that it takes a lecturer three hours (including preparation) for each hour of lecturing, and three hours' preparation for each week of laboratory work (but not for each lab 'split').

Case Studies 4 and 5 are summarised in Table 2.4 below.

Table 2.4 Summary of Case Studies 4 and 5

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Aims or outcomes</th>
<th>Assessment methods</th>
<th>Teaching and learning methods</th>
<th>Learning resources</th>
<th>Teaching role</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Laboratory-based course</td>
<td>Laboratory skills, experimental design skills, understanding of scientific concepts</td>
<td>10 lab reports (20%) Exam (80%)</td>
<td>22 lectures 11 x 3-hour labs</td>
<td>Textbooks Lab notebook Lab</td>
<td>Presenter, designer of labs, marker of lab reports</td>
<td>Very high, but good economies of scale</td>
</tr>
<tr>
<td>5 Resource-based course using computer simulations</td>
<td>Laboratory skills, experimental design skills, understanding of scientific concepts</td>
<td>Reports and skills as coursework requirements (unmarked) 100% examined</td>
<td>10 lectures 10 demonstrations 10 x 4-hour computer labs 10 peer-marking sessions</td>
<td>Computer simulations, videos Guides to simulations Textbook Model lab reports</td>
<td>Briefing, supervising, organising, monitoring progress</td>
<td>Medium, with good economies of scale: very economical with large numbers</td>
</tr>
</tbody>
</table>

Case Study 4: A laboratory-based course

Rationale

Students are assumed to learn by ‘doing science’ in the laboratory. Lectures are considered appropriate to introduce the underpinning theory. Theory and practice are therefore brought together. Students are assumed to learn by writing up lab reports in the way scientists do and to be highly motivated by laboratory work. Students are considered to have insufficient knowledge and maturity, and there are insufficient resources, to allow them to design their own experiments, so regrettably they have to follow specified procedures. Students are considered to need weekly tasks to keep them working.

Aims

1. To develop practical laboratory skills
2. To develop understanding of theoretical concepts
3. To develop experimental design skills
Assessment

Coursework: 20 per cent
Ten laboratory reports each worth 2 per cent
Exam: 80 per cent. Two-hour exam with 20 short-answer questions on factual information and two longer questions about theoretical concepts, based on the lab work.

Methods

Two weekly lectures, one introducing the theoretical and the other the practical background to that week's lab session. A weekly three-hour lab session, accompanied by a detailed written lab notebook which provides instructions. The lab takes 20 students at a time.

Role of teacher

Presenter of the background theory and practicalities; designer of the lab sessions; supervisor and guide during lab sessions; corrector of mistakes in lab reports. Lab technicians also perform a teaching role.

Resources

Two science textbooks are listed. References are listed in the laboratory notebook. This notebook provides summaries of the background to lab sessions and detailed instructions for carrying out the lab work, including data recording sheets and drawings of the apparatus in most cases.

Timetable

Week 1  Lectures 1 and 2
Week 2  Laboratory session 1; lectures 3 and 4
Week 3  Laboratory session 2; lectures 4 and 4
         Submission of lab report 1
Week 4  Laboratory session 3; lectures 6 and 7
         Return of lab report 1; submission of lab report 2
Weeks 5–11  Repeated pattern as for week 4
Week 12  Revision
Week 13  Exam

Learning activity

The main learning activity is writing up lab reports. The expectation to ‘write up’ lecture notes and to ‘prepare’ for lab sessions is not explicit or structured.
<table>
<thead>
<tr>
<th>Learning activity</th>
<th>Hours</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>2 hours/week</td>
<td>22</td>
</tr>
<tr>
<td>Labs</td>
<td>3 hours/week</td>
<td>30</td>
</tr>
<tr>
<td>Reading lecture notes/textbook</td>
<td>2 hours/week</td>
<td>22</td>
</tr>
<tr>
<td>Preparing for lab sessions</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Writing up lab reports</td>
<td>4 hours/week</td>
<td>40</td>
</tr>
<tr>
<td>Revising for exam</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td><strong>Total hours</strong></td>
<td></td>
<td><strong>150</strong></td>
</tr>
</tbody>
</table>

**Costs**

<table>
<thead>
<tr>
<th>Student numbers</th>
<th>Total teaching hours</th>
<th>Teaching hours per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>146</td>
<td>14.6</td>
</tr>
<tr>
<td>40</td>
<td>233</td>
<td>5.8</td>
</tr>
<tr>
<td>80</td>
<td>369</td>
<td>4.6</td>
</tr>
</tbody>
</table>

**Comments on Case Study 4**

Students often rate their lab sessions as the most rewarding component of their courses, and lectures can be an efficient way of briefing students for labs. Students are likely to be very familiar with this pattern of course design.

With large numbers it is often necessary to have highly structured courses. However, despite the familiarity of this course design, it suffers from a number of potential problems:

- Science courses are often expensive to teach and this is partly reflected in the higher funding per student in science. There are substantial economies of scale in this example, but for groups of 80 it still costs twice as much as the most expensive research methods course for 80 students described in Case Studies 1, 2 and 3. Laboratory technician costs, any demonstrator costs and the costs of the laboratory and its equipment and consumables have not been taken into account, so we are looking at a very resource-intensive form of education here. Whether these costs are justified would depend on how well its aims were achieved and whether there were feasible, cheaper, alternatives. Case Study 5 offers one such an alternative.

- Although the first aim of the course is to develop practical skills, these are not actually assessed – neither lab reports nor the exam will reveal the degree of skill that students have acquired.

- The second aim of the course – to develop understanding of theoretical concepts – can be acquired in more economical ways (see Case Study 5).
• Although the third aim of the course is to develop experimental design skills, students never actually use this skill and it is not assessed. All the lab sessions are designed by the lecturer. Students could have been set an exam question which required them to design an experiment for a specified purpose, but they were not.

• With 80 students, assessment involves marking 800 lab reports. This is likely to be dull as well as time consuming. Case Study 5 proposes an alternative.

• Lab report marks often fail to distinguish between students: everyone gets middling to high marks. Individual students also often get the same mark week after week. The value of allocating marks to lab reports is therefore questionable. Using weekly reports may well be productive in terms of the learning activity it generates and feedback will be valuable. However, both the activity and the feedback can be designed into courses without using lecturer's precious time marking.

• The assumption that lectures and pre-specified labs bring theory and practice together seems questionable. The experiential learning cycle describes learning by doing as a cyclical process involving doing, reflection, thinking and planning, followed by more doing. Traditional science sequences involve doing (in the lab), and may involve thinking (in the lecture), but often miss out both reflection and planning by the students, and so fail to link theory to practice.

• The learning activity most likely to be dropped by students is probably ‘reading lecture notes/textbook’ and ‘preparing for lab sessions’, involving over 20 per cent of the available learning time.

Case Study 5: Resource-based course using computer simulations

Rationale

It is assumed that students can ‘see’ and understand scientific principles more clearly in computer-based simulations than in the laboratory, and can undertake many more, and more varied, ‘virtual experiments’. They can also learn more about scientific method if they design experiments themselves, rather than having to follow tight sets of instructions. It is believed that students learn more when they work collaboratively, so all simulation work will be undertaken in pairs. Students are considered capable of acquiring practical skills with equipment outside labs and without pretending to be doing experiments.

Aims

The aims are identical to those in Case Study 4. The outcomes are:

1 Demonstrate [the following] equipment handling skills to a specified standard.

2 Demonstrate understanding of [the following] concepts by tackling short experimental problems.

3 Identify flaws in experimental designs.

4 Design experiments to test specified hypotheses.
Assessment

The assessment consists of five elements:

1. It is a course requirement that students must submit a complete portfolio of individual reports on their weekly computer-based experiments in order to be allowed to sit the exam. The portfolio itself is not marked.

2. Students obtain weekly feedback on their experimental work through 'model' reports written by the lecturer and written peer assessment. This does not involve marks.

3. There is a list of equipment handling skills that students have to acquire from video demonstrations and practice. These skills are tested by a technician. If the technician finds the students 'not yet competent', they have to re-submit themselves for testing the following week. It is a course requirement that students must successfully acquire the complete set of skills before being allowed to sit the exam.

4. In week 7, there is a break from weekly lectures and computer labs when students take a 'mock' exam in exactly the format of the final exam. They spend one hour on the paper and then one hour marking each others’ answers and discussing them with the lecturer.

5. The course is 100 per cent examined. The exam involves computer-marked, multiple-choice questions that test understanding of scientific concepts, and two open-ended questions concerned with experimental design. One question requires students to critique a flawed experimental design; the other requires them to design an experiment to test a specified hypothesis.

Methods

One lecture a week to introduce scientific concepts and an accompanying textbook. One demonstration a week to illustrate how the computer simulation can be used to undertake virtual experiments. One peer assessment session a week to give feedback on computer lab reports. Open access to computer laboratories (supervised by the lecturer, 15 minutes per student pair per week). Open access to video demonstrations and equipment, supervised by a lab technician, in a room next to the lab.

Role of teacher

Gives lectures which brief students about the work to be undertaken, selects computer simulations and designs a range of possible uses of each simulation, supervises computer lab sessions, writes 'model reports' for each week's work, organises peer assessment, organises technicians and equipment for skills acquisition, monitors students' progress.

Resources

A set of computer simulations involving the scientific concepts the course is concerned with; video demonstrations of equipment, and the equipment itself; printed guides to each simulation and its potential uses; model reports; textbook, open-access computer labs.
Chapter 2  Designing courses: the practice

Timetable

Week 1  Conceptual lecture 1 and demonstration 1
         Open access computer lab sessions
         Open access equipment skills lab

Week 2  Conceptual lecture 2 and demonstration 2
         Open access computer lab sessions
         Open access equipment skills lab
         Peer assessment of reports from Week 1

Weeks 3 to 6  Repeated pattern as Week 2

Week 7  Mock exam: multiple-choice question test and experimental design task. Peer assessed using model answers

Weeks 8 to 11  Repeated pattern as Week 2

Week 12  Revision, completion of portfolio of reports, completion of skills testing

Week 13  Exam

Learning activity

Students’ main learning activity is undertaking and writing up their computer-based experiments, peer assessing and getting feedback (40 + 20 + 10 = 70 hours).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Demonstrations</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Peer-marking sessions</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Computer lab work</td>
<td>4 hours/week</td>
<td>40</td>
</tr>
<tr>
<td>Reading lecture notes/textbook</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Preparing for lab sessions</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>Writing up reports</td>
<td>2 hours/week</td>
<td>20</td>
</tr>
<tr>
<td>Work acquiring and being tested</td>
<td>1 hour/week</td>
<td>10</td>
</tr>
<tr>
<td>on equipment skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mock exam: revision, peer</td>
<td>10 hours</td>
<td>10</td>
</tr>
<tr>
<td>assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revision for final exam</td>
<td>20 hours</td>
<td>20</td>
</tr>
<tr>
<td>Total hours</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>
Costs

<table>
<thead>
<tr>
<th>Student numbers</th>
<th>Total teaching hours</th>
<th>Teaching hours per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>66</td>
<td>6.6</td>
</tr>
<tr>
<td>40</td>
<td>108</td>
<td>2.7</td>
</tr>
<tr>
<td>80</td>
<td>144</td>
<td>1.8</td>
</tr>
</tbody>
</table>

There are additional weekly costs associated with computer laboratories and equipment, the use of technicians next to the laboratory, and also purchase costs for simulations. However, these are unlikely to be higher than for the use of conventional laboratories and are not included here.

Comments on Case Study 5

- The teaching time costs are less than half those for Case Study 4. For larger groups, costs are comparable to the cheapest non-science and non-lab-based courses described in Case Studies 1, 2 and 3. Science courses are not inevitably more expensive!

- The aims of the course are linked explicitly to methods and assessment – students’ experimental design and equipment handling skills are both assessed, whereas in Case Study 4 they are not.

- Students have a very flexible timetable and this course design might suit part-time students much better than the one described in Case Study 4.

- The lecturer marks only two questions on the exam – all other assessment is either computer-marked or peer-assessed for feedback without marks. For 80 students this means at least 800 fewer pieces of student work to mark than in Case Study 4.

- Students have an opportunity for a ‘dry run’ at the exam, in Week 7, giving themselves plenty of time to rectify any weaknesses they discover.

- Students’ experimental work and practice at handling equipment is largely self-paced, with flexibility in timing, providing easier access to the course.

- Students are likely to learn a great deal from marking each others’ weekly reports and they will get immediate feedback instead of waiting a week or more.

- Students work collaboratively on all simulation-based work as well as in weekly peer assessment (51 hours in all compared with none in Case Study 4). This is likely to build into the course more informal discussion and more sense of a learning community.

- More time is spent doing experiments and less time writing them up than in Case Study 4.

- Fifteen minutes per student pair per week of personal attention by the lecturer in computer labs may not seem very much, but it is 67 per cent more than students get in the labs described in Case Study 4 (3 hours for 20 students = 9 minutes per student).
There is less unstructured and unsupported out-of-class time here than in Case Study 4, and so it is more likely that students will actually put in the necessary time.

Students both plan their own experiments and reflect on them through peer assessment. This provides the elements that were missing from the experiential learning cycle in Case Study 4.

Care would need to be taken in checking that simulations and practical work covered all the knowledge and skills that would have been covered by the conventional course in Case Study 4.

Whether computer simulations are as effective as conventional labs in helping students to understand science concepts is empirically testable, and ought to be a focus of evaluation.

### Activity 2.10 Considering the potential of course design ideas in a case study for your own course

Which of the following course design features adopted in Case Study 5 might be adaptable for use in your course, either to save resources or to improve student learning?

<table>
<thead>
<tr>
<th>Course design features</th>
<th>Potential for saving resources</th>
<th>Potential for improving learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of computer simulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students working in pairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer assessment for feedback on coursework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment on skills by support staff</td>
<td></td>
<td></td>
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<tr>
<td>Multiple-choice question testing</td>
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<tr>
<td>Portfolios of completed work as a course requirement</td>
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<td></td>
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</tbody>
</table>
2.6 Conclusion

This chapter has attempted to break the complex business of course design into its component parts and then put them back together again by analysing case studies. It has not been possible to go into detail about crucial components such as setting aims and outcomes, designing assessment, planning to support students and considering the uses of C&IT. Other chapters and packs in the series provide this detail. Equal opportunity issues need to be considered in all aspects of course design as one of the underpinning practices in teaching and learning. You are encouraged to find out more about these separate components and then return to the 'big picture' presented here.

You are also encouraged to use the following list of further reading to explore these ideas in more depth and, in particular, to find accounts of course designs in your own subject area, and these you should find in your subject network (LTSN website).

The most important idea you need to take from this chapter is that courses work, or fail to work, as systems – as a complex pattern of interrelated components that may or may not be coherent and may or may not be working together towards clear ends. Activity 2.4 addresses issues which are more important than any of the specific details of components of your course.

Further reading

Baume, C. and Baume, D. A. (1992) Course Design for Active Learning, Sheffield, CVCP Universities’ Staff Development and Training Unit.

A practical manual oriented towards the kinds of course design that are more likely to support active and engaged learning.


One of a series of ten discipline-specific publications outlining the issues facing courses as they adopt more resource-based designs and providing brief case studies. A useful source of references for guidance on producing open and distance learning courses and materials.


A substantial and comprehensive US manual taking a formal systematic approach to course design. Useful for the examples of course design and their documentation.


A pragmatic guide to designing courses to cope with large classes, with examples of a series of ‘before and after’ course redsings together with costings.


A superb example of a discipline-specific practical guide which goes wider than individual course design and covers the design of whole programmes. Packed with examples and references to discipline-specific literature.

Both scholarly and practical, this classic book takes you through all the key issues in course design in an insightful and realistic way.

**References**


