PAUL RAMSDEN

LEARNING TO TEACH IN HIGHER EDUCATION

SECOND EDITION

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Learning to Teach in Higher Education, 2nd Edition

This classic text combines practical advice with sound theory to provide a uniquely stimulating introduction to the practice of university teaching. The book has a simple message: to become a good teacher, first you must understand your students' experiences of learning. Out of this grows a set of principles for effective teaching in higher education.

This fully revised and updated new edition reflects a changed higher education environment, addressing issues of quality, standards and professional development in today's universities. The book includes new research findings and suggestions for further reading, while case studies of exemplary teaching connect ideas to practice.

The book is essential reading for new and experienced lecturers.

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Learning to Teach in Higher Education, 2nd Edition

Paul Ramsden

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Foreword

In universities and colleges at the beginning of the twenty-first century the politics of teaching quality can occasionally feel overwhelming. Excellence in teaching is required as an institutional marketing tool, as part of an individual academic's case for promotion, to respond to almost ubiquitous student feedback, to justify system-wide investment in research and scholarship, and to provide accountability for public funding. Much of the rhetoric associated with all these requirements is feverish, and contributes to making the issues feel new and pressing. In these circumstances it is easy to forget that learning—defined as a subject-based conversation between more and less experienced learners—has always been at the heart of the higher education enterprise, even in the most ambitious 'research-led' institutions. Being an effective teacher is high up the list of intangible benefits that attract bright women and men into academic careers, and for many it is still the feature which gives them the most satisfaction.

Historically it has also been a part of the professional role that has relied on passive socialisation, on tacit knowledge and on benignly collegial assumptions of competence. Raising its status has often appeared threatening, as well as yet another example of the breakdown of trust implicit in the 'audit society'. Researchers and staff developers in learning and teaching in the higher education context have had to tread carefully to avoid charges of oversimplification of complex processes, of failure to understand deeply embedded cultural commitments and of being stooges of cost-cutting and instrumental 'new' managers.

Paul Ramsden is a leading light among the small band of researchers and developers who have steered the rest of us through this minefield with our objectives clear and our integrity intact. *Learning to Teach in Higher Education* is deservedly a classic text. The original edition allied some of these deep historical commitments with new and arresting ways

of looking at student learning. A decade on, the research methodology and resulting evidence has made considerable progress, as reflected in this substantially revised and updated volume. But the original intention—of working with the grain of the best conscience of the academic enterprise—has not reduced or been diverted. For both experienced and new teachers in higher education this book will prove a rewarding and reassuring investment.

Sir David Watson
Vice-Chancellor
University of Brighton

Preface to the second edition

Learning to Teach in Higher Education aims to provide a unique introduction to the practice of university teaching. It has a simple message: to become a good teacher, first understand your students' experiences of learning.

Since it first appeared over ten years ago, it has become one of the most popular books on university teaching. I hope that this new edition will be as attractive to a new generation of university teachers as the first one was to their colleagues. The message is the same, but I have taken the opportunity to reflect a changed environment by reworking some of the practical examples and the discussion of evaluation and quality in several chapters. I have also added suggestions for further reading and some new research findings to bring the story up to date. Chapters 1, 7, 9, 11 and 12 are substantially different.

Designed as a text for practising lecturers, both new and experienced, *Learning to Teach in Higher Education* starts from a conviction that university teachers can improve their teaching if they apply evidence from research into student learning. It does not present a series of teaching techniques that they might follow; it does not suggest that there are any right answers to the question of how to teach students better. It argues only that there are solutions that may work better or worse for each individual teacher, each department, each university and each group of students. The idea of the book is to help readers find their own way through reason combined with intuition.

The book is addressed chiefly to teachers of undergraduate students in systems of higher education based on the United Kingdom model. I have revised it at a time when academics continue to be under pressure to demonstrate their effectiveness and efficiency, and to widen access, while not sacrificing excellence. You can read the book as a text on the evaluation of courses and teaching in this taxing climate of concurrent restraint and expansion. It returns again and again to issues of the quality

of teaching, students' perceptions of how effective it is, and indicators of teaching performance.

But it is a text written from a certain point of view. Another of its themes is that the demands of performance measurement and quality review, while they form part of the environment in which today's lecturers have to work, can never in themselves make learning and teaching and better. We can only hope to improve teaching in higher education if we understand that the process and outcomes of improvement are worthwhile ends in themselves.

Paul Ramsden
Sydney

Acknowledgements

Part 1

Learning and teaching
in higher education

Chapter 1

Introduction

> You cannot be wise without some basis of knowledge; but you may easily acquire knowledge and remain bare of wisdom.
>
> (A.N.Whitehead)

University teaching in its context

We work in surroundings that our colleagues of thirty years ago would not recognise. Higher education has become part of a global shift to a new way of creating and using knowledge. The new way is focused on solving problems and is sensitive to customer needs. It strives for quantity as well as quality. It cuts across disciplinary boundaries. It is enlivened by apparently infinite quantities of instantly accessible information.

That is the good news. In knowledge-based economies, governments see universities as engines for social change and the expansion of prosperity. Being competitive on world markets means that we must invest in higher education. However, being competitive also demands controls on public expenditure. The only way to solve this equation is to spread available resources more thinly and to find new, non-public sources of income. University teachers have accordingly found themselves working harder and at the same time being required to be more businesslike and more accountable.

We have seen assiduous pressure on universities to give more formal and public accounts of themselves for funding purposes. Progress towards connecting university funding with performance is an international phenomenon. Implacable forces mandate it: the staggering cost of mass higher education means that those who pay the piper will want to call the tune. More visible and intrusive types of evaluation and reporting now link resource allocation intimately to the kind of achievements that taxpayers, students, employers and governments want from their

institutions of higher education. Accountability, quality assurance, league tables and performance indicators have become permanent entries in the higher education lexicon. Variation in the level of external inspection may come and go, but not the principle that all support comes with strings attached. 'Gone are the days' said a higher education minister approvingly, 'when being a university or a teacher in a university was enough to command respect. Opening our services to public accountability is a key way in which we support quality enhancement and improvement' (Margaret Hodge, quoted in *The Guardian*, 13 March 2002).

Because of these various changes, the pleasures of the academic life have dwindled for many university teachers. They are unimpressed especially by the administrative effort associated with quality assurance and accountability. It uses up time and energy that could be focused on the core business of research and teaching. It seems to compromise the uncertainty that is intrinsic to scholarship and discovery. The idea of learning as a dialogue between student and teacher appears to retreat before a tide of bureaucracy.

Tensions arise especially from the requirement to do more with less– to teach more undergraduates, to supervise more research students, to get those students through their degrees more quickly. Where many lecturers in the 1980s handled classes of 30 to 50 students, they are now faced with groups in the hundreds. Widening participation means that today's academics are also expected to deal with an unprecedentedly broad spectrum of student ability and background. They can no longer rely on students having detailed previous knowledge, especially in mathematics and science. Attainment in literacy, the primary generic skill, often leaves much to be desired. One in five students in the United Kingdom, and one in three in Australia, will drop out. Yet most of these very same students are contributing substantial sums to their education and are working to pay their way. They have grown up with the expectation of staying connected to a customer-focused, instant, 24-hour, 7-day week service: why should a university education be any different? Today's undergraduates are at once harder to teach and less indulgent towards indifferent teaching.

It is little exaggeration to say that these changes, taken together, mean that the average university teacher is now expected to be an excellent teacher: a man or woman who can expertly redesign courses and methods of teaching to suit different groups of students, deal with large mixed-ability classes, apply information and communication technology appropriately, and inspire students with zero tolerance for delay whose minds are probably on their next part-time job rather than on the pleasures

of learning. At the same time she or he will be expected to be highly productive in research, search out fresh income sources, juggle new administrative demands, and show accountability to a variety of masters as both a teacher and a scholar. How should we adapt to this changed environment?

A rationale for learning to teach better

These pressures form an inescapable background for any discussion of better university teaching. As you read this book, you may be wondering how to cope next week with a class that has grown to twice its former size, how you will find the time to acquire the formal training in teaching that your university now expects, or how to convince your head of department that your performance is excellent in your annual performance review. One way to address these problems would be for me to write and you to read a book about how to handle large classes, how to prepare a teaching portfolio, how to rescue failing students, or how to present evidence in an appraisal interview.

These are reasonable questions, and there are plenty of books that will help you answer them. But we should be careful not to confuse symptoms with causes. We deceive ourselves if we think that responses to new demands like these constitute our real problem, as surely as institutions and governments deceive themselves if they think that the forces of accountability and quality assurance will inevitably improve the standard of teaching and research, and as surely as students deceive themselves if they think that passing tomorrow's examination is what learning is all about. The truth is that external pressures form an inadequate basis for enhancing the quality of teaching. Something else is needed to make teaching better. If you really want to improve your own teaching, you must understand what this something is.

This book has been written because I believe that teaching is one of the most delightful and exciting of all human activities when it is done well and that it is one of the most humiliating and tedious when it is done poorly. Let me be clear about one fact: the quality of undergraduate education can bear a good deal of improvement. Outside a few favoured institutions, and even then for only a brief moment in history, no golden age of impeccable instruction and taken-for-granted high academic standards ever existed, except in the world of academic mythology. Accountability or no accountability, large classes or small, it is useless to deny that, although there is much that is and has been excellent in higher education teaching, there is a great deal that has always been frankly

bad. And there is little in the world of education that is more depressing than bad university teaching. Perhaps its nadir is reached in the vision of an outstanding scholar standing before a class of brilliant, handpicked first year students. He or she mumbles lifelessly from a set of well-worn notes while half the class snoozes and the other makes desultory jottings, or maybe—if this is an engineering or medicine lecture especially—tests new aerodynamic theories by constructing and launching paper projectiles. Everyone longs to get the hour over and get back to something serious.

The greatest fault of this sort of 'teaching' is not that it is inefficient or ineffective as a way of helping students to learn (though it is that as well) but that it is a tragic waste of knowledge, experience, youth, time and ability. There need never be any excuse for it: every teacher can learn how to do better. Anyone who has seen good teaching in action will not need to invoke the exigencies of performance review and assurance of academic standards as reasons for improvement. I think they will begin to understand the truth of the proposition that good teaching, though never easy, always strenuous, and sometimes painful, is nevertheless its own reward.

A view of learning and teaching

The basic idea of this book is that we can improve our teaching by studying our students' learning—by listening to and learning from our students. It will be useful to be clear from the start just what I mean by learning. One of the ideas you will meet time and time again as you read the following chapters is that learning in educational institutions should be about changing the ways in which learners understand, or experience, or conceptualise the world around them. The 'world around them' includes the concepts and methods that are characteristic of the field of learning in which they are studying.

From this point of view, the vital competences in academic disciplines and the application of knowledge consist in *understanding*. By understanding, I mean the way in which students apprehend and discern phenomena related to the subject, rather than what they know about them or how they can manipulate them. Many students can juggle formulae and reproduce memorised textbook knowledge while not understanding their subjects in a way that is helpful for solving real problems. Merely being able to repeat quantities of information on demand is not evidence of a change in understanding—at any level of education. Learning that involves a change in understanding implies and

includes a facility with a subject's techniques and an ability to remember its details. These skills become embedded in our knowledge during the slow process of changing our understanding of a topic, as anyone who will reflect on their own learning will recognise. In a university education, facts and skills are by no means the opposite of understanding, but they are of little use without it.

The idea of learning as a qualitative change in a person's view of reality is essential to an appreciation of my main argument. I shall maintain that improving teaching involves the same process that informs excellent student learning. It implies changing how we think about and experience teaching—it involves changes in our conceptions, in our common-sense theories of teaching as they are expressed in practice. These theories consist of sets of ideas and knowledge of their application. They are not coherent conceptual structures inside teachers' heads; they are expressed, as far as the individual teacher is concerned, solely in their experiences of teaching. They are exemplified through activity in the classroom, the design and implementation of educational programmes, teamwork with colleagues, and even the management of academic departments and universities. If the way in which lecturers understand teaching determines how effectively they will teach, as I hope to show, then simple solutions that offer better teaching through such devices as presenting them with a thousand and one techniques for using ICT are bound to fail. In subsequent chapters, I shall try to illustrate exactly what this means for improving university education.

The aim of teaching is simple: it is to make student learning possible. Teaching always involves attempts to alter students' understanding, so that they begin to conceptualise phenomena and ideas in the way scientists, mathematicians, historians, physicians or other experts conceptualise them—in the way, that is to say, that we as academics want them to understand them. There can be no such thing as a value-free education. This book, too, embodies an overriding educational value. Its main object is to help improve university teaching through encouraging academic staff to reason about what they do and why they do it. This argument rests on the proposition that higher education will benefit if those who teach inquire into the effects of their activities on their students' learning. This proposition, together with the idea that changes in how we think about and experience teaching are crucial to improvements in higher education, leads to this book being different from many others that have been written on the subject.

A reflective approach to improving teaching

The assumption that the primary aim of teaching is to make student learning possible leads to the assertion that each and every teaching action, and every operation to evaluate or improve teaching, should be judged against the simple criterion of whether it can reasonably be expected to lead to the kind of student learning which we desire. I shall look at what this kind of learning is in Chapter 3.

This in turn leads to an argument for a reflective and inquiring approach as a necessary condition for improving teaching. Such a strategy has always been tenable: good teachers down the ages have continually used what they learned from their students to improve their practice. But it is easier to implement it today than it used to be. During the last quarter century, some important research has taken place. It has looked, from the students' point of view, at the processes and conditions of effective university learning. It offers a valuable foundation—a basis in evidence—for progress towards better teaching.

One result of the knowledge gained through this research is confirmation of the fact which many people know intuitively—that teaching and learning in higher education are inextricably and elaborately linked. To teach is to make an assumption about what and how the student learns; therefore, to teach well implies learning about students' learning. 'Learning and teaching are constantly interchanging activities. One learns by teaching; once cannot teach except by constantly learning' (Eble 1988:9). This idea is compatible with a view that many of us would share: that university teaching unaccompanied by study and research is of limited value. The interdependence of research and teaching is a foundation stone of higher education.

A recurrent finding of research into student learning is that we can never assume that the impact of teaching on student learning is what we expect it to be. The educational context or environment in which they learn profoundly affects students' thoughts and actions. They react to the demands of teaching and assessment in ways that are difficult to predict: a lot of their learning' is not directly about chemistry or history or economics or engineering, but about learning how to please lecturers and gain high marks. These strategies all too often lead to them using methods of study that focus on simply recalling and reproducing information rather than methods which will lead to changes in their understanding. An important part of good teaching is trying to apprehend these contextual effects, adapting assessment and teaching strategies accordingly. Good teaching involves striving continually to learn about students' understanding and the effects of teaching on it.

Precisely because research into student learning has studied and described the conditions which are necessary for changes in student understanding, it provides a promising source of ideas for university teaching. I shall try to show how these insights, when harnessed together with our own experiences as teachers, can help us to decide on the best ways to organise the curriculum, evaluate teaching in order to encourage improvement, and plan satisfactory programmes for helping lecturers to teach better.

A focus on several different levels of the system

It is tempting to see improving the quality of teaching as something that requires a single focus—on the individual lecturer. This emphasis is clear in most manuals on effective university teaching. It is still common in the workshops and seminars run by the educational development units that exist in most universities. It is implied in national movements to train and accredit academics as university teachers.

I shall argue that it is too narrow a view. Improvement requires intervention at several different levels of the enterprise of higher education. The level of the individual academic is an important point of influence, but it is not the only one. Although university teaching is still in many cases a private affair, no lecturer works alone. Many well-intentioned changes to curriculum and teaching fall foul of the apathy or jealousy of departmental colleagues. Focusing on this level alone is likely to create frustration, conflict and, ultimately, regression to the status quo.

To achieve change in the quality of teaching and learning, we ought rather to look carefully at the environment in which a lecturer works and the system of ideas which that environment represents. This means an emphasis on teams, curricula, courses and departments, as well as on individual academics. It is often more efficient and more practical to try and change a degree course than to start by trying to change every single teacher in it. We should also look to the management of academic units: to what extent does a head of department understand and encourage effective teaching in his or her field of study? The highest point of intervention, for the purposes of this book, is the institution itself. What understanding of teaching is evident in its public statements and its internal procedures? To what extent does it vigorously promote teaching that will lead to learning of high quality? If it wants teachers to change, it must direct resources towards helping them to change; and it must reward them when they do.

An emphasis on how to help students learn academic content

As I have already indicated, one approach to improving university teaching involves concentrating on the various techniques of instruction—how to give a lecture, organise a laboratory class, or run a small group discussion, for example. This book takes a fresh approach to the problem. It concentrates on the best ways to teach students in relation to what we know about how they learn actual subject matter in the everyday setting of classes and assessment. Why is this such an important difference?

Much university teaching is still based on the theory that students will learn if we transmit information to them in lectures or present it to them online, or if we encourage them do things in class. Thus it is not surprising that improving teaching is often seen as a process of acquiring skills– how to lecture, how to run small groups, how to use learning management systems, how to set assignments, and so on. Unfortunately, effective teaching is not essentially about acquiring techniques like this. They are actually rather easily learned; it is understanding how to use them that takes constant practice and reflection. And they are useful only in so far as they are directed by a clear awareness of key principles—in particular, that the content of student learning is logically prior to the methods of teaching the content, and that what students do, not what teachers do, is what really matters.

We shall find as we move through the book that the skills of selecting teaching methods, structuring and planning courses, assessing students, and discovering the effects of teaching on students through evaluation, may all be derived from a small number of essential teaching principles of this kind. No book can tell you how to approach a teaching problem; only you learn how to do that, for yourself. When you have learned how to approach a teaching problem, you will have learned something far more valuable than a set of rules for how to run a class of 500, how to make your PowerPoint slides more visible, or persuade a recalcitrant student to say something in a tutorial. You will have learned to make the technical skills of teaching part of your understanding of teaching.

Towards a professional approach to teaching in higher education

For too long we relied in universities on teaching that was essentially an amateur affair. Things began to change in the 1990s, most notably in Britain after the Dearing Report (1997). But progress has been distressingly

slow since then and not all the paths that have been followed have taken us in the right direction.

A professional approach to teaching should be seen in the same light as a professional approach to law, medicine or engineering. From the perspective adopted in this book, it is not enough for a lecturer to be an exceptional clinician, advocate or designer. She or he must be a distinguished teacher as well. To achieve distinction, she or he must use an evidence-based approach to helping students learn.

A distinctive characteristic of professionals is that they retain theoretical knowledge on which to base their activities. This body of knowledge is more than a series of techniques and rules. It is an ordered pattern of ideas supported by evidence that a teacher uses in order to decide on appropriate course of action from many possible choices. The professional authority of the academic-as-scholar rests on a body of knowledge in a field of study. The professional authority of the academic-as-teacher should rest on a body of knowledge about learning in a field of study. I hope to convince you that a deep understanding of learning and teaching and their relationship to each other is an essential base for effective action as a university teacher. Changing students' approaches to the subject matter they learn is the key to improving their learning: in turn, the key to improving teaching is changing the way in which the process is understood by its practitioners.

Teaching' in this book is defined in its broadest sense. It includes the aims of a course, the methods of presenting the knowledge those aims embody, assessing students' achievement and evaluating the effectiveness of the whole process. Professional teachers in higher education display certain salient characteristics. They possess a broad range of specialist teaching skills; they never lose sight of the primacy of their goals for student learning; they listen to and learn from their students; they constantly evaluate their own performance. They understand that teaching is about making it possible for students to learn; they succeed in integrating educational theory and shrewd classroom knowledge. I want to show in the following pages how every lecturer can learn to imitate the qualities of teachers like these through reflectively applying intelligence about his or her students' learning to the problems of teaching. The book will do this by linking theory and action at a number of different levels.

The structure of the book

The following chapters invite readers to think in depth about their students' learning and their own understanding of teaching, and to

undertake a journey which may lead them to change their way of understanding it. There are as many different ways to read a book as there are readers. This one tries to tell a continuous story that has a beginning, a middle, and an end—even if the end cannot be more than a glimpse into an uncertain future. It begins from the idea that there are different ways of experiencing teaching; it ends with speculations on how to make it better.

Part 1 lays the foundations. It covers some of the central ideas that have emerged from studies of students' and lecturers' experiences of university learning and teaching. We shall explore how and what students learn in different academic subjects, and look at the students' views of what effective teaching consists of. This part also examines some of the different ways in which lecturers understand the process of teaching in higher education.

A grasp of the main ideas about how students experience learning is indispensable for a complete understanding of the arguments about the nature and methodology of teaching that follow in the remainder of the book.

Out of these experiences of lecturers and students grows a set of principles for effective teaching in higher education. Chapters 6 and 7 isolate these principles and describe the relations between how lecturers understand teaching and the strategies they use.

Part 2 of the book shows you how to use the ideas to enhance student learning. Its three chapters link theory and practice by covering three of the main areas, or problems, that we face in teaching: what we should teach, how we should teach it, and how we can decide what students have learned from what we have taught them. It is quite impossible to do justice to every method of teaching and assessment in higher education in one book, and these chapters do not attempt to do anything of the kind. They are highly selective and they concentrate on the application of principles in real situations rather than description of techniques. Their aim is to stimulate thinking about teaching, first by looking critically at current methods and second by providing some case studies of good practice. These case studies of exemplary teaching, based on the experiences of actual lecturers, demonstrate that the improvement of teaching using a professional, evidence-based approach is an entirely realistic goal.

Part 3 is also about applying theory. Here, though, the spotlight shifts to the theory's relevance to quality assurance, evaluating teaching, and educational development and training. I look at some of the main problems in evaluating university teaching and learning and in combining

self-evaluation, which is so essential for improvement, with measures of accountability. Although evaluation and quality assurance, like the assessment of student learning, has the potential to distort the curriculum, I argue that the remedy is not to turn our backs on it but to use it to our advantage to improve the standards of teaching.

The concluding chapter tries to show how we can apply the arguments about improving student learning to the process of academic development in universities. From the perspective established earlier in the book, it will become clear that, if we really want to improve the quality of higher education, the principles of effective teaching must also be applied to the task of managing academic units and educating lecturers.

Chapter 2

Ways of understanding teaching

No one starts out teaching well.

(Herbert Kohl)

A good way of starting to learn more about any subject is to review what you already know about it. We quite often find that we think we know more than we actually do. We can remember an idea or a formula, but get stuck when we to try to apply it to a real problem. This signals the need to go back a step and revise our earlier work.

We can apply this approach to improving university teaching. Most lecturers probably think that they know more about teaching than they really do. University teaching is a very complicated and detailed subject. It takes many years of practice to learn how to do it well, and even then, you will not have learned enough. Some lecturers do not know where to start improving it; at once overwhelmed by and unwilling to admit its complexity, they ask for a set of rules that will solve all their difficulties. Half the difficulty with doing it better is knowing what the real problem is, of being aware of what we do not know. In order to be clear about what we do not know, we will find it useful to ignore the details of teaching and form a picture, a simplified description, to help us to understand our problem.

In this chapter, we look at a simple description of different ways of understanding teaching. Its purpose is to encourage active reflection on your own understanding of it. Later in the book, when I have described learning and teaching from several points of view, including the student's, we shall return to these ideas and consider their application to more involved problems in real life teaching.

What exactly is teaching about? What do we mean when we say we

'teach' someone something? What are the main problems we face in teaching? What methods should we use, and why? What helps our students to learn? What stops them learning? Can thinking about teaching usefully be separated from the activity of teaching itself? The case studies of teachers described below are fictionalised and each combines information from several different individuals, but all the information comes from what actual teachers have said or have been observed to do.

Case 1

John teaches electrical engineering. He regards today's students as inferior to those of ten, or even five years ago—mainly, he says, because the schools don't prepare them as well. Asked why he thinks this can be so when the entry standards to his department's courses are now higher, he blames falling standards in school-leaving examinations—especially maths. He also argues that today's students put less time and effort into their studies.

He has been experiencing, for the first time in his career, discipline problems in lectures:

> The students just aren't interested, aren't bothered, like they used to be. They're out to get a degree as easily as possible. They're not natural workaholics, which engineering students have got to be, because the amount of work they have to get through is reasonably strenuous. This lot think they can memorise the facts the night before the exam, spot the question types, and plug the numbers into the right formulae, and to hell with listening in lectures. They're wrong, of course, but they don't know how wrong until after the first-year exams.

John wants some new techniques for delivering his content more effectively.

> Most of the things that used to work don't seem to work any more. The techniques in the book on lecturing you lent me didn't work either. They all ignored the buzz group questions and talked about Saturday's game or something. They're basically idle and won't do a thing unless it gets a mark. I tried a few labs differently, I asked them more questions and tried to explain things better, but there were problems because some of the students reckoned I was spending too much time on explaining and not enough on getting the stuff across, covering the syllabus. Which was true of course. And now with my

student appraisal coming up, I'm worried, I guess. Remembering what we tell them is the big thing for students. The amount of knowledge in this subject increases every few minutes and the syllabus is now twice as big as it was when I was a student. I'm thinking about some video presentations to get the stuff across, to transfer it more efficiently from my mind to the students' heads. If something is visual, they'll remember it better. Isn't that right?

Case 2

Shari teaches politics. She is convinced that students learn best by doing, by being active:

> The session you ran on small group teaching was really helpful. The problem is to get them doing and talking. They come into second year expecting me to be the fount of all knowledge. They want all the answers.

She sees a main task in her teaching as being to overcome this lack of independence by managing student learning in class.

> What I'm doing now is not thinking so much about the material in the topic but about how I'm going to split this up and work out the groups. How I'm going to structure the movement from two to say, groups of six or a plenary. It's vital to get people voicing their opinions early. Once they're off, the session will be pretty much over and you're home and dry. You've treated the problem effectively.

Shari does not talk about the subject matter, the concepts and knowledge associated with the particular topic, in her description of her class management strategy. She assumes that if the students are talking and the class ends on a high note that they will have learned something important. The students' involvement is a measure of success, and she feels quite successful.

Case 3

Elizabeth teaches physiology. She has spent the last five years restructuring the first-and second-year curriculum for medical students in this discipline, and has become interested in applying ideas from educational research to the practice of teaching. She has developed an ability to step back

from the immediate events of the lecture room and practical class and see what is happening to the quality of students' engagement with the content. She has altered the curriculum to make it more interesting, to make its aims clearer, and to begin from students' naive conceptions of physiological structure and systems. She has tried to change the assessment methods so that students are rewarded for (and see they are rewarded for) understanding and explanation rather than being able simply to reproduce 'correct' factual information. Student evaluations and grades have improved, and there is also some evidence of students being able to use the material more effectively when they begin the clinical component of the medical course.

She enjoys teaching but is not entirely comfortable with her course.

> I try to listen to students all the time and 'read' their work as I am marking it. They are all different. It's still far from not ideal. I can't get to all of them. I've come to see that teaching can never be perfect and that if you wait for the one perfect solution you delude yourself and nothing changes. In the end it's up to the teacher to keep changing. I spend a lot of time thinking 'I wonder what the difference is between what I did last time and what I did this time. What caused the difference?' It's puzzling and it's enjoyable. Sometimes I realise then that what I expected students to get from the session wasn't what they actually got, so I change it next time. I try to expect the unexpected.

What John, Shari and Elizabeth are saying

Case 1

- Teaching is about transmitting knowledge from academic staff to students.
- Student learning is separate from teaching.
- Student learning is a process of acquiring new knowledge.
- Problems in learning are not to do with teaching.

Case 2

- Teaching is about managing student activity.
- Student learning is associated with teaching.
- Problems in learning can be fixed by adopting the right teaching strategy.

Case 3

- Teaching is about making it possible for students to learn subject matter.
- Student learning is a long and uncertain process of changes in understanding.
- Teaching and student learning are interrelated—understanding students' ways of thinking about the subject matter is essential for helping them to learn.
- The activities of teaching and the process of reflecting on them are inextricably linked.
- Problems in learning may be addressed by changing teaching, but with no certainty of success. Constant monitoring is needed. Yesterday's solutions might not work today.

These three examples highlight important differences in the ways lecturers think about teaching and function as teachers. Success in learning how to improve your own teaching is related to the extent to which you are prepared to conceptualise your teaching as a process of helping students to change their understanding of the subject matter you teach them.

But simply thinking about teaching is not enough. Every teacher has thought about teaching: the challenging assignment is to merge thinking and doing. Constant practice informed by the study of the qualities displayed by good teachers is necessary. Everyone has progressed some way down the road represented by these three stories; theories 1 and 2 above are not so much 'wrong' as inadequate representations of the truth. They are narrow visions of teaching. Telling students about facts and ideas in science or humanities is not in itself incorrect: it is simply that it is only one part of teaching, and not its most important part. Blaming students is not improper—what teacher has not done it sometimes, often with more than enough justification? But that is not the point. It is not an efficient or effective way of helping students to learn: it is not a professional approach to teaching.

Each of these ways of experiencing teaching has implications for the ways in which students will learn. In the following three chapters I shall look at these implications, from three related points of view: the different outcomes of learning, the ways in which students go about learning, and our students' perceptions of teaching.

What students learn

Instead of encouraging the student to devote himself to his studies for the sake of studying, instead of encouraging in him a real love for his subject and for inquiry, he is encouraged to study for the sake of his personal career; he is led to acquire only such knowledge as is serviceable in getting him over the hurdles which he must clear for the sake of his advancement.

(Karl Popper)

Qualitative differences in learning

We come now to examine what is known about the quality of student learning in higher education. While you are reading this chapter, it will be useful to keep in mind the different conceptions of teaching described in Chapter 2 and to think about how they might be related to differences in what students learn. It may be helpful as well to think occasionally about your own teaching and how what you do might lead to different student learning outcomes.

The central questions to be addressed here are: 'What do we want students to learn?' and 'What are the variations in the outcomes of their learning?' An important idea is introduced: there is often an inconsistency between the outcomes of student learning as teachers and students would ideally like them to be and the reality of what students actually learn. In other words, there is a gap between what lecturers say they want from their students and what students actually accomplish. Every university teacher wants students to understand important concepts and their associated facts and procedures in his or her subject, but many students are unable to accomplish these goals. Why does this discrepancy occur? The argument developed in the next few chapters is that differences in the quality of learning are due to differences in the ways that students go about learning; and these differences can in turn be explained in terms of

their experiences of teaching. We can only improve the quality of university education if we study its effects on students and look at the experience through their eyes.

The issue of what students learn at university has been examined from many points of view—those of lecturers, educational theorists, employers, graduates and the students themselves. A good deal of research into what students actually remember and understand from their studies has been carried out. And there is no shortage of complaint about the quality of student learning, and by implication methods of teaching. But in this area it is more than usually difficult to decide where rational inquiry ends and prejudice begins—particularly now that higher education has become more attractive to political hobby-horse riders than it ever was.

It is perhaps simplest to arrange the present selective review by looking at what students learn in terms of a series of qualitatively different levels. At the most abstract level, there are very general abilities and personal qualities—such as 'thinking critically and imaginatively' or 'being able to communicate effectively'. At the second level, there are more specific, content-related changes in understanding, linked to particular disciplines or professions—such as understanding the formal theorems of Newtonian mechanics or the inductive propositions of psychology, as well as the less easily defined ways of thinking 'like a sociologist' or 'like an electronic engineer' when faced with a typical problem in a subject. Finally, there are highly categorical proficiencies like knowledge of factual information, technical or manipulative skills, and specific problem-solving techniques. Knowledge at all these levels, and the ability to connect knowledge at each level to each of the others, is regarded as essential if a graduating student is to be considered an educated person.

General aims and higher level abilities

The concept of excellence in higher education has remained surprisingly unchanged down the years. In 'Universities and their Function', an essay first published in 1929, A.N.Whitehead described his view of the proper aims for student learning of an institution of higher education; his comments are entirely compatible with the expectations of lecturers today. Whitehead's ideas were, perhaps unexpectedly, also in harmony with the idea that higher education should be relevant to the community and the knowledge economy—although there was nothing crudely utilitarian about them. His main

theme was that a university education should lead students to 'the imaginative acquisition of knowledge':

> The university imparts information, but it imparts it imaginatively… A university which fails in this respect has no reason for existence. This atmosphere of excitement, arising from imaginative consideration, transforms knowledge. A fact is no longer a bare fact: it is invested with all its possibilities. It is no longer a burden on the memory: it is energising as the poet of our dreams, and as the architect of our purposes.
>
> Imagination is not to be divorced from the facts: it is a way of illuminating the facts. It works by eliciting the general principles which apply to the facts, as they exist, and then by an intellectual survey of alternative possibilities which are consistent with those principles. It enables men to construct a vision of a new world, and it preserves the zest of life by the suggestion of satisfying purposes…
>
> Thus the proper function of a university is the imaginative acquisition of knowledge. Apart from this importance of the imagination, there is no reason why business men, and other professional men, should not pick up their facts bit by bit as they want them for particular occasions. A university is imaginative or it is nothing—at least nothing useful.
>
> (Whitehead 1929:139, 145)

Whitehead's 'imaginative understanding' is reminiscent of the often-articulated aim that university students should develop the ability to 'think critically'. As long ago as 1861 this was seen as the key to the kind of secondary school education that prepared students for university. 'You are not engaged so much in acquiring knowledge as in making mental efforts under criticism' said the headmaster of Eton in an address to his pupils. The Hale Report (1964) asserted that 'an implicit aim of higher education is to encourage students to think for themselves'; while Ashby (1973:147–9) described how students should develop 'from the uncritical acceptance of orthodoxy to creative dissent…there must be opportunities for the intellect to be stretched to its capacity, the critical faculty sharpened to the point at which it can change ideas'. Although higher education has expanded to include those excluded from the sort of education to which these quotations refer, we would still aspire to the same aims for our students.

The former Council for National Academic Awards described the aims of a programme of study in higher education as:

> The development of students' intellectual and imaginative powers; their understanding and judgement; their problem-solving skills; their ability to communicate; their ability to see relationships within what they have learned and to perceive their field of study in a broader perspective. The programme must aim to stimulate an enquiring, analytical and creative approach, encouraging independent judgement and critical self-awareness.
>
> (Quoted in Gibbs 1990:1)

More recently, the Dearing Report reiterated the same theme—with modern variations. A university education for the knowledge economy should 'inspire and enable individuals to develop their capabilities to the highest potential levels throughout life, so that they grow intellectually, are well equipped for work, can contribute effectively to society and achieve personal fulfilment'. The generalisable skills of graduates should include 'learning how to learn' and 'critical analysis' (Dearing 1997).

There seems to be nothing new about the key skill of critical thinking as a graduate attribute. University and polytechnic lecturers in a survey of educational objectives carried out at Lancaster University in the late 1960s (Entwistle and Percy 1974) evidently thought along corresponding lines; in these interviews, 'there was a substantial consensus about the importance of critical thinking' (Entwistle 1984:4). Knapper (1990) summarises two studies, at Monash University in Australia and in Canada, that tell the same story about lecturers' aims for student learning. Staff were asked, among other things, to indicate their agreement or disagreement with fifteen possible teaching goals. The Canadian and Australian academics were most likely to agree with the same three educational objectives:

- To teach students to analyse ideas or issues critically;
- To develop students' intellectual/thinking skills;
- To teach students to comprehend principles or generalisations.

Comparable statements are found in most writings advocating the need for lifelong learning in higher education, particularly in professional fields. Aims such as the capacity to respond flexibly to changing circumstances, to learn throughout a career, and to integrate theory and practice by generalising from a theoretical knowledge base to deal capably with previously unmet situations, are very common (see Bligh 1982; Knapper and Cropley 1985; General Medical Council 1987; Williams 1988; Murphy 2001). Equally ubiquitous are arguments that these goals are not

being met by conventional means of instruction and course administration. Of these kinds of criticism, more in a moment.

Content-related expectations: disciplinary and professional abilities

What of more specific objectives related to particular disciplines and professions? What is involved in learning a subject well? This kind of goal overlaps with the general aims described above. When lecturers are asked to describe what they expect one of their competent students to be able to do, their answers naturally vary depending on the discipline or profession being taught. However, there is also a sense in which the expectations are uniform, so that they can be related to the general aims of the kind summarised above.

Entwistle and Percy's lecturers, when speaking about their subjects more specifically, spoke of objectives involving the effective use of evidence and social awareness (history) entering into different individual and cultural conditions (English), interpreting and analysing experimental data (physics), becoming concerned with the nature of evidence and scientific argument (psychology). Many of the lecturers interviewed were apprehensive about over-emphasising factual knowledge (Entwistle 1984:3). The aims of medical and veterinary schools, and many other professional faculties, generally stress the importance of developing professional problem-solving skills and the ability to apply information to new problems, together with the development of professional values peculiar to the vocation (Heath 1990).

It is clear from several studies that the ideas expressed by teachers in higher education will usually embrace knowledge of procedures and familiarity with the basic facts of the subject, but they will invariably include what the lecturers themselves describe as something more fundamental. These fundamentals can be summarised as an understanding of key concepts; an ability to go beyond the orthodox and the expected so that unfamiliar problems can be tackled with spirit; a facility with typical methods of approaching a problem in the discipline; and—closely associated with the previous point—an awareness of what learning and understanding in the discipline consists of. In other words, lecturers describe content-related versions, with a substantive and a procedural or syntactic element, of the general principles of 'critical thinking' and understanding. It is important to understand that the general educational goals gain their meaning through the specific subject content in which they are expressed.

What do you want your students to learn? In my own development work with higher education lecturers, I used to find it valuable to introduce ideas about teaching against a background of what lecturers themselves want their students to learn. (The importance of relating all teaching methods to particular goals for student learning is a topic which I shall be highlighting repeatedly.) When my colleagues and I asked a group of newly appointed lecturers in several different disciplines to describe their aims for undergraduate student learning, these were some of the things they mentioned:

- To take an imaginative and creative approach to design problems (Environmental Planning);
- Understanding when a particular mathematical concept (integration) is needed for an [engineering] problem and when it is not (Mechanical Engineering);
- Being able to analyse different perspectives on the nature of Renaissance Art (Fine Arts);
- Communicate professionally (listen carefully, interpret accurately, respond with concern) with a patient (Medicine);
- Have an appreciation of the significance of the normal in interpreting data from a patient (Medicine);
- Understand the limitations of the concept of marginal utility in real situations (Economics);
- Understand the social, political and economic context of legal decisions; and develop the desire to know more about them (Law);
- Analyse the variety of practices and disputes that arise in the area of industrial relations (Industrial Relations);
- See the connections between a physiological and a pharmacological way of solving a problem (Pharmacology).

Content-related objectives of this type are important. They form a rather more accessible link between studies of what students have learned and the curriculum with which they are provided than the more general aims previously mentioned. It seems that high-quality student learning is a concept which is well understood by teachers in higher education. The expectations all show a degree of consistency, despite their specific subject allusions. Analysing, understanding, appreciating the significance, interpreting, are recurring descriptions for explaining what students are meant to learn. It seems plain that a student who had achieved these objectives would be well on the way towards the 'imaginative understanding' of a subject as described by Whitehead. An understanding

of the main issues in a subject, an appreciation of the nature of appropriate arguments in it, an awareness of what counts as relevant evidence, and the wisdom to think critically and admit one's deficiencies in knowledge —all these things are important, though they naturally vary depending on the discipline being studied.

The academic staff who expressed these objectives for their students did, with some prompting, describe acquisition of facts and techniques as well as more general skills (being able to identify and use legal rules, for example). But they were always at pains to point out that these were subordinate to and included within their higher-level objectives. Factual knowledge had no value in itself; but the higher-level objectives had no meaning unless they were taken to imply the lower-level knowledge. This is also interesting, because these views are exactly compatible with the assumptions of the theory of student learning that informs this book. University teachers do not ultimately judge students on the amount of knowledge in their possession, but on their self-critical awareness of what they do not know and their readiness to find out more.

In discussions with teaching staff of a more formal kind, I have found that they persist in emphasising the importance of encouraging students to undertake higher-order thinking about problems in the discipline (Ramsden *et al.* 1988). Physics lecturers, for example, argued that first year physics learning should not simply be a matter of memorising facts and formulae and applying these to familiar types of problems. They insisted that students should relate experiences in the physical world to theoretical concepts. 'Students have to be able to visualise and understand the situation and say, "Yes, this formula should apply to that situation"', as one lecturer put it. For these lecturers, an understanding of the role of mathematical models in physics was important; students should appreciate the importance of seeing the relationships among the equations that they encountered rather than seeing them as unrelated formulae applicable to different physical problems: 'Part of the idea that you're trying to get across is that it's profitable to start from simple situations, simple models, and see how and when things depart from this in the real world'.

Law lecturers interviewed as part of the same project described their objectives for student learning on two levels. The first included overarching substantive concepts such as the development of a sensitivity to the idea of morality in twentieth-century law, together with general procedural objectives such as learning about the dynamics of law and methods that can be used to change its course. The second embraced more specific legal concepts (such as what 'property in trust' means to a

lawyer) and related specific skills (such as arguing with legal logic). Again, the emphasis was on changes in student understanding and the ability to tackle new problems with confidence.

In first year history, a fundamental goal was for students to 'think historically'. This involved sensitivity to the ways people in other cultures understood themselves and a healthy caution about applying currently understood definitions of concepts such as 'feudalism' to the past. Developing higher-order skills in analysis and historical argument was a crucial objective. Students, according to the history lecturer whom I interviewed, should be able

> to pose meaningful questions about the past and answer them logically in the way a historian does, to recognise that history involves debate about how understanding is to be achieved, to eschew the idea that there is one right answer laid down by historians.

Studies of the outcomes of learning

How far do students achieve these intellectual aims, both general and specific? And to what extent is the third type of goal—mastery of particular knowledge and skills—attained? The three types overlap, of course, so achievement in one area cannot always be precisely separated from that in another. In all cases, however, it is necessary to look at how students have experienced learning in order to judge the extent to which development takes place. There is enough evidence to suggest that there is a good deal of variation in the quality of learning. Moreover, while the general changes in ways of thinking are common enough outcomes, changes in discipline and subject-specific knowledge are often limited to basic procedural skills and the temporary mastery of factual information.

Level I: General intellectual development

Studies of changes in thinking

William Perry's work at Harvard (Perry 1970, 1988) clearly implies that students develop increasingly sophisticated ways of thinking as they progress through higher education. Initially, many students appear to conceptualise knowledge as a set of conveniently packaged and static facts and techniques. Learning these packages implies gaining

authoritative information about them; the 'right' answers exist, are held by teachers and textbooks, and the student's first task is to discern these answers. It is then necessary to remember the information and accurately reproduce it.

Although this conception of knowledge and learning may have served intelligent students well in their time at school, it is, as Säljö (1984) observes, not an invention of the school system, but a part of commonsense thinking. Perry describes a gradual change in students' conceptions, away from the absolutistic view of knowledge and learning towards a relativistic conception. Knowledge is then seen to be uncertain; the truth always remains provisional. Altogether, Perry identified nine 'positions' along a spectrum of ethical and intellectual development in college students. After having passed from the stage of basic duality through a stage of confusion about the nature of knowledge and belief, at the highest level students will have learned to commit themselves to personal values and particular interpretations of evidence, while at the same time acknowledging the existence of alternative interpretations of 'reality' and being capable of continuing to learn.

A similar pattern of intellectual change emerged in Heath's interviews of students at Princeton (Heath 1964). His ideal type of student (the 'reasonable adventurer'), which other students gradually came to resemble, alternated between curiosity and critical thinking. This conception is comparable to Whitehead's description of the imaginative consideration of knowledge. We may assume that at least part of this development is due to the experience of higher education.

Remaining at this macro level of analysis, we find other studies that show the existence of demonstrable effects on intellectual development. Hasselgren (quoted in Dahlgren 1984) studied student teachers' abilities to interpret videotape sequences of children at play. Four categories were identified, ranging from partial, impressionistic accounts that mentioned only what was immediately observable, to accounts which considered the events observed as concrete instances of abstract educational ideas. The majority of students showed evidence of development from the lower to the higher categories during their course.

Säljö (1979) carried out an interview study which led to his describing five different understandings of what learning consists of among adults (see also Van Rossum and Schenck 1984). When students were asked to say what they understood by learning, their replies could be classified into different categories:

1   Learning as a quantitative increase in knowledge. Learning is acquiring information or 'knowing a lot'.
2   Learning as memorising. Learning is storing information that can be reproduced.
3   Learning as acquiring facts, skills and methods that can be retained and used as necessary.
4   Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.
5   Learning as interpreting and understanding reality in a different way. Learning involves comprehending the world by reinterpreting knowledge.

You will probably be able to see immediately that conceptions 4 and 5 in Säljö's system are qualitatively different from the first three. The first three conceptions imply a less complex view of what learning consists of. They resemble the early stages of Perry's and Hasselgren's schemes; learning in these conceptions is something external to the learner, and at its most extreme (conception 1) is understood to be something that just happens or is done to you by teachers. Conceptions 4 and 5 emphasise the internal or personal aspect of learning: learning is seen as something that you do in order to understand the real world. These conceptions imply a more relativistic, complex and systematic view of knowledge and how it is achieved and used. And indeed, as we would expect from Perry's work, Säljö found that the adult students who had experienced higher education were more likely to express conceptions 4 and 5. Säljö points out that an important aspect of his system is that it is hierarchical: in other words, students who conceive of learning as understanding reality are also able to see it as increasing their knowledge. Each higher conception implies all the rest beneath it.

Students' and employers' views

Complementary studies of the influence of higher education have been carried out by asking students to describe their attitudes and the significant changes they have experienced as a result of their studies, and by collecting employers' descriptions of the value of graduates. The findings tend to point in the same general direction. West *et al.* (1986), for example, reported the results of an inquiry into mature students' attitudes. Using data from the same students at the beginning and at the end of their courses, they found that the experience of higher education was associated

with perceptions of an increase in academic interests, self-esteem, liberal attitudes and general life satisfaction; and a decrease in dogmatism.

Powell (1985) examined autobiographical accounts written by graduates, and reached the conclusion that students attached most importance to the acquisition of general intellectual skills, attitudes and values. Specific prepositional knowledge was rarely mentioned and was presumably taken for granted; descriptions of the development of problem-solving, logical thinking, and information-gathering skills, together with a growth in self-confidence and independence, dominated the accounts. For example:

> I think I learnt to organise my work and myself, to think theoretically and evaluate concepts, to look things up before I made statements, and that first draft work should be left in a drawer for a week before being re-read and totally re-written several times more.

> I have realised since finishing at university that I didn't gain so much a body of knowledge as an approach. I became a problem-solver.

> What I believe I learnt was a capacity to apply logical principles.

> …self-directed research, flexibility of approach and resourcefulness and tenacity in grappling with the varying demands of university and family life.
>
> (Ibid.: 133–5)

The picture was by no means uniformly satisfactory, however. Negative effects attributed to excessive competition and inappropriate assessment were described. They give a foretaste of the kind of student comments on the quality of university teaching that we meet in subsequent chapters. For example:

> I latched on to the idea that to pass you got a clear view of what you were expected to know, and learnt it, word for word. Not much thinking. Just learn the sacred texts. I had no more trouble passing university examinations. Unfortunately, the apparent success of this mind-stunting technique impressed me and retarded my mind's development for years to come.
>
> (Ibid.: 133)

It is popularly supposed that employers are highly critical of their graduate

recruits and the 'irrelevance' of higher education to the world of work, but research into their actual views does not support quite such simple conclusions. In fact, there seem to be many variations in employers' views of the quality of graduates. In Kogan's study of expectations of higher education in England and Wales (Kogan 1985), there were certainly some minority views among employers that non-graduates were better employees than graduates, and that university students did not grasp the importance of the market and its forces. On the other hand, the majority of employers seemed to think that higher education did improve their employees' generic skills. They believed that it enhanced academic ability and personal qualities, especially flexibility and motivation; they supported educational experiences that increased general understanding:

> Few had doubts about the value added by higher education…There were explicit comments approving the opportunity that higher education gave to students: in one accountant's terms, the opportunity 'to study a subject because they love it…'. When asked about the advice they would give students about their choices of subject, some employers felt that students would be best studying something they were interested in or good at.
>
> (Ibid.: 103)

The results of later studies are similar. Employers broadly agree on their priorities and the degree to which they are satisfied (see Bennett *et al.* 2001; A.C.Nielsen 2000). Many of their views resemble those expressed by the more satisfied students in Powell's study. However, other studies of graduates' skills at work have been less positive. Brennan and McGeevor (1988), for example, found that graduates themselves were critical of experiences of higher education which had emphasised individual work at the expense of collaborative skills in teams, while employers are also critical of inadequate communication and interpersonal skills (Williams 1988; A.C.Nielsen 2000; Harvey *et al.* 1997).

Lecturers' views

Rather surprisingly, it is lecturers themselves who are the least enthusiastic of all about the qualities that their students develop. Both Entwistle and Percy (1974) and Hounsell and Ramsden (1978) report numerous comments criticising students for their lack of intellectual development and their inadequate motivation even at the end of their degree courses. Many students, Entwistle and Percy's lecturers believed, showed a disappointingly low level of understanding after three years of university

study. The lecturers in both studies were quick to attribute poor progress to weaknesses in students' natural abilities or personalities.

On balance, it seems that many students' understanding of what learning consists of does change during the course of their studies, and that the changes are in a direction that lecturers and others, including many employers of graduates, find desirable. There is also some evidence of movement towards general intellectual competence and a more openminded attitude to knowledge and a tolerance of differing values; and there is a degree of satisfaction with these aspects of the outcomes of higher education. But the evidence indicates considerable variation in quality. The effects of higher education are not uniformly positive or strong; some employers, students and (especially) teachers are dissatisfied with the results of the experience. Weak development of skills in working cooperatively and independently appears to be one continuing concern.

There is another problem in taking an optimistic view of the effects of higher education on students from these studies. A nagging anxiety recurs: how well will students have understood and remembered the knowledge and professional skills they supposedly acquired in the early years of their university studies, when their views of learning were so undeveloped? Yet such basic knowledge may be critical to expert judgement. It would seem clear that one of the outcomes of effective teaching will be that it encourages rapid development of more sophisticated conceptions of learning, but there is no evidence that such changes occur until late in most students' experiences of university. The third difficulty concerns level of analysis. The strength of these structural analyses is that they are highly general and not tied to any particular subject content. This is also a weakness, however; differences in intellectual development that are tied to specific subject matter are invisible.

Levels 2 and 3: Content-related outcomes

A depressing picture emerges from studies of the quality of students' understanding in academic disciplines and professional subjects. It seems that many students do not change their understanding in the way that their lecturers would wish.

Set against the epistemological and educational position that was taken in Chapter 1 of this book—that learning is fundamentally about changes in understanding of reality, and that teaching should be directed towards helping students to understand phenomena in the way subject experts do—these findings represent a serious indictment of the effectiveness of

higher education. It seems that it has not been as successful as it could have been in helping students to change their understanding of, for example, the nature of the physical world, or to grasp the nature of the scientific process. It has become clear from numerous investigations that:

- Many students are accomplished at complex routine skills in science, mathematics and humanities, including problem-solving algorithms.
- Many have appropriated enormous amounts of detailed knowledge, including knowledge of subject-specific terminology.
- Many are able to reproduce large quantities of factual information on demand.
- Many are able to pass examinations.
- But many are unable to show that they understand what they have learned, when asked simple yet searching questions that test their grasp of the content. They continue to profess misconceptions of important concepts; their ideas of how experts in their subjects proceed and report their work are often confused; their application of their knowledge to new problems is often weak; their skills in working jointly to solve problems are frequently inadequate. Conceptual changes are 'relatively rare, fragile and context-dependent occurrences' (Dahlgren 1984:33).

In summary, the research indicates that, at least for a short period, students retain vast quantities of information. On the other hand, many of them soon seem to forget much of it (see, for example, Saunders 1980), and they appear not to make good use of what they do remember. They experience many superficial changes—acquiring the jargon of disciplines, for example—but they still tend to operate with naive and erroneous conceptions. Moreover, many students do not know what they do not know: they have not developed self-critical awareness in their subjects.

These failings are not confined to university students—but that is small consolation. A complete description of the findings would occupy the remaining pages of this book. Among the studies that lead to these conclusions are those of the Gothenburg group of researchers on text-related analysis of the content of learning (see Marton and Säljö 1984; Dahlgren 1984; Säljö 1984); numerous investigations of science and mathematics students' learning; research into medical students' clinical skills and the outcomes of other professional education courses; and studies of humanities and social science students' misconceptions. These studies show that there exist genuine qualitative differences in student learning outcomes.

It may be best to begin this brief summary by recalling the statements made by the physics teachers earlier in this chapter. Remember how they highlighted the importance of students relating physical and mathematical models to each other and to the real world, rather than simply slotting memorised equations into typical problem types. But their views of what their students actually did were in stark contrast to these ideals. Their students, rather like those described in Entwistle and Percy's study, were described as generally incapable or uninterested in higherorder thinking or relating ideas to reality. They were perceived to spend their time searching for recognisable problems to which they could apply the 'right' formulae:

> A lot of them seemed to get swamped with formulas. They tried to learn every formula, get every formula in the world—but they didn't know where to go from there.

> If you just have to plug in formulas, you never learn how to analyse and interpret… A lot of them didn't understand. They just tried formula shoving.

> They knew every formula, but didn't know the situation to which it applied. Sometimes they recognised it from the symbols, which didn't always work, because symbols change in different situations. They got confused there. They'd try to shove in Density instead of Distance!

The students in this study did not disagree that they adopted this way of learning:

> You learn the formulas, as many as you can. You could say that's the whole exam. You have to understand the question and put in the right formula. So that's all I have to know—the formulas.
>
> (Ramsden *et al.* 1988)

Teachers in an Australian accountancy course with which I was involved were also critical of their students' understanding, their ways of learning, and their general attitude to studying:

> In the final exam, students are weak on conceptual points, such as the matching principle. It is possible to pass without being competent in handling Debit and Credit, or accruals. Students can't write; this may be because they don't understand the concepts. So they concentrate on number crunching in order to pass.

> Many students go from week to week, from topic to topic, without being able to see how anything fits together. Therefore they find the subject difficult, and this reduces their motivation to work at it.

> Tutorials are largely wasted. Many students don't prepare for them, but just come to copy the answers from the board. This would apply to one-third of the best groups, two-thirds of the worst ones.

> They believe they already know accounting, when all they have learned is rules and techniques dogmatically.

In an earlier investigation of lecturers' perceptions in the United Kingdom, I found that staff were easily able to distinguish the learning outcomes of their weaker students (the majority) from those of their stronger ones (a small minority) using similar terms. Engineering lecturers, for example, spoke of students' inability to relate technical knowledge to realistic applications and their tendency to handle every new problem as a special case. A psychology teacher observed a comparable phenomenon:

> The general impression I get is that they don't seem to see how things hang together. They seem to treat the articles they read as if they were all disparate and not related to the same topics—there's no coherence in it, they don't see a pattern. They don't see why somebody's done something in relation to somebody else's experiment, or they don't see any kind of systematic approach to the kind of reading they're doing, or the kind of material they're being offered. They aren't able to tie it together into a package.
>
> (Hounsell and Ramsden 1978:138)

The studies summarised above focus chiefly on the methodological aspects of students' learning—their inability to use the explanatory frameworks of their disciplines to achieve understanding. West (1988) described several examinations of the outcomes of university science education and reached analogous conclusions about the quality of students' understanding of specific concepts. Gunstone and White (1981) interviewed science graduates about simple physics concepts related to gravity, and identified several outright misconceptions. West *et al.* (1985) reported serious gaps in the learning of apparently excellent first year chemistry students when asked to apply their new knowledge of phase changes to simple real-world situations (such as the effect of different pressures on the boiling point of water when cooking vegetables).

In other investigations, the belief that 'motion implies a force' (contrary to the Newton's conception of force as expressed in his first law) among American, British, Swedish and Australian college students has been widely reported (see, for example, di Sessa 1982). In one of these experiments, Johansson *et al.* (1985) asked mechanical engineering students to answer the following question:

A car is driven along a motorway in a straight line at a high constant speed. What forces act on the car?

Two main categories of conceptions of a body moving at a constant velocity were identified. The first was that all the forces counterbalanced each other (the car is in equilibrium because it is moving at constant speed; therefore no net force exists). The second was that the car required a net pushing force to keep going (the forces directed forwards have to be greater than those in the opposite direction are). The second conception is non-Newtonian and would get no marks from a physics teacher. Of the seven students in this study who expressed it at the beginning of a course in mechanics, six still held it at the end.

McDermott (1984) found that students who did well in course examinations were often incapable of demonstrating a qualitative understanding of acceleration as the ratio $\delta v/\delta t$ when they were asked to apply this concept to an example of actual motion. The fact that some university and senior secondary students may have quite severe difficulties in understanding frames of reference and relative velocities also has been demonstrated in studies at Melbourne (see Ramsden *et al.* 1991).

Even simple algebraic thinking seems to prove problematic for many higher education students. As soon as they are set free from the straight-forward manipulation of symbols, and are forced to consider the meaning underlying them as well, many appear to flounder. The classic example is Lochhead's. He reported that 80–90 per cent of US college students do not really understand ninth-grade algebra, although they can meet standard behavioural objectives in the subject. If they are asked to express the equation A=7S in an English sentence, nearly three-quarters will interpret it incorrectly (i.e. backwards) (Lochhead 1985).

The biological sciences appear to fare no better than the physical ones. Barnett and his colleagues (Barnett *et al.* 1983) asked zoology students, from third year to graduate level, to answer questions on biological theory and the philosophy of science. Students were invited, for example, to state whether they agreed that 'All biological phenomena are in the long run explicable in terms of the physical sciences' (and to comment on the statement); to

discuss the concept of natural selection; and to comment on the proposition that 'A theory is scientific only if it can, in principle, be refuted'.

The results were surprising, to say the least. None of the students had failed conventional assessments, yet few proved to have a satisfactory grasp of central biological concepts or the fundamentals of scientific process. More than half of them accepted the extreme reductionist position that all biological phenomena could eventually be reduced to physical science. If this were true, there would be no organisms remaining to be explained. Confusion about evolution was evident: two-thirds of students accepted natural selection uncritically, as an axiom or dogma. And more than 80 per cent were baffled by the question on scientific theory, being unable to distinguish different categories of propositions (Popper 1972) and consider the different ways theories are actually used. These students seemed to have a narrow and absolutistic conception of science. The findings are similar to those of other studies (such as Brumby 1982) and probably have general application.

Professional courses are not exempt from criticism either. In medicine, for example, Balla (Balla 1990a, 1990b) explains how the available evidence shows that learning in traditional curricula is often unsatisfactory. In most medical schools, the biomedical sciences are introduced before clinical experiences; it is assumed that students will apply the theory to practice. In fact, students often use basic science knowledge incorrectly or not at all in formulating and revising diagnoses; when they become practising clinicians, they continue to use their theoretical knowledge only rarely and with difficulty. Numerous investigations show that both students and clinicians make errors and possess systematic biases, ignoring probabilities and basic science in favour of other sources of information.

Heath (1990) describes another problematic area of student learning, this time in the context of veterinary science—the development of professional values and understanding of clients' and colleagues' needs. Both teachers and students regard these aspects of professional competence highly, but students and novice veterinarians complain that they feel inadequate in their dealings with clients and superiors. A major review of engineering education (Williams 1988) came up with similar findings. The review found that both graduates and students felt that they had not developed enough self-awareness, self-confidence and understanding of other people and their motives, or gained skills in management, teamwork, and industrial relations, as a result of their courses.

Social science and humanities subjects have been less closely researched,

but numerous cases of misconceptions and misunderstandings of the syntax of disciplines that survive years of instruction have been reported. It would be tiresome, though, to give more and more details of the many other studies of this kind here. Suffice it to say that we are talking about the fundamentals of learning, and the portrait that the research paints of what many students know about these fundamentals is bleak. When a physics student discerns the relation between, say, a mathematical model and a physical reality, and sees the causal principles behind a formula (such as $\Sigma F=ma$) she has been taught—whereas previously she saw the formula as simply a handy tool to solve problems set by the lecturer—then it seems to make sense to say that she has learned something.

Similarly, when a student begins a course in economics by thinking that price is determined by the value of an object, and ends it by having a conception of price as system-dependent, then learning has occurred. There has been a movement from one way of conceptualising a phenomenon to another, qualitatively distinct one. The student looks at the phenomenon, at some aspect of the world, quite differently.

The same thing could be said to occur when medical students develop a capacity to use biomedical science knowledge, together with knowledge of prior probabilities, to revise an early diagnostic formulation and solve a diagnostic problem imaginatively. From seeing diagnosis as matching a pattern, they come to understand it as a much more complicated process of relating many parts to form a whole; a qualitatively different conception of reality has become established. The development of professional skills associated with ethics and human relationships (including strategies for collaborating with colleagues) may also be seen as a shift from a narrowly technical view of the professional role to a broader, more liberal and qualitatively different one.

It seems evident that, from a perspective on learning as changes in understanding, many students are not learning as effectively as they should be. There is clear variation in quality, and the developments of the last decade and a half in describing qualitative differences enable us to be much clearer about what this variation is like. It is true that some students understand better than others, and it seems certain that some courses are more successful in promoting changes in conceptions of subject matter than others. Nevertheless, very large numbers of students appear to be learning an imitation of at least some of the disciplines they are studying, a counterfeit amalgam of terminology, algorithms, unrelated facts, 'right answers', and manipulative skills that enables them to survive the process of assessment. Evidence of inadequate skills in working cooperatively to solve problems, over-dependence on teachers as sources of information,

and a lack of that self-critical awareness of one's own ignorance in a subject area that is the only true precursor of further inquiry—together these indicate that the standards achieved by our graduates in relation to the resources invested in educating them are often less than satisfactory.

Why do students just come to classes to copy from the board? Why do they think they understand accounting or history when all they know is a set of narrow rules or one accepted explanation? Why do they use the wrong formulas in physics? Why are they poor at working on real problems? Why can't they see the wider picture? One way of trying to understand these defects is to ask the students to tell us about their learning and how it is affected by our teaching. The connection between how students experience our teaching and how they learn will accordingly be the subject of the next two chapters.

Further reading

This is not the place to summarise the numerous studies of graduate attributes, transferable skills and employer perceptions of graduate capabilities, nor is it my purpose to examine the effectiveness of attempts to realise key skills agendas. For general reviews of higher education aims, generic skills and conceptions of learning, and an updated view of Perry's scheme, see:

Dearing, R. (1997) *Higher Education in the Learning Society. Report of the National Committee of Inquiry into Higher Education*, London: HMSO.
Drummond, I., Nixon, I. and Wiltshire, J. (1998) 'Personal transferable skills in higher education: The problems of implementing good practice', *Quality Assurance in Higher Education* 20:315–18.
Hofer, B. and Pintrich, P.R. (eds) (2002) *Personal Epistemology: The Psychology of Beliefs about Knowledge and Knowing*. Mawah, New Jersey: Lawrence Erlbaum.
Marton, F., Beaty, E. and Dall'Alba, G. (1993) 'Conceptions of learning'. *International Journal of Educational Research* 19:277–300.

Approaches to learning

Nearly every subject has a shadow, or imitation. It would, I suppose, be quite possible to teach a deaf and dumb child to play the piano. When it played a wrong note, it would see the frown of its teacher, and try again. But it would obviously have no idea of what it was doing, or why anyone should devote hours to such an extraordinary exercise. It would have learnt an imitation of music. And it would have learnt to fear the piano exactly as most students fear what is supposed to be mathematics.

What is true of music is also true of other subjects. On can learn imitation history—kings and dates, but not the slightest idea of the motives behind it all; imitation literature—stacks of notes of Shakespeare's phrases, and a complete destruction of the power to enjoy Shakespeare…

(W.W.Sawyer)

Real and imitation subjects

In the preceding chapter, we saw how teachers in higher education expect their students to develop intellectual abilities that go beyond the possession of technical skills and subject knowledge. There is nothing remotely new about the concept of generalisable skills associated with specific knowledge. In all subject areas, the attributes involve combining and relating ideas so that students can use the knowledge effectively. Lecturers want their students to learn how to analyse what is unfamiliar to them, to assess proposed solutions to problems critically, to recognise the style and persuasiveness of concepts that describe the physical or social world, and to be able to apply ideas learned in formal classes to the world outside the classroom. They expect students to change their interpretations of the

world in which they live through developing their understanding of the subjects they have studied.

Why do these changes not always happen? Why do students so often obtain quantities of knowledge, yet fail to change their understanding of what it means? How can it be that they can keep their academic knowledge separate from their experience? Why is the quality of undergraduate education deficient in these respects? Sawyer's little book, first published in 1943, holds the essence of the answer. Anyone serious about improving their teaching should think about the implications of the idea of an 'imitation subject' carefully. Students who have learned imitation subjects have been involved in a certain process that has enabled them to acquire factual knowledge which is useful in a very limited range of situations. Much of what they have learned has no personal relevance to them (except as a form of gaining qualifications) or any connection with the real world it is supposed to explain.

In this chapter and the next one, I try to show how we can use the idea of different approaches to learning to explain the perplexing phenomenon of students' misunderstandings, and to learn how to tackle its causes. We must do this by examining in detail the students' own experiences of learning and teaching—by looking, in other words, at learning from the student's perspective. It will become clear that the quality of our students' understanding is intimately related to the quality of their engagement with learning tasks.

How students learn: the concept of approach to learning

We now meet one of the most influential concepts to have emerged from research into teaching and learning in higher education during the last twenty-five years. You must fix clearly in your mind the concept of *approach to learning* in order to understand and get full value from the recommendations for better teaching in this book. It is unquestionably a pivotal concept in teaching and learning. The main idea is not particularly difficult, but it is somewhat abstract. The explanation of it is inevitably a little technical but it is of much interest.

In previous chapters I introduced the idea that we might think of learning as a change in the way we conceptualise the world around us. According to this way of looking at learning, a conception of an aspect of subject matter can be thought of as a sort of *relation* between a person and a phenomenon. In the academic world, a conception describes how an individual makes sense of something such as classical conditioning, irregular German verbs, integral calculus, or the anatomy of the upper

arm. A conception is not a stable entity within a person's mind; it is a way that the person relates to the world outside the person. The 'world outside' includes the subject matter of academic disciplines: the principles and concepts the discipline uses to explain phenomena and ideas, and its characteristic ways of discovering and explaining. When we talk about a student understanding something, what we are really saying is that he or she is capable of relating to a concept or topic in the way that an expert in that subject does.

We can think approaches to learning in exactly the same fashion. The way in which anyone goes about learning is a relation between the person and the material being learned. I am not talking about psychological differences between people, but about how someone makes sense of a particular learning assignment. Learning, from this perspective, is always the learning of something. There is no such thing as 'learning' in itself. The assignment in question might be almost anything in the world of academic learning—finding out about relativity, writing an essay about Chaucer, solving an economics problem, doing a project on pressurised water reactors, reading this book. The concept of approach describes a qualitative aspect of learning. It is about how people experience and organise the subject matter of a learning task; it is about 'what' and 'how' they learn, rather than 'how much' they remember. When a student learns, he or she relates to different tasks in different ways.

Review your own experiences of learning. There will have been times in all our experiences of formal schooling when, for example, we have seen the task before us as temporarily memorising facts or formulae for an examination; and others, when we took delight in mastering an idea, representing an interesting concept in our own words, painstakingly practising until we got a proof or an essay just right. Most university lecturers will have become teachers because of the pleasure they experience in doing the second type of learning within their specialist subjects. That sort of relationship with what is to be learned is hard work; it is no harder nor easier a relationship than learning in the dull way. But because it leads to a command of the genuine subject, not its imitation, it is profitable hard work.

Approaches to reading academic texts

In the last chapter, I mentioned some different outcomes of learning in experiments at Gothenburg University where students were asked to read academic texts. One of these experiments involved reading an article about pass rates and educational reforms. The researchers classified

students' answers into four categories representing a hierarchy of understanding. The first two of these showed that students had grasped the meaning the author intended to convey; they both involved a focus on the *conclusions* that the author drew from the evidence he presented. The second two categories focused on *describing* parts of the text alone. These students did not understand the point of the article; they merely remembered some vestiges of it. Why did these differences occur? Because of the nature of the relation between the student and the task of reading this particular article.

The students in the second group were not looking for the meaning of the text that embodied the intention of its author. They could not understand the article because they did not intend to understand it. They concentrated on its constituent parts rather than the whole in relation to the parts. They defined their job as if they were empty vessels into which the words on the page would be poured. They focused on the separate words and sentences of the text, rather than on the meaning those words and sentences were intended to convey; they 'skated along the surface of the text', as Marton and Säljö express it. They were not personally involved in the task. They saw it as an external impositiona job they had to complete for some purpose outside themselves. They anxiously tried to memorise what was in the article, because they knew they would be asked questions on it later and felt that they would need to recall all its details.

One said: 'You get distracted. You think, "I've got to remember this now". And then you think so hard about having to remember it—that's why you don't remember it.' As a consequence of using this approach, these students found it hard to distinguish between principles and examples, between evidence and conclusions, between main points and secondary details. They were also less likely than the others to remember the ideas and facts.

The other group engaged with the task in a different way. They experienced the learning situation as one that required them to extract personal meaning from the article. They were not dominated by a requirement to answer questions later. They tried to understand the author's message by searching for connections within the text, looking for an underlying structure, or by relating the text to something in the real world or in their previous reading. They defined their job as actively making sense. They stood more chance of understanding because they intended to understand and organised the information they read to that end. They were not trying to memorise the points made by the author, yet they remembered the ideas and the evidence

used to support the ideas very well when they were asked to recall them. From their perspective, the text was not an end in itself, but a means to understanding the author's message: 'The whole aim of the article was what I was thinking of.'

This original concept of approach to learning was narrowly focused on the task of reading a text. It has since been broadened to include all the different sorts of learning tasks that students carry out, as we shall see below. The two contrasting ways of relating to a learning assignment described above have become known as surface and deep approaches to learning respectively. Strictly speaking, there are two different aspects of an approach to learning. One is concerned with whether the student is searching for meaning or not when engaging with a learning task; the second is concerned with the way in which the student organises the task. The first aspect is what the original researchers meant by deep and surface approaches (which they at first called 'deep level and surface level processing'). The second aspect, which derived from the work of Lennart Svensson, is about differences in how students organise the information, and particularly about whether they distort and segment the framework of the task. They may confuse, for example, the author's argument with the evidence he or she uses to support it, and perhaps see each separate component as a single sequence of 'facts'. This approach is called an atomistic one. The alternative is to maintain the structure through integrating the whole and the parts; and this is known as a holistic approach.

We therefore have two related aspects of an approach to learning, one concerned with *what* the student refers to (energetically trying to understand or passively trying to reproduce—a focus on the signs or words of the text versus what is signified by it) and the other with *how* the student structures the task (relating its components in a connected structure or keeping them isolated).

In practice, these two aspects of approaches become fused together. In order to understand, a student must integrate and organise and see the text or other learning task as a whole. It makes no sense to talk about the meaning attributed to something unless you also talk about how the meaning is constituted. On the other hand, you cannot consider how a student structures a task in isolation from what he or she is intending to structure. In the literature on student learning we sometimes meet the terms 'deep-holistic' and 'surface-atomistic' to describe the combination of the two aspects, although deep and surface alone are often used to describe the same mixture. The logical structure of the categories used to describe approaches to learning is summarised in Figure 4.1.

APPROACH TO LEARNING

HOW
'Structural' aspect:
the act of experiencing,
of organising, of structuring

WHAT
'Meaning' aspect:
that which is experienced;
the significance of the task

HOLISTIC
Preserves the
structure, focuses
on the whole in
relation to the parts

ATOMISTIC
Distorts the structure,
focuses on the parts,
segments the whole

DEEP
Focuses on
what the task is
about (e.g. the
author's intention)

SURFACE
Focuses on the
'signs' (e.g. the
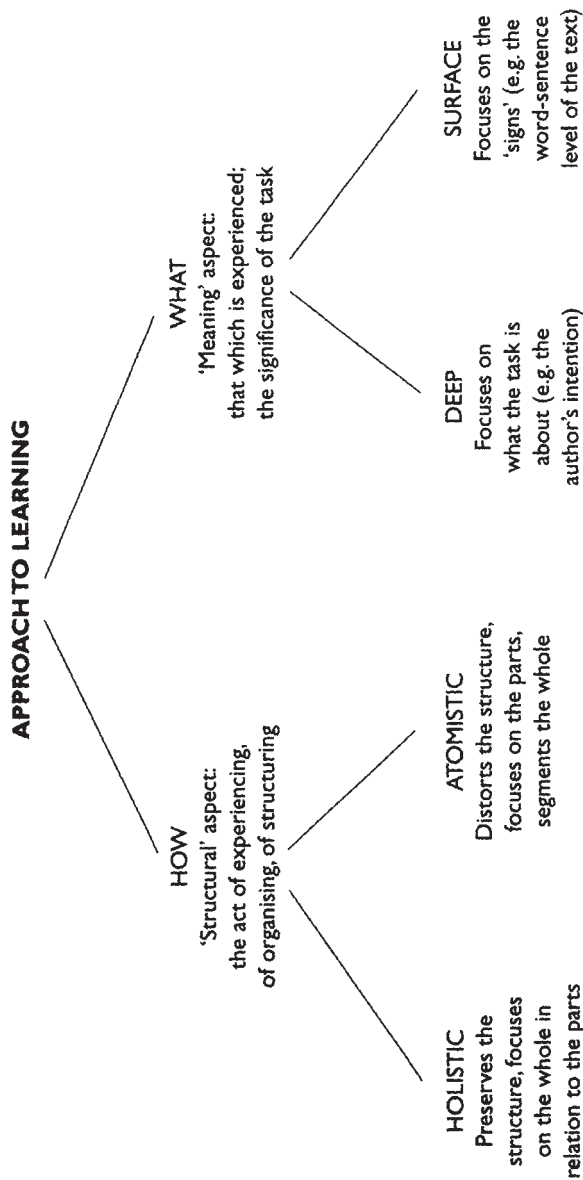word-sentence
level of the text)

Figure 4.1 The logical structure of approaches to learning

The fate of many seminal ideas has been to acquire a common-sense significance remote from their original meaning. The idea of an approach to learning is very frequently misunderstood. The most usual mistakes are to believe that an approach is a characteristic of an individual person, like the colour of a student's hair; to believe that the approach can be inferred from a student's observable behaviour; to concatenate low ability' and surface approaches; or to think that surface and deep approaches to learning are in some way complementary or sequential.

The only way to overcome these misconceptions is to understand the concept for yourself. Approaches to learning are not something a student *has*; they represent what a learning task or set of tasks *is* for the learner (see Marton 1988:75). This may sound like playing with philosophical definitions, but it is a very practical difference. Everyone is capable of both deep and surface approaches, from early childhood onwards. An approach describes a relation between the student and the learning he or she is doing. It has elements of the situation as perceived by the student and elements of the student in it (how else can a situation be perceived?), but you cannot reduce it to the sum of these two sets of elements. It would be just as impossible to do this as it would be to reduce the baking of a cake to the heat in the oven and the raw ingredients. There is no escaping the fact that a baked cake is something qualitatively different from each of these elements, while at the same time it cannot exist without both of them.

The distinction between characteristics of students and the nature of different approaches to learning is a critical one for teachers to understand. Its implications run right through how we should teach. In trying to change approaches, we are not trying to change students, but to change the students' experiences, perceptions or conceptions of something.

Take care also with the differences between knowing facts or understanding concepts and the different approaches. An approach is not about learning facts versus learning concepts: it is about learning just the unrelated facts (or procedures) versus learning the facts in relation to the concepts. Surface is, at best, about quantity without quality; deep is about quality and quantity. As John Biggs has put this:

> Knowing facts and how to carry out operations may well be part of the means for understanding and interpreting the world, but the quantitative conception stops at the facts and skills. A quantitative change in knowledge does not in itself change understanding. Rote

learning scientific formulae may be one of the things scientists do, but it is not the way scientists think.

(Biggs 1989:10)

It may be helpful in understanding these distinctions to return to the idea of an imitation subject, and to remember that imitation subjects, like surface approaches, cannot occur in an ideal educational environment. They cannot ever be acceptable as long as the educational value position represented in this book, and made tangible in the statements of university lecturers about their goals, is maintained. Surface approaches are uniformly disastrous for learning, as we shall observe below; yet they may permit students to imitate authentic learning and to bamboozle their teachers into thinking that they have learned. So, depending on one's point of view, a surface approach might be the best bet sometimes (the night before an exam in a subject you missed all the lectures for, maybe). The snag is that you may survive the exam but you will almost certainly forget everything you memorised for it after a few days. As Marton and Säljö say: 'We are not arguing that the deep/holistic approach is always "best": only that it is the best, indeed the only, way to *understand* learning materials' (1984:46).

Students' experiences of surface and deep approaches

The variations in approaches to learning that were noted in the original experiments can be observed in many educational contexts. The last twenty-five years have seen the important concept of approach to learning extended and applied to all kinds of learning tasks in higher education, from writing essays in history to problem-solving in science. It has also been generalised to describe the ways students engage with clusters of learning tasks and complete courses of study. 'Text' takes on a metaphorical sense when approaches to learning in everyday studies are considered (see Marton and Säljö 1984:45). A student may focus on passing a course or completing a particular learning assignment, such as a laboratory report or examination, as an end in itself, or alternatively on the meaning the course or assignment has in relation the subject matter and the world that the subject matter tries to explain.

The defining features of the different approaches in the context of everyday academic studying are summarised in Table 4.1.

In order to illustrate the nature of these differences, I quote below some students' descriptions of their approaches to normal learning tasks. Think about what the student in each of these extracts is trying to do.

Table 4. 1 Different approaches to learning

Deep approach	Surface approach
Intention to understand	Intention only to complete task requirements
Student maintains structure of task	Student distorts structure of task

• Focus on 'what is signified' (e.g. the author's argument, or the concepts applicable to solving the problem)	• Focus on 'the signs' (e.g. the words and sentences of the text, or unthinkingly on the formula needed to solve the problem)
• Relate previous knowledge to new knowledge	• Focus on unrelated parts of the task
• Relate knowledge from different courses	• Memorise information for assessments
• Relate theoretical ideas to everyday experience	• Associate facts and concepts unreflectively
• Relate and distinguish evidence and argument	• Fail to distinguish principles from examples
• Organise and structure content into a coherent whole	• Treat the task as an external imposition
• Internal emphasis: 'A window through which aspects of reality become visible, and more intelligible' (Entwistle and Marton 1984)	• External emphasis: demands of assessments, knowledge cut off from everyday reality

What meaning is he or she imposing on the task? How is the content being organised? What messages about learning do these students seem to be getting from the tasks they have been set to do?

(Subject matter: Geography. Task: essay preparation)
Well, I read it, I read it very slowly, trying to concentrate on what it means, what the actual passage means. Obviously I've read the quotations a few times and I've got it in my mind what they mean. There's a lot of meaning behind it. You have to really get into it and take every passage, every sentence, and try to really think, 'Well, what does this mean?' You mustn't regurgitate what David is saying, because that's not the idea of the exercise. I suppose it's really original ideas in this one, getting it all together.

(Physics, practical work)
I suppose I'm trying to imagine what the experiment is talking about, in a physical sense, sort of get a picture of what it's about. This one says an ultra-violet lamp emits one watt of power; it says calculate the

energy falling on a square centimetre per second. I'm just thinking of the light and the way it spreads out, so therefore I know it's the inverse square law…

(Engineering, problem solving)
It's an operation research exercise, a program to find a minimum point on a curve. First I had to decide on the criteria of how to approach it, then drew a flow diagram, and checked through each stage. You have to think about it and understand it first. I used my knowledge of O.R. design of starting with one point, testing it and judging the next move. I try to work through logically…I chose this problem because it was more applied, more realistic. You can learn to how to go about O.R. You get an idea of the different types of problem that exist from reading (Laurillard 1984:134–5).

(Computer Studies, lecture notes/revision)
[Learning in this course is] getting enough facts so that you can write something relevant in the exam. You've got enough information so you can write an essay on it. What I normally do is learn certain headings. In an exam, I can go: 'Introduction' and I'll 'look' at the next heading, and I know what I've got to write about, without really thinking about it really. I know the facts about it. I go to the next heading and regurgitate.

(Physics, exam revision)
Formulae. You just have to go into the exam with as many formulae as possible. So you learn those parrot-fashion. And approaches to the way you work out problems, techniques involved in maths. I seem to remember these just sort of one day or two.

(Engineering, problem solving)
This problem is not to be handed in…I knew how I'd do it from looking at it; it practically tells you what equation to use. You just have to bash the numbers out. I knew how to do it before I started so I didn't get anything out of it. There's not really any thinking. You just need to know what you need to solve the problem. I read through the relevant notes, but not much because you don't need to look at the system (ibid.).

Can you categorise these extracts into the different approaches previously described? The first three show typical characteristics of deep approaches. The students are focusing on the content of the task and

how it relates to other parts of the course or previous knowledge; they are trying to understand the task and relate its component parts to the whole. The process is internal: the students are concerned with integrating the new material with their personal experiences, knowledge and interests. The remaining three quotations are classic surface—the assignment is a chore, the focus is on reproducing bits and pieces of memorised or textbook knowledge. The process of learning is external to the student: it is one in which alien material is impressed on the memory or manipulated unthinkingly with the intention of satisfying assessment demands.

How many students are talking here? Is this is a distinction between bright and weak students? In fact, there are three students represented in these extracts, and each one of them is describing first a deep approach and then a surface approach. His or her relation to the task differs from one situation to another. Each student is using deep and surface approaches in response to different circumstances. We can see that one cannot be a deep or surface learner; one can only learn the content in a deep or surface way.

Approaches in different subject areas and academic tasks

The same student learns differently in different situations; but there is a further complication. What constitutes an approach to learning, surface or deep, varies according to the academic task. The relational character of the concept also implies this. The content of the subject being learned is inextricably linked to the approach: learning, as I have emphasised, is always the learning of some particular content. Since typical tasks vary between different disciplines, we find that the way in which approaches manifest themselves also varies. The extent to which these differences are in some way a function of the essential nature of the discipline or have a socio-cultural origin is not important—for our purposes. The fact that the differences exist is.

It may be instructive to work out some of the characteristic ways in which different approaches reveal themselves in tasks associated with your own discipline. You would be likely to find, if you compared the defining features of approaches in science and humanities areas, that they reflected some of the typical differences in the ways of thinking that characterise practitioners of these different specialisms. The conclusion reached by the research into student learning is that while the general difference between deep and surface approaches is as

applicable to English and politics as it is to chemistry and engineering, the meaning of the distinction has to be reinterpreted in relation to different subject areas.

For example, an initially narrow concentration on detail and logical connections as part of a deep approach is common in subjects typified as cumulative, paradigmatic, replicable and capable of being summarised in terms of general laws (such as physics); while in subjects usually described as being particularistic, idiographic and reinterpretive (such as history) a deep approach is more likely to involve the student in stressing, right from the start, an intention to elucidate material in a personal way. In describing surface approaches, students of science are more likely to speak of a narrow focus on techniques, procedures and formulae, while humanities and social scientists tend to report a more generalised and vague approach, which frequently includes oversimplification of main ideas in reading and essay writing, or memorising unrelated generalities in preparation for examinations. I listed many specific examples of these sorts of differences, extracted from my student interviews at Lancaster, in a previous book (Entwistle and Ramsden 1983). It was also clear from these interviews that students have implicit theories about the disparate demands of different disciplines which map neatly on to what is known about differences in teaching and assessment practices in different subject areas (see Ramsden 1988a).

Studies show that in professional subjects, which usually involve a large amount of problem-solving activity, the approaches used are also in an important sense the outcomes of learning. In other words, students are learning a process that will be an essential part of their work as professionals. For example, they are learning how to gather clinical information, relate it to theoretical knowledge (such as disease prevalence rates) and form a diagnosis. We could identify analogues in architecture, law, engineering, accounting and other professional subjects—including teaching. It is clear that the dichotomy typically appears in the context of clinical education tasks, for example, in relation to the integration or separation of theoretical and practical knowledge. In clinical medicine, and specifically diagnostic problem solving, a deep approach typically appears as the establishment of a complex chain of associations that links symptoms to theoretical knowledge. A surface approach implies a focus on specific isolated symptoms, linking and sequencing these parts in order to arrive at a conclusion. In using a surface approach, a student may

address the task of clinical information gathering by listening for a cue from the patient, and then using a routine, predetermined list or 'casematching' strategy (Whelan 1988).

Orientations to studying

Deep and surface approaches in the original sense in which Marton and Säljö used them are about a student's immediate engagement with a particular learning task, such as reading a social science text or solving a mathematical problem. However, as we have already seen, the fact that the concept of approach has at its heart the idea of learning as an experience of something does not prevent us from looking at approaches in a more general fashion, as propensities to address a range of different learning tasks—say all the tasks making up a course of study—in a certain way. Although it is abundantly clear that the same student uses different approaches on different occasions, it is also true that general tendencies to adopt particular approaches, related to the different demands of courses and previous educational experiences, do exist. Variability in approaches thus coexists with consistency. This should not really be too surprising a paradox to live with. It is no different from saying that you generally support the Conservative party but that you decided to vote for the Labour candidate in a local election because she happened to have a special interest in a community issue that concerned you. We shall see later how the existence of these general approaches, or orientations to studying, has important consequences for the effects of changes to teaching on the quality of student learning.

Students' approaches to courses of study have been investigated using both interviews and questionnaires. Svensson (1977), Prosser and Millar (1989) and Ramsden (1981), for example, asked students questions in interviews such as 'How did you read the books set for the course?', 'What sorts of things do you usually do when studying for [this course], and why?', 'What kinds of things do you do in tutorials and seminars?' Clear differences between students emerged. While some of them stressed memorising and arranging disconnected pieces of course content in order to increase their amount of knowledge, others stressed the process of linking together and abstracting personal meaning from the same material. Several researchers have used questionnaires to examine these different orientations to studying. The two best known of these questionnaires were designed by Biggs (at Newcastle in Australia) and Entwistle and his colleagues (at Lancaster in the United Kingdom). In these similar instruments, students are asked to agree or disagree with questions about

Table 4.2   Examples of questions in the Lancaster Approaches to Studying and the Biggs Study Process questionnaires

Orientation to studying (general approach to learning)	Indicative items
Meaning orientation (Deep approach)	I try to relate ideas in one subject to those in others, whenever possible.
	I usually set out to understand thoroughly the meaning of what I am asked to read.
	In trying to understand new ideas, I often try to relate them to real life situations to which they might apply.
	When I'm tackling a new topic, I often ask myself questions about it which the new information should answer.
	In reading new material I often find that I'm continually reminded of material I already know and see the latter in a new light.
	I spend a lot of my free time finding out more about interesting topics which have been discussed in classes.
Reproducing orientation (Surface approach)	I find I have to concentrate on memorising a good deal of what we have to learn.
	I usually don't have time to think about the implications of what I have read.
	Although I generally remember facts and details, I find it difficult to fit them together into an overall picture.
	I find I tend to remember things best if I concentrate on the order in which the lecturer presented them.
	I tend to choose subjects with a lot of factual content rather than theoretical kinds of subjects.
	I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.

their typical approaches to studying. Many of the questions derive from what students have said in interviews about how they study.

Examples of the questions in the Entwistle and Biggs questionnaires appear in Table 4.2. (The Biggs and the Entwistle questionnaires each include items concerning a third aspect of student learning, known as the 'strategic orientation' or 'achieving approach', but these need not concern us here.) Questionnaires of this type can be used as a form of course evaluation, because they provide direct information about students' responses to particular curricula and they way the are taught and assessed.

The two main orientations have been identified in a whole series of studies, too numerous to describe here, in the USA, Australia, the UK, New Zealand, Hungary, Venezuela and Hong Kong, not only in universities but in secondary schools as well. The deep (meaning) and surface (reproducing) components show impressive stability across age groups and national boundaries. There is little room for doubt that they describe a primary difference in how our students learn.

Relations between approaches and outcomes

What is the effect of different approaches to learning on the quality of student learning? There is no uncertainty about the answer. Many research studies have shown that the outcomes of students' learning are associated with the approaches they use. *What* students learn is indeed closely associated with *how* they go about learning it. It does not seem to matter whether the approaches are measured by means of questionnaires or interviews, whether the subject area is engineering or history or medicine, or whether the outcomes are defined in terms of grades, or in terms of some qualitative measure of learning (as in the first Gothenburg study). It is also evident that approaches are related to how much satisfaction students experience from their learning. Deep approaches are related to higher-quality outcomes and better grades. They are also more enjoyable. Surface approaches are dissatisfying; and they are associated with poorer outcomes.

Qualitative measures of understanding

In the original Gothenburg studies, deep and surface approaches to learning were functionally related to the outcomes of learning. There was a logical inevitability about the association in Marton's original experiment—the students who 'did not get the point' of the text were

Table 4.3 Relationship between approach to learning and outcome of learning

| Level of outcome | Approach to learning | | | |
	Surface	Not clear	Deep	Sub-totals
A (conclusion orientated, detailed)			5	5
B (conclusion orientated, mentioning)	1	6	4	11
C (description, detailed)	8			8
D (description, mentioning)	5	1		6
Sub-totals	14	7	9	30

Source: Based on Marton and Säljö (1976 and 1984).

not looking for it. They focused on the text itself, rather than the main points and the relations between the details and conclusion. They could not achieve understanding because they defined their task in a way that excluded the possibility of understanding. It was overwhelmingly clear as well, however, that outcome and process were empirically linked. Although there were cases where the researchers could not classify students' approaches, the links between the four main types of outcome and the approach used were clear. Table 4.3 summarises these relations. The main dividing line between outcomes is between B and C: the fact-conclusion structure of the article is understood in types A and B, but not in types B and C (see Marton and Säljö 1984:42).

Entwistle and Ramsden (1983) reported comparable results, using students' written responses rather than interviews. Watkins (1983) also described positive relations between approaches and outcomes. It has also been found that students who use deep approaches retain more of the factual material presented in the text when tested on their knowledge of it several weeks later.

Van Rossum and Schenk (1984) analysed learning outcomes of reading text in a rather different way, using a taxonomy developed by Biggs and Collis (1982) to classify students' answers. This SOLO taxonomy (SOLO is an acronym for 'Structure of the Observed Learning Outcome') is a hierarchy that contains five levels of outcome which are used to classify the structural complexity of students' responses. Unlike the outcome measures used by the Gothenburg group, the categories are not content' specific, but are assumed to apply to any kind of subject matter. The system is summarised in Table 4.4. The main dividing line is between levels 3 and 4: at level 4 and above, the responses involve evidence of understanding in the sense of integrating and structuring parts of the

Table 4.4 Levels of Biggs's SOLO taxonomy

1	Prestructural	Use of irrelevant information, or no meaningful response
2	Unistructural	Answer focuses on one relevant aspect only
3	Multistructural	Answer focuses on several relevant features, but they are not coordinated together
4	Relational	The several parts are integrated into a coherent whole: details are linked to conclusions; meaning is understood
5	Extended abstract	Answer generalises the structure beyond the information given: higher-order principles are used to bring in a new and broader set of issues

material to be learned. Biggs has shown how this system can be applied to learning outcomes, curriculum design and assessment in many different subject areas (Biggs 1999). We shall meet it again below and in subsequent chapters.

Van Rossum and Schenk (1984) also showed that approaches to learning were strongly associated with SOLO outcomes. In their experiment, 27 of the 34 students who used a deep approach achieved a relational or extended abstract outcome, while none of the 35 students using a surface approach gave a response higher than multistructural. Van Rossum and Schenk also classified students' conceptions of learning (see above, p. 27), and found that most of the students who used surface approaches saw learning as a process of increasing knowledge or memorisation, while deep approaches were associated with views of learning as understanding reality and abstracting meaning.

Biggs's work on students' essay writing (Biggs 1988) extended studies of the relationship between approach and outcome to the task of essay writing. The analogy with reading text is very close. When students feel dominated by external assessment demands and define their task as listing points or reproducing information, planning, composing and reviewing are not complex; but when they see writing the essay as a learning experience in its own right, careful attention is given to the audience, style and discourse structure. Biggs showed how surface approaches to essay writing in history restrict the quality of outcome to a low level, while deep approaches provided the writer with the opportunity to obtain high-quality outcomes. Hounsell (1985) reported similar results.

Whelan (1988) and Balla *et al.* (1990) described comparable associations in their studies of medical students' problem solving. Whelan

identified two main levels of outcome in an interview study of students' diagnostic procedures: *description*, which was characterised by short associative links between symptoms and diagnosis, purely descriptive answers, or failure to make a diagnosis; and *understanding*, which involved complex causal chains of reasoning using pathophysiological links. Students were more likely to demonstrate understanding if they used a deep-holistic or 'structuring' approach (including relating previous knowledge to the problem and maintaining the problem's structure) than if they used a surface-atomistic or 'ordering' approach to the two cases presented.

A study by Prosser and Millar (1989) examined approach-outcome associations in first year physics students. This study is of particular interest as it looked at *changes* in students' conceptions of phenomena concerning Newtonian mechanics (such as identifying forces in cases of reducing and constant velocity). Tests of understanding were carried out before and after the course. Prosser and Millar show that students who adopt surface approaches to the course of study are less likely to show high-level conceptions of the particular concepts involved. They also provide strong evidence of a causal connection between the approach used and the level of understanding reached. They found that development in conceptions as the course proceeded was related to the approach used. Students who used deep approaches were more likely to change their understanding in the direction that lecturers desired—away, for example, from Aristotelian views of force and motion towards Newtonian ones. Twenty-one of the 23 students classified as using surface approaches showed no development, while eight of the nine students using deep ones did.

Grades and degree results

There is equally convincing evidence that students who use deep approaches get better marks. Svensson (1977) identified deep and surface approaches in the context both of reading experiments and normal studies, and found that there were close relationships between approaches and outcomes in both contexts (see Table 4.5). Ninety per cent of students classified as using deep approaches in both the experiment and in normal studies passed all their examinations.

It is impossible to discuss all the studies of associations between approaches and academic performance here, but some examples of the range of investigations will give a flavour of the findings. Entwistle and Ramsden (1983) found that British university students classified in

Table 4.5 Approaches to learning and examination performance

Approach		Examination performance		Total
Experiment	Normal studies	Passed all	Some failure	
Surface	Surface	3	10	13
Deep	Deep	9	1	10
Deep	Surface	4	2	6
Surface	Deep	1	0	1

Source: Based on Svensson (1977).

interviews as using 'consistent deep' approaches were more likely to obtain first or upper second class honours degrees. Comparable findings, for British, Australian and American students, have been reported by Biggs (1987, 1999), Crawford *et al.* (1999), Hounsell (1985), Ramsden *et al.* (1986), Schmeck (1983), Trigwelletol (2000), WatkinsandHattie (1981) and Wilson *et al.* (1997). Ramsden and Entwistle (1981) in Lancaster, and Biggs (1987) in Australia also described links between students' self-ratings of their own academic progress, compared with their peers, and their approaches. The Lancaster investigation suggested that meaning orientation was more effective, and reproducing orientation more heavily penalised, in arts than science. A study of adaptation to higher education in Melbourne found that a group of students who described themselves as high on deep approaches and low on surface ones, both at school and at university, also reported conscientious and well-organised study habits (compare Svensson's finding below), obtained better school-leaving examination results and, in the first year of university, gained better average grades.

   None of the relationships between results and approaches reported in the literature is as strong as the associations established using measures of the quality of learning, for reasons which I discuss below. Their consistency is nevertheless remarkable.

Attitudes to studying

No one reading the interview material reported in books such as The *Experience of Learning* (Marton *et al.* 1984,1997) could fail to be struck by the regularity with which students obliged to use a surface approach to a task, or to an entire course, describe their feelings of resentment, depression and anxiety. In contrast, deep approaches are almost universally associated with a sense of involvement, challenge and achievement, together with

feelings of personal fulfilment and pleasure. Svensson (1977) showed that this relationship helps to explain the connection between examination performance and approach. Students who are taking a deep approach find the material more interesting and easier to understand, and are therefore more likely to spend 'time on task'. But studying using a surface approach is a tedious and unrewarding activity: persisting with this approach leads to procrastination and delay. Surface approaches thus mean that students spend less and less time in private study, and consequently are more likely to fail their exams. When students appear to be 'unable to study' we should examine their approaches to learning before blaming them for being idle and unmotivated, particularly in view of the effect of our teaching on their approaches—as we shall see in the next chapter.

The Lancaster study established that surface approaches were linked to negative attitudes to studying: students adopting a reproducing orientation were more likely to agree with questionnaire statements such as 'Often I find myself wondering whether the work I am doing here is really worthwhile' and 'When I look back, I sometimes wonder why I ever decided to come here'. My work with students in Melbourne has shown identical associations. Students who describe the use of surface approaches, both in the sixth form and in higher education, are less satisfied with university study. Students who use deep approaches are the best adapted to the demands of higher education, and most committed to studying. Similarly, Biggs (1987) reported that surface approaches were related to a high degree of dissatisfaction, and deep approaches to satisfaction with performance.

The interview evidence from several studies makes it clear that the approach—satisfaction connection is reciprocal. While the approach used determines the level of enjoyment and commitment, interest in the task for its own sake encourages a student to use a deep approach. William Sawyer captured these connections between approach and attitude in a few concise sentences:

> Real education makes howlers impossible, but this is the least of its advantages. Much more important is the saving of unnecessary strain, the achievement of security and confidence in mind. It is far easier to learn the real subject properly, than to learn the imitation badly. And the real subject is interesting. So long as a subject seems dull, you can be sure you are approaching it from the wrong angle. All discoveries, all great achievements, have been made by men who delighted in their work.

> (Sawyer 1943:9)

Taken as a whole, the relationships discovered in these various studies of the connection between approaches to learning and the outcomes of learning are extremely robust, with two qualifications: surface approaches are usually more strongly linked to poor learning than deep ones are to effective learning; and the connections between grades and approaches are less marked than those between measures of learning quality and approaches. The reasons for both qualifications are plain. In the first place, although using a surface approach logically prevents a student from achieving understanding, using a deep approach does not guarantee it. Other things, such as a well-structured knowledge base in the area being studied, are necessary. In other words, surface approaches can never lead to understanding: they are both a necessary and a sufficient condition for poor-quality learning. Deep approaches are a necessary, but not a sufficient condition, for high-quality outcomes.

The explanation for the second qualification is that grades or degree results are a much less reliable and valid measure of outcome than a test of understanding based on the same study material that was used to classify the students' approaches. Many assessment methods do not test understanding, although we may believe that they do. Students may succeed in an examination or a degree course despite using a surface approach; alternatively, they may not be given the opportunity to display the full range of their understanding because of the assessment methods used—two facts that are worth reflecting upon in themselves. Several investigations of approaches and outcomes show that surface approaches are often effective for recollecting unrelated facts and details over a short period. This, of course, explains the popularity of surface approaches as a form of revision for unseen examinations and as a way of coping with excessive amounts of curriculum material. It also sheds light on the genesis of the examination howler.

Conclusions on approaches

The ubiquity of surface approaches in higher education is a disturbing phenomenon. 'In my own work at universities,' said Whitehead, 'I have been much struck by the paralysis of thought induced in pupils by the aimless accumulation of precise knowledge, inert and unutilised…The details of knowledge which are important will be picked up ad hoc in each avocation of life, but the habit of the active utilisation of well-understood principles is the final possession of wisdom.'

Surface approaches have nothing to do with wisdom and everything to do with aimless accumulation. They belong to an artificial world of learning, where faithfully reproducing fragments of torpid knowledge to please teachers and pass examinations has replaced understanding. 'Paralysis of thought' leads inevitably to misunderstandings of important principles, weak long-term recall of detail, and inability to apply academic knowledge to the real world. A surface approach shows itself in different ways in different subject areas, but it leads down the same desolate road in every field, from mathematics to fine arts. Once the material learned in this way is reproduced as required, it is soon forgotten, and it never becomes part of the student's way of interpreting the universe.

Through this concept of approach to learning, we can begin to unlock the puzzle of poor-quality learning described in the previous chapter. The outcome of a surface approach is essentially quantitative—a list or unstructured grouping of pieces of disparate knowledge. Such outcomes tend to be associated in markers' minds with errors in calculation, the use of incorrect procedures, recapitulation (sometimes inaccurate) of material presented in lectures, linear narration techniques in essay writing, misapplied concepts, and so on. These are the outcomes about which university and college teachers spoke so deprecatingly when they identified their 'weaker students' (the majority) thirty years ago (Entwistle and Percy 1974); their views were echoed more recently by the physics and accountancy lecturers also quoted in an earlier chapter.

It is clear that, in contrast, deep approaches embody the type of learning that lecturers expect students to do. It seems certain that the imaginative, flexible and adaptive skills which higher education is supposed to develop in students can only be properly established in this way. It is also apparent from what we have heard from students that a deep approach is a very much more satisfying way to study. It allows students to use academic knowledge to control and clarify the world outside academic knowledge. Deep approaches are connected with the qualitatively superior outcomes which we associate with understanding a subject: the making of an argument, the novel application of a concept, an elegant solution to a design problem, an interplay between basic science knowledge and professional application, mastery of relevant detail, relating evidence correctly to conclusions. These outcomes share certain general characteristics. Among them are high structure, a strong knowledge base, ability to apply one's own and other people's ideas to new situations, and integration of knowledge. These common elements are almost identical to the subject-related aims of university teachers described in Chapter 3.

Our knowledge of the nature of approaches to learning thus enlightens

our search for means to improve the quality of higher education. Good teaching implies engaging students in ways that are appropriate to the deployment of deep approaches. Later in the book, we shall see how improving teaching implies engaging lecturers in ways that are appropriate to the development of their understanding of teaching. We must start, however, by examining in some detail the students' own experiences of teaching and how these influence their approaches to learning.

Further reading

Among the very large literature on university students' approaches to learning that has developed since the early 1990s, the following are useful starting points:

Marton, F. and Säljö, R. (1997) 'Approaches to learning', in F.Marton *et al.* (eds) (1997) *The Experience of Learning,* 2nd edition, Edinburgh: Scottish Academic Press.
Prosser, M. and Trigwell, K. (1999) 'Students' approaches to learning', Chapter 5 of *Understanding Learning and Teaching,* Buckingham: SRHE and Open University Press.
Richardson, J.T.E. (2000) 'Approaches to learning' and 'Conceptions of learning', Chapters 2 and 3 of *Researching Student Learning: Approaches to Studying in Campus-based and Distance Education,* Buckingham: SRHE and Open University Press.

Learning from the student's perspective

> Schools teach you to imitate. If you don't imitate what the teacher wants you get a bad grade. Here, in college, it was more sophisticated, of course; you were supposed to imitate the teacher in such a way as to convince the teacher you were not imitating.
>
> (Robert Pirsig)

The context of learning

If the quality of student learning is dependent on the approach taken, how can we encourage students to use deep approaches? Deep and surface approaches are responses to the educational environments in which students learn. This is implied by the relational nature of the idea of an approach to learning. In phenomenological jargon, an approach is an 'intentional' phenomenon. It is directed outside the individual to the world outside them, while simultaneously being defined by that world. It is not something inside a student's head; it is how a student experiences education. The most important thing to keep in mind is that students adapt to the requirements they perceive teachers to make of them. They usually try to please their lecturers. They do what they think will bring rewards in the systems they work in. All learners, in all educational systems and at all levels, tend to act in the same way.

Our students' experiences of curricula, teaching methods and assessment procedures create the educational environment or context of learning. Remember that we are dealing here with the students' own perceptions of assessment, teaching and courses, and not with 'objective' characteristics such as the division of teaching methods into tutorials, practicals and lectures, or assessment methods into examinations and assignments. There happen to be good reasons for believing that some

teaching and assessment methods are better than others. But it is more important now to understand that the effects of different teaching methods on students are—from their teachers' point of view—often unpredictable. Students respond to the situation they perceive, and it is not necessarily the same situation that we have defined. It is imperative to be aware of this routine divergence between intention and actuality in university teaching. In fact, as we shall see, becoming aware of it is part of what it means to teach well.

Unintended consequences of interventions

Can we instruct students in the use of deep approaches? Because of the inevitable gap between our intentions and students' perceptions of the context of learning, the answer is probably no. This fundamental point is illustrated in one of the experiments carried out by Marten's research team (summarised in Marton and Säljö 1984:47). When the Gothenburg researchers tried to give students hints about how to take a deep approach to reading a text—by inserting questions that encouraged students to relate the various parts—a curious thing happened. The students in question actually adopted an extreme form of surface learning. They 'invented' a way of answering the inserted questions without engaging with the text. The research team's questions, which were intended to be a means of helping students to understand what they were reading, were perceived by the students as ends in themselves. And in order to answer them expeditiously, the students adopted a superficial approach to reading, focused on being able to mention the parts of the text.

One of the studies at Melbourne produced somewhat similar results (see Ramsden *et al.* 1986). Attempting to train first year students to adopt more effective learning strategies had the practical effect of increasing their tendencies to use *surface* approaches. Our interviews of students showed that they perceived first year courses to require the accurate retention of large amounts of content. They took from the learning skills programmes what they believed would help them to pass these courses. What they thought would be useful was the inverse of what the programmes were trying to teach.

In each of these interventions, the effects on student learning were the opposite of those that their designers intended, precisely because the students saw things differently. It would be fruitless to blame the students for perceiving the situation in a way we did not predict; they acted with perfect rationality. These results do not necessarily mean that all attempts to help students develop better learning skills are a waste of time. What

they do imply is that we cannot train students to use deep approaches when the educational environment is giving them the message that we reward surface ones. We deceive ourselves if we think we can tell students not to imitate when they look around them and see that imitation, suitably disguised, appears to them to be what teachers want.

Neither, it would seem, can we train students to use particular approaches in all contexts. Approaches to learning are not skills that students possess or do not possess regardless of the subject matter they are learning. They are more domestic phenomena than that. They are inseparable from both the content and the context of student learning, both as previously experienced and as currently experienced.

Different kinds of contextual effects

There is a long tradition behind the idea that teaching and assessment has a weakening influence on the quality of student learning. Much anecdotal and research evidence points towards the mostly negative effect of the academic environment on students. Whitehead, for example, pointed to the 'evil path' in education of easy texts and unimaginative teaching which leads to rote learning of ill-understood information for examination purposes. Experiences of bad teaching and bad assessment practices dominate many of the stories. Tales of the unintended, and negative, consequences of teaching and assessment in higher education appear with alarming regularity.

In everyday studying, the context of learning is an ever-present influence on students' activities. Students do not simply read a textbook or write a practical report, for instance. They read or write for a particular audience and they do these things in response to the implicit or explicit requirements of their teachers. They are enrolled for courses of study and degree programmes. They have had previous experiences of the subject matter and tasks associated with it, as well as previous experiences of other educational institutions. It may be helpful to think about the relation between students' perceptions and their approaches at several interconnected levels. These are the learning task itself (including students' previous experiences of dealing with similar tasks) the quality of interaction with lecturers, the curriculum and assessment, and, at the most general level, the atmosphere or 'ethos' of the course, programme of study or institution. Each of these levels suggests a point at which interventions can occur to change students' approaches. In Chapter 12, I shall show how we might apply similar ideas to improving the quality of teaching.

Student interest, knowledge base and previous experience

Students' approaches depend partly on their previous experiences and the nature of their interest in the task in hand. It is often hard to separate the context of learning and previous experiences in describing learning in its everyday setting. Deep approaches are closely related to a student's interest in the task for its own sake. Intrinsic interest and a sense of ownership of the subject matter provide fertile ground for attempts to impose meaning and structure. In addition, deep approaches are associated with a well-developed base of knowledge in the field of study. If there are gaps in your understanding of basic concepts, then it is obviously much more likely that your attempts to understand new material that assumes knowledge of those concepts will be frustrated. A learner may then resort to strategies requiring the minimum of interaction with the task, as this Lancaster student makes clear in his description of how he tackled two different parts of the same problem:

> It was like one of the questions from a previous course, which I could relate. It was a Shrödinger equation for a particle in a box, which we'd solved generally before in chemistry, so I could see a picture of what I wanted. I knew basically what sort of answer I should get, and from that I could work my way through it…. The other bit was different; I couldn't do it. Basically, I gave up with it, because it was a function, which I've never really understood. I looked at it and I thought, 'That looks complicated'. It was very short. It looked like it would need a lot of rearranging.

Another Lancaster student, after describing a deep approach to writing essays in one course in whose subject matter she felt personally involved, spoke of a quite different way of tackling an apparently similar assignment in another course:

> This subject's a bit confusing. When it comes to writing essays, because I'm not very interested in it, I tend to rush through the books I'm reading, so I don't really understand it when I've finished reading. And because there's so much information, I think you can either tend to oversimplify or get into too much detail.

Fransson (1977) also showed (this time in an experimental setting) that intrinsic motivation and absence of anxiety—as perceived by the student,

although not always as intended by the experimenter—were related to the use of a deep approach. Failure to perceive relevance, however, was associated with surface approaches.

Background knowledge and interest in the subject matter are, of course, related to each other. Both are also affected by the student's previous educational experiences. Occasionally, people argue that because students sometimes use either deep or surface approaches consistently across different tasks, then the statement that approaches to learning are adaptive responses, rather than student characteristics, is wrong. This is a misunderstanding. The way in which a student perceives a learning task, or a whole course of study, is partly determined by his or her previous experiences. This is important for teaching, not so much because we can repair a student's past experiences but because we can influence his or her future approaches. Intrinsic interest in a learning assignment seems to lead to a deep approach; a concern with external demands to a surface one. But interest or extrinsic motivations are themselves related to previous experiences of learning.

Marton and Säljö tried to manipulate students' approaches to reading by asking one group of them a series of questions that were highly factual and specific, and the other group questions that focused on relations between conclusions and evidence. But not all the second group used deep approaches; it would seem that they interpreted what was demanded of them in different ways. This was presumably because, in spite of the attempted manipulation, they perceived the task differently. These students must have brought with them a predisposition to use a surface approach, which they had previously developed in response to similar situations. Like all of us, they carried their history of learning along with them.

The approaches to studying that students deploy at university are certainly influenced by their experiences of learning in secondary school (see Crawford *et al.* 1999). One study in Melbourne found that experiences of school environments which encouraged deep approaches led to the persistence of these approaches in the first and subsequent years of university study, although they were also associated with perceptions of the quality of teaching in higher education. The same was true for surface approaches (see Ramsden 1991a). The fact that some students begin higher education with habitual tendencies to use surface approaches has implications for how effectively they will be able to engage with the learning tasks that they are set. This is turn implies that we must make special efforts to design learning contexts for first year students which rapidly develop more sophisticated approaches to academic learning.

The effects of assessment

'If we wish to discover the truth about an educational system, we must look into its assessment procedures,' said Derek Rowntree (Rowntree 1977:1). This statement could with advantage be written in large letters over every lecturer's desk. The methods we use to assess students are one of the most critical of all influences on their learning. There are two related aspects to consider: the amount of assessed work and the quality of the tasks.

As I have already suggested, it seems that a good deal of student learning' is not in fact about understanding biology or political science or engineering, but about adapting to the requirements of teachers. It is as if two different worlds existed—a manifest one, defined by the staff and the written curriculum, and a latent one, defined by the students' perceptions. Benson Snyder (1971) represented this contrast between intent and actuality as the 'formal' versus the 'hidden' curriculum. The formal curriculum at the Massachusetts Institute of Technology in the 1950s, according to Snyder, emphasised excellent educational goals of the kind that were mentioned in Chapter 3—goals such as independent thinking, analysis, problem-solving ability and originality. Students received a different message. The hidden curriculum, manifested in their perceptions of assessment and teaching procedures, involved memorising facts and theories to appease teachers and achieve success in examinations.

Howard Becker and his colleagues described a similar situation. In the students' 'definition of the situation', the grading system was all-powerful. Students learned strategies that enabled them to earn high grades—at the cost of understanding the material. They were pushed away from the kind of learning they would have liked to undertake towards surface approaches. As one said:

> There's an awful lot of work being done up here for the wrong reasons. I don't exactly know how to put it, but people are going through here and not learning anything at all…There are a lot of courses where you can learn what's necessary to get the grade and when you come out of the class you don't know anything at all. You haven't learned a damn thing really. In fact, if you try to really learn something, it would handicap you as far as getting a grade goes.
>
> (Becker *et al.* 1968:59)

Parallels between these findings and the conclusions of Fransson, and Marton and Säljö, will be evident. Unsuitable assessment methods

impose irresistible pressures on a student to take the wrong approaches to learning tasks. It is our assessment, not the student, that is the cause of the problem.

Many studies of how students learn have registered this tendency of assessment methods and excessive amounts of assessed course material to have a harmful effect on students' attitudes to studying and approaches to learning. Laurillard (1984) describes how approaches to problem solving in science are related to students' perceptions of marking criteria. In her study at a British university, the students believed that some of the problem-solving tasks required only the barest of interaction with the content in order to obtain satisfactory marks. Students tackled what Laurillard calls the 'problem-in-context', not necessarily the problem set. The problem-in-context consisted of much more than the microelectronics content intended by the lecturer: it also included the students' interpretations of the lecturer's behaviour and second-guessing of what the lecturer would like:

> I thought of a diagram drawn in a lecture and immediately referred back to it. Then I decided which components were wanted and which were not and started to draw it out, more or less copying without really thinking.

> I decided since X was setting the question, block diagrams were needed.
>
> (Laurillard 1984:131)

While some problem-solving tasks are perceived to require preserving the structure of the problem, others can unfortunately be answered in a way that distorts the structure, and essentially involves manipulating isolated elements. It is not apparent that this helps students to learn anything useful about the subject. As one of the students interviewed at Lancaster said, on reading down a list of physics problems handed out the previous week:

> The first one—well, I know that formula off from last year. It's just a simple formula. You shove in a number and it comes out straight away.

In problem-solving tasks, the structural aspect of the dichotomy between different approaches to learning (see p. 43) is crucial to an awareness of the unintended negative effect of the context on students' understanding.

A learning task must employ a student constructively. 'Shoving in a number', while it may have some advantages right at the start of learning a new topic in removing a sense of fear, more often implies poor-quality engagement with the material. It teaches you little you don't already know about the behaviour of elementary particles or electronic systems. If the student responds to the problem-in-context rather than the content of the problem, a qualitatively inferior outcome learning is inevitable. The task is at best inefficient in that it takes up time the student could be using more productively, and at worst positively harmful in that it reinforces undesirable attitudes to the subject. As Laurillard puts it: 'The whole point of problem solving as a learning task is that it should engage the students actively in thinking about the subject matter, and in operating on the relations within it, so that personal meaning can be created' (1984:136).

In a series of investigations carried out in Lancaster in the late 1970s, I interviewed many students about the ways in which assessment influenced their approaches to learning. Several of the published extracts from these interviews have been widely quoted in the literature, and I apologise to any readers who may be familiar with them already for repeating some of them here. One of the most memorable interviews for me was with a brilliant second year psychology student who passed with first class honours. He described his approaches to essays and unseen tests in very different ways:

> I think I tend to relate quite a lot of the reading [for the essay] to my own experiences; I try and think of instances where these experiments would be proved right. So it takes a bit of time reading. I think if they're talking about things like field independence, I try to think about whether people I know are field dependent or independent…As I was writing I was thinking about how the final product was going to come about, and that sort of directed my reading, in fact.
>
> In the class test, if you can give a bit of factual information, so-and-so did that, and concluded that, for two sides of writing, then you'll get a good mark. I hate to say it, but what you've got to do is have a list of the 'facts'. You write down ten important points and memorise those—then you'll do all right in the class test.

The point of this story is not that examinations are bad and essays good, but that inappropriate assessment methods may push students towards learning in ineffective and dispiriting ways. Students will study what they think will be assessed; but no student enjoys learning counterfeit subjects.

Additional comments from Australian and British students make the negative effects of our assessment methods very apparent:

> I look at the topic and think to myself, 'Well, I can do that if I can be bothered to hunt through hundreds of textbooks and do the work'—and you sort of relate that to the value of the work in the course, which is virtually zero because it's so much exam assessment…My revision is basically for the exams, purely and simply aimed at passing the exams without bothering too much about studying the subject. (Physics)

> When I revise, I just write my notes till I've got about four copies and then try old questions and write essay plans for every conceivable question, and learn those. And when I write the exam, I can often picture the pages of my notes. I know I've written about a subject and it's on a particular page and I can 'see' it and recall it. That sort of learning I don't like having to do, because it's very false, and I forget it very quickly. But you have to learn like that to pass the exams on this course. (Education)

> I'd say the thing that would get you through [this subject] is not what you know but how good you are at learning. Techniques involved in learning how to cut down on the understanding and just aim at the marks. How quickly you adapt to the techniques involved in passing exams, in getting assignments in with good marks. (Humanities)

> I don't think you have to understand, you just have to be able to recite, which is unfortunate. You can spend all your time memorising things and then you'll go really well, but you might not know much about it. (Medicine)

> I just memorise a few facts to get through the courses I need to pass …for some coursework you can get it straight out of the textbook and you give them a result, just copying down something if you're lucky—which lots of people do. (Geology)

Closely related to the quality of assessment tasks is the amount of curriculum material that is taught and assessed—the *workload* and pace of a course. Overloading syllabuses with content leads to poor learning (the following extracts include written comments from students on course evaluation forms):

In very few of the lectures was I picking up the principles as we did them. It took me all my time to get the notes down. The pace is so fast that you get the notes down and that's it. You don't really follow what's going on. You can't do two things at once. You can't sit back and listen to what's being said. I put this down to the very keen desire to cover that much work. (Engineering)

There is far too much content especially for those who have not studied this subject since year 10. The course should cover less but explain the part that is covered so we understand it better, and can remember and thus use it better. (Physics)

I think the course could be improved by reducing the content quite substantially. After all, it is the quality of what one learns not the quantity. I have bits and pieces of memorised knowledge but no real understanding of the concepts. From past experience I will soon forget the things I have 'learned' like this. I found that there was quite a heavy reliance on teaching students in one semester the amount it would personally take me a year to fully comprehend. (Economics)

I'd really much prefer to be able to study by thoroughly understanding the work. It becomes so much more interesting and worthwhile if there is some meaning behind it. Unfortunately, the large amount of knowledge that we are expected to have leads me to simply memorise facts for the exams. (Medicine)

The above examples graphically illustrate the dominant effect of students' perceptions of assessment requirements. Notice especially how the students themselves are often painfully aware of the fact that the approaches to learning they are using will lead to inferior outcomes. Whatever we may say about our ambitions to develop understanding and critical thinking in our disciplines, it is in our assessment practices that we demonstrate to undergraduate students what competence in a subject really means. There, starkly displayed for students to see, are the values academic staff attach to different forms of knowledge and ways of thinking. Assessment methods that are perceived to test the ability accurately to reproduce large quantities of information presented in class, or to manipulate procedures unthinkingly, tell students that our fine aims for conceptual understanding are but a veneer on the solid material of recalling facts.

The process of assessment influences the quality of student learning in two crucial ways. It affects their approaches; and, if it fails to test

understanding, it simultaneously permits them to pass courses while retaining the conceptions of subject matter that teachers wished to change. Should the assessment of students' learning go no further than testing what can be unreflectively retained in their memories, misunderstandings will never be revealed. These two aspects interact to support a stable system: the undetected misunderstandings are a result of superficial engagement with the subject matter and they in turn set the scene for the future use of surface approaches.

Dahlgren's explanation of the inadequate understanding of concepts displayed by economics students (see also Chapter 3, p. 32) brings together these aspects. Students who had passed end-of-year examinations could not answer questions that tested their understanding:

> If a more thorough understanding is required in order to answer a question [about phenomena such as price determination and equilibrium], the number of acceptable answers is very low… In many cases, it appeared that only a minority of students had apprehended basic concepts in the way intended by teachers and textbook authors. Complex procedures seem to be solved by the application of memorized algorithmic procedures…In order to cope with overwhelming curricula, the students probably have to abandon their ambitions to understand what they read about and instead direct efforts towards passing examinations., which reflect the view that knowledge is a quantity.
>
> (Dahlgren 1978)

Nevertheless, as we shall see in Chapter 10 and elsewhere, assessment need not be cast as arch-villain in the saga of higher education. We can also use it as a positive force for the improvement of both teaching and learning. It is a potent agent for enhancing or injuring quality; it is an agent that must be handled with infinite care.

Students' experiences of teaching and teachers

The next level at which we can conveniently examine the effects of the learning context on approaches and attitudes to studying is that of the individual lecturer or tutor. There is a ubiquitous belief that a student's sense of interest and involvement with a topic will be increased if the lecturer is stimulating and communicates a sense of his or her own interest. There are numerous accounts in the literature of higher education of the way in which enthusiastic teaching may lead to greater student

involvement and commitment to the subject, while its lacklustre and rambling counterpart results in negative attitudes and a sense of futility.

Here is a typical example of these stories, from a student's experience at University College, Liverpool (later to become the University of Liverpool) in the late nineteenth century. The lecturer is John Macdonald Mackay, professor of history, 'an impressive and formidable figure…a great man, the most dominating personality I had ever met':

> As a lecturer Mackay was not good. He could not survey a wide field: in the course of a year we never got further than Henry III. He could not make the past come alive. He could not give his students any idea of the way in which the facts set forth in the text-book were obtained. Although it would have seemed to me, at that time, positive blasphemy to admit all this, I found his lectures incoherent and boring…I attended many of Mackay's lectures during the three years when I was living on the chopped straw of a pass degree course, and, without losing my respect for his greatness, I gradually realised that his lectures were a futile waste of time. His sole object seemed to be to get rid of the prescribed hour when he had to be in the classroom, without the trouble of preparing for it…
>
> Mackay had caused me to waste three years on a pass degree, which gave me no real intellectual discipline, and taught me habits of laziness.
>
> (Muir 1943)

Will teaching that engages students lead to interest, commitment and deep approaches to the subject matter? The research findings of studies of learning from the student's perspective tend to confirm pictures of the kind provided above, but they show that the real situation is rather more complicated. While sterile and lifeless teaching is hardly conducive to the development of understanding, colourful presentation is by no means sufficient for effective student learning. A good performance is not necessarily good teaching. In fact, an entertaining lecturer may leave students with a sense of having been entertained, but with little advancement of their learning. (Students are, however, quite competent to distinguish effective teaching from diverting exhibition. I return to this issue in the next chapter.)

It is worthwhile thinking at this point about the effects of the different kinds of teaching described in Chapter 2 on students' approaches to learning. Which is more likely to lead to changes in students' understanding?

The research suggests that deep approaches are associated with quite specific characteristics of the experience of teaching. Teaching which is

perceived to combine certain human qualities with explanatory skills is the most likely to encourage deep approaches. The emotional aspect of the teacher-student relationship is much more important than the traditional advice on methods and techniques of lecturing would suggest. For example, the science students in Bliss and Ogborn's study (Bliss and Ogborn 1977) reported that they were more likely to understand the content of lectures if the lecturer interacted with them in a way that encouraged involvement, commitment and interest. Various studies of student ratings of teachers in higher education also identify a recurring factor variously labelled 'student-centredness' 'respect for students' and 'individual guidance' and 'lecturer-student rapport' among other aspects of teaching such as the ability to explain things clearly, explain requirements fully, provide a reasonable workload, and encourage student independence (see Ramsden 1988a).

Marris (1964, quoted in Hodgson 1984) concluded that the effective lecturer helped students to make sense of their subject matter through enabling them to see its relevance:

> He [*sic*] can provide a more personal context, showing why the subject interests and excites him, how he has used it in his own experience, how it relates to problems whose importance his audience already understands. From this, the student can more easily imagine how he himself could use it: he develops his own context of motives for mastering a problem.
>
> (Marris 1964:53)

Hodgson (1984) developed this idea of the quality of the relationship between student and teacher, identifying two categories of student engagement with lectures analogous to deep and surface approaches: an intrinsic and an extrinsic experience of relevance. She argued that teaching which focuses on the use of vivid illustrations and demonstrates personal commitment may encourage students to see the content as having meaning in the real world. Thus, it seems that lecturers can help their students to use deep approaches through enabling them to experience the meaning of the subject matter vicariously.

My research at Lancaster and subsequent development work in both the UK and Australia showed similar connections between students' perceptions of teaching quality and approaches to learning. Interest in undergraduate students, help with difficulties in understanding, using teaching devices that encourage students to make sense of the content,

creating a climate of trust, a proper balance between structure and freedom, and conscientious, frequent and extensive evaluative comments on assignments and other learning tasks: all these aspects of teaching are related, in students' experiences, to the use of deep approaches and the development of interest and commitment to the subject matter. The opposite is just as surely true for poor quality teaching. The students' comments, both written and oral, speak for themselves; there is much to learn from them:

> We looked at Renaissance art in terms of universal concepts that are important and relevant to people now. Doing this made it accessible, helped me to get into it and feel for it, rather than just looking at it from outside. I think this organising of the topics was very important in developing our understanding…The staff weren't concerned to push a particular view; they were just very concerned to help you come to a personal understanding, to get to know your own view-points through art. I thought their background knowledge was very good, but it was their concern for us as students that I was most impressed by. (Art History)

> The method of feedback on assignments was unacceptable. No comments were put on the assignments, leaving students wondering what was wrong—in particular, what areas their assignment fell down in. Although a circular was handed out re assignments, this is no substitute for comments. Each assignment's faults are peculiar to itself. If the university is to remain an education centre and not become just a degree machine assessing the 'pass-fail' of students, the usefulness of feedback cannot be ignored. (Economics)

> All too often the lecture or series of lectures would present a string of unrelated points with no structure. These lectures were full of details which were both boring and soon forgotten and they did not make clear what the major points were that we had to understand. To make things worse, many of the lectures seemed to be made deliberately uninteresting, as if the lecturers did not care about whether we understood or not, or as if they wanted to show how ignorant and stupid students were…I guess they proved their point with many of them. The—course was just the opposite—the lecturer bothered about whether we learned, and was around to help, and commented on ideas, and I worked a lot harder at this subject. And I definitely will be able to use what I learned as it still stands out so clearly. (Medicine)

Luckily, I'm doing some courses with good tutors on them. They can make the books come alive because they can talk about them, and they can direct you to a chapter or a passage, and that's important. If you get a guideline from the tutor, then it's a godsend. (History)

When we asked questions, if the tutor regarded them as being too basic, we were told off. But tutorials are to learn, not to be told off when you are wrong! A student should be encouraged, not discouraged. The tutor had a strong influence on my lack of interest. (Industrial Relations)

We had a problem sheet to hand in for yesterday which was really hard, because the guy that's lecturing is really terrible. He's given equations and in the lecture notes there's nothing about them, because he just goes on and on and mumbles to himself. Then you're asked questions on it, and you don't know where to start. (Science)

I gave in two essays at the beginning of the second term and I didn't get those back till this term. It's a bit difficult when you're writing the next essay, because you want to know where you've gone wrong and the points that have been all right. By the time you've got it back after waiting a whole term you've forgotten what it's all about, and it doesn't really mean much then. (Humanities)

If tutors have enthusiasm, then they really fire their own students with the subject, and the students really pick it up. I'm really good at, and enjoy,—, but that's only because a particular tutor I've had has been so enthusiastic that's he's given me an enthusiasm for it. And now I really love the subject. (English Literature)

I think a lot of the lecturers are just not particularly interested in you. Some tutors don't really bother whether you learn or not. They just prefer to sit there and wait for you to think of what you don't know. I mean, if you knew what you didn't know you'd probably learn it anyway. I've got a tutor like that at the moment—it's no good at all. (Physics)

The positive approach of the teaching staff and their own commitment to teaching always made me feel supported and this made me take more risks than I otherwise would have done during discussions. No one dominated at any time and we could learn from one another. So I learnt more and understood more and can already use what I learnt in my own classes, and it *works*! The theory was difficult but after a

while I started to see how it was immediately vocationally relevant. I can appreciate for about the first time the applicability of educational research to my work. The excellent organisation led to me reading much more widely and deeply. I have changed the way I teach my students. (Education)

The effects of courses, departments and institutions on students' approaches

Each individual lecturer's teaching and assessment methods will influence the quality of his or her students' learning. It is also possible, though, to consider the effects of the context of learning at a more general level. The policies and practices of academic teams, departments, courses and institutions also determine students' approaches to learning—in fact, several of the quotations from students given above suggest this. These relations have important implications for how we improve the quality of university education.

In Chapter 4, I described the use of questionnaires to look at students' general approaches to learning or *orientations to studying* in a school, course or academic programme. In the early 1980s, the Approaches to Studying questionnaire described in the previous chapter was completed by a national sample of over 2,000 undergraduates following programmes of study in academic departments in UK higher education institutions. These students also replied to a survey of course perceptions that contained categories, derived from a programme of interviews, concerning the context of learning. This questionnaire included items asking students to describe their perceptions of the quality of teaching (how helpful students felt the staff were in dealing with academic problems, for example), of the degree to which they felt they were encouraged to exercise responsibility and independence in learning, and of the amount of assessed work they were required to handle. Students in 66 programmes completed the two questionnaires, the disciplines represented being engineering, English, physics, economics, psychology and history.

What happened when the programmes were compared with each other? You can predict the answer from what you have already learned from this chapter. They differed from each other in terms of the perceived quality of teaching and in terms of the preferred approach to learning. I looked at whether the programmes whose students had high average scores on the meaning orientation were also ones where the students described effective teaching, and whether the programmes with high reproducing scores were places where the students felt they under too much pressure from assessment.

It turned out that the prediction was generally accurate. Even within the different subject areas, the context of learning did seem to affect students' orientations in the expected way. Reproducing orientations were more common in programmes perceived to combine a heavy workload with inappropriate assessment and lack of responsible choice over learning. Meaning orientations were more common where students experienced high-quality teaching and opportunities to study independently.

These relationships are remarkably similar to the ones identified among students in the Lancaster interview study. But the level of analysis has now changed: we are now dealing with aggregates of students and teachers rather than individuals. It is evidently possible for students to describe the effects of teaching both at the level of the individual lecturer and at the level of the course, and, moreover, it is possible to measure the average quality of teaching and learning using a course or department as the unit of analysis. I will present further evidence to confirm this conclusion in Chapter 6, and consider its implications in Part 3.

The Lancaster questionnaire investigation also showed that students in the less highly rated programmes (where surface approaches were more common) were more likely to express negative attitudes to their studies. This, of course, is just what we would expect from what we have learned about the relationships between the approaches to learning and satisfaction with studying. Surface approaches are dull and boring; deep ones are a pleasure—although also a challenge.

Marton and Säljö (1976) found in their experimental studies that it was rather easy to push students into using surface approaches by altering the context of learning, but that changes in the questions asked did not necessarily lead to students using deep ones. Exactly as we might expect from these findings, the connection between the high workload, low independence programmes and the reproducing orientation was much stronger than the connection between the good teaching, high independence programmes and meaning orientation. In other words, some types of teaching and assessment definitely induce narrow, minimalist approaches to studying. But deep approaches are fragile things; while we can create favourable conditions for them, students' previous experiences and other unmeasured factors may mean that they remain unexercised. This is a warning worth heeding, both in evaluating our own teaching and when it comes to measuring the effectiveness of other people's. No one can ever be certain that teaching will cause students to learn. In the last analysis, excellence in teaching cannot guarantee that students will understand.

Many subsequent studies of different institutions and programmes have revealed differences in students' orientations and attitudes to studying

which are only explicable in terms of the powerful effects of contexts of learning. Research on British, Australian and Hong Kong students has shown exactly the same associations between approaches and the perceived quality of teaching (Baillie and Toohey 1997; Crawford *et al.* 1999; McKay and Kember 1997; Wilson *et al.* 1997). Relations between graduates' and students' satisfaction with courses and experiences of good teaching were confirmed by the results of the teaching performance indicator studies (described in Chapter 6). A significant investigation of the effects of different medical school environments (Newble and Clarke 1985) established that a problem-based curriculum—one where the focus of student learning is on problems of the type met in professional life, rather than on academic disciplines taught separately from professional practice—was more likely to encourage students to employ deep approaches than a conventional curriculum.

Results of this kind have substantial implications for our choice of teaching and assessment methods. We will see in Chapters 8, 9 and 10 how important it is to integrate the content to be learned with methods of teaching and assessment. In the meantime, it will be useful to summarise the main influences on deep and surface approaches that have been established by these various studies of how students learn (Table 5.1).

Summary: a model of learning in context

Much research evidence has been presented in the last three chapters. It is now worthwhile to consolidate some main themes concerning associations between students' learning outcomes, their approaches to learning, and the context of institutional learning in higher education. This summary is preparatory to the analysis of the characteristics of good teaching that follows in the next chapter.

Very early in the book I argued that learning is best conceptualised as a change in the way in which people understand the world around them, rather than as a quantitative accretion of facts and procedures. This view harmonises with many statements about the mission of higher education and with lecturers' own aims for student learning. We have seen, however, that there is a large body of evidence indicating that some central goals of higher education—students' understanding of key concepts and ways of thinking in a discipline, and the development of abilities to integrate theoretical and practical knowledge in professional subjects—are by no means always achieved.

We traced the source of this puzzle to the quality of students' engagement with learning tasks. I used the fundamental concept of

Table 5.1   Characteristics of the context of learning associated with deep and surface approaches

Surface approaches are encouraged by . . .
- Assessment methods emphasising recall or the application of trivial procedural knowledge
- Assessment methods that create anxiety
- Cynical or conflicting messages about rewards
- An excessive amount of material in the curriculum
- Poor or absent feedback on progress
- Lack of independence in studying
- Lack of interest in and background knowledge of the subject matter
- Previous experiences of educational settings that encourage these approaches

Deep approaches are encouraged by . . .
- Teaching and assessment methods that foster active and long-term engagement with learning tasks
- Stimulating and considerate teaching, especially teaching which demonstrates the lecturer's personal commitment to the subject matter and stresses its meaning and relevance to students
- Clearly stated academic expectations
- Opportunities to exercise responsible choice in the method and content of study
- Interest in and background knowledge of the subject matter
- Previous experiences of educational settings that encourage these approaches

approach to learning to demonstrate how the student's intention (to understand or to reproduce) interacted with the process of studying (to maintain the structure of the subject matter of the learning task, or to distort it), and how in turn these processes and intentions were reflected in the quality of understanding reached. Deep approaches generate high-quality, well-structured, complex outcomes; they produce a sense of enjoyment in learning and commitment to the subject. Surface approaches lead at best to the ability to retain unrelated details, often for a short period. As they are artificial, so are their outcomes ephemeral. The precise descriptions of surface and deep approaches differ from task to task, and so from subject area to subject area, just as learning outcomes in different subjects obviously vary. But the approaches have enough in common across different tasks to allow us to speak confidently about the universal relevance of the dichotomy they delineate. An understanding of the meaning and application of the distinction is indispensable to university teachers.

In the present chapter, we saw how approaches are intimately connected to students' perceptions of the context of learning. Perceptions of assessment requirements, of workload, of the effectiveness of teaching and the commitment of teachers, and of the amount of control students might exert over their own learning, influence the deployment of different approaches, which are very clearly adaptive responses to the educational environments defined by teachers and courses. Students' perceptions are the product of an interaction between these environments and their previous experiences, including their usual ways of thinking about academic learning. Adaptation may lead to a student understanding the topic or subject, or to learning merely a counterfeit version of it.

Figure 5.1 outlines a model of learning in context that brings together many of these ideas. Reading from the left we begin from the students' previous experiences, the content to be learned and the methods of teaching and assessment associated with the content. We trace the source of the outcomes of their learning through their general approach or study orientation (itself constituted through their experiences) and their perception of the context of specific learning tasks. The diagram is heuristic, not deterministic: it is supposed to help us to reason about possible relations between different aspects of learning and teaching. It does not imply an inevitable or single causal sequence of events, but rather a chain of connections at different levels of generality. It could be useful at this point for you to think of some specific examples of students' perceptions, approaches and outcomes in relation to teaching and assessment in your own subject area.

These connections establish points of intervention to enhance the quality of student learning by changing the curricula we construct, the teaching methods we use, and the ways in which we assess our students— and by how well we can make all these contextual aspects cohere. In so far as contextual variables are in the control of academic staff, it should be possible to structure the environment rationally so that students' adaptive responses are congruent with our aims. Although it is easy to encourage surface approaches, and harder to help students towards deep ones, in practice it will be most efficient if our efforts are directed simultaneously towards removing incentives for reproductive approaches and towards providing inducements for meaningful learning. Several teaching strategies can be used in order to help students to change their understanding; most of them revolve around the careful diagnosis of misunderstandings and a focus on a small number of important concepts. Yet none of them will work unless we pay attention to setting the right conditions for the development of deep approaches.
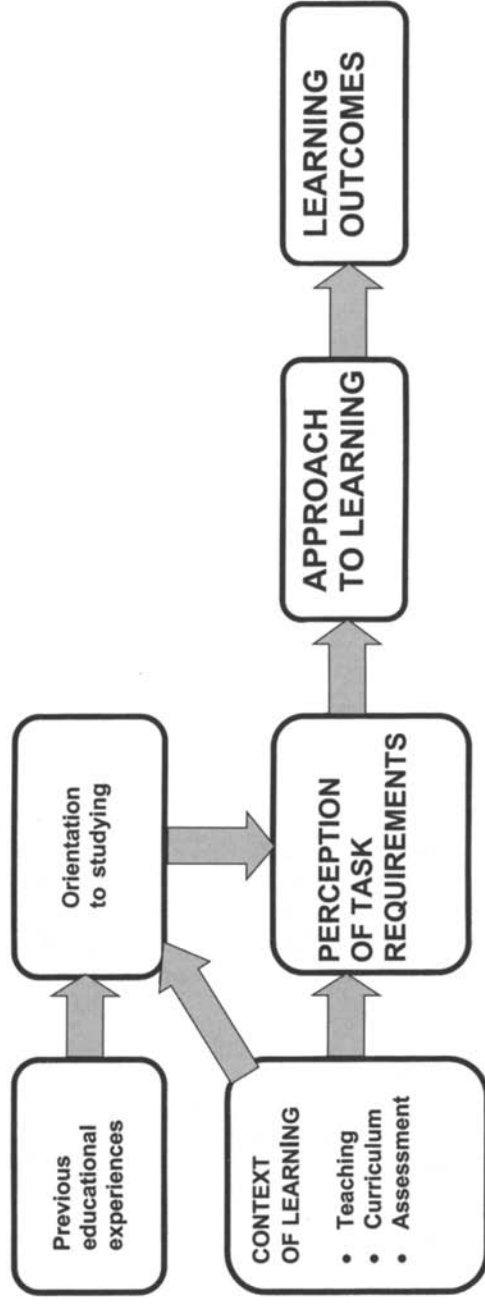
Figure 5.1 Student learning in context

In subsequent chapters we shall see how almost exactly the same arguments might be applied to evaluating and improving teaching. I have used Sawyer's idea of an imitation subject to point up the contrast between deep and surface ways of learning academic subject matter; but evaluation and the improvement of teaching each has its imitation and its genuine version as well. In all three cases, an understanding of what is involved in coordinating theoretical and practical knowledge is required in order to encourage authentic learning.

Further reading

There is now a great body of research evidence about the relations between students' experiences of teaching and their approaches to learning. Some accessible starting points are:

Laurillard, D. (1997) 'Styles and approaches in problem-solving', in F.Marton *et al.* (eds) (1997) *The Experience of Learning,* 2nd edition, Edinburgh: Scottish Academic Press.

Presser, M. and Trigwell, K. (1999) 'Students' prior learning experiences' and 'Students' perceptions of their learning situation', Chapters 3 and 4 of *Understanding Learning and Teaching,* Buckingham: SRHE and Open University Press.

Chapter 6

The nature of good teaching in higher education

> Bad teaching is teaching which presents an endless procession of
> meaningless signs, words and rules, and fails to arouse the imagination.
> (W.W.Sawyer)

The idea of good teaching

The dominant theme of my argument so far has been that the quality of student learning should be improved and can be improved. How might we improve it?

The answer lies in the connection between students' learning of particular content and the quality of our teaching of that content. Through listening to what students have said about their learning, we have observed how real this connection is. Good teaching and good learning are linked through the students' experiences of what we do. It follows that we cannot teach better unless we are able to see what we are doing from their point of view.

Good teaching encourages high-quality student learning. It discourages the superficial approaches to learning represented by 'imitation subjects' and energetically encourages engagement with subject content. This kind of teaching does not allow students to evade understanding, but neither does it bludgeon them into memorising; it helps them respectfully towards seeing the world in a different way. Later in the book, I shall try to show how these basic ideas can be applied to the design of curricula, teaching methods and assessment.

First, though, we must be clear about *how* teaching might encourage deep approaches, interest in the subject matter and changes in student understanding. Thus, I begin this chapter with a survey of what we know

about the characteristics of effective teaching in higher education. How does this knowledge relate to what students say about their learning? What does good teaching mean in practice? What actually happens to students when different teachers approach teaching from contrasting perspectives, such as those described in Chapter 2? This review and these case studies lead us to six essential principles of effective university teaching. Finally, I want to look at the idea of good teaching at the level of an academic department or programme of study, and describe some work on variations in teaching performance in different courses and departments.

In the next chapter, we shall see how the essence of good teaching and that of its less effective counterparts as described here can be understood in terms of different theories of teaching. One reminder about terminology: as in the rest of the book, 'teaching' is defined in a broad way. It includes the design of curricula, choice of content and methods, various forms of teacher-student interaction, and the assessment of students.

Some myths about teaching in higher education

It suits many lecturers to believe that because learning is ultimately the student's responsibility, effective teaching is an indeterminate phenomenon. There is a cherished academic illusion, supported by abundant folk tales, that good teaching at university is an elusive, many-sided, idiosyncratic and ultimately indefinable quality. Now I take it for granted throughout this book that there cannot be one 'best' way of teaching. Like studying, it is too complicated and personal a business for a single strategy to be right for everybody and every discipline. So far so good. It is folly, however, to carry this truism beyond its proper territory and to suggest that there are no better and worse ways of teaching, no general attributes that distinguish good teaching from bad. The fallacy of this belief will become apparent below.

A related myth in the culture of university teaching is that because the greater part of learning in higher education takes place apart from lectures and other formal classes, then teaching is not very important after all. Learning is what students do; its relation to teaching is unproblematic. This convenient illusion draws on two prevalent misconceptions about teaching at this level: that it consists in presenting or transmitting information from teacher to student, or demonstrating the application of a skill in practice; and that students in higher education

must not be too closely supervised, lest the bad habits of dependent learning they are supposed to have acquired at school are reinforced. The myth argues that learning is something separate from teaching—learning is the student's job, and teaching the teacher's, and they should stay in different boxes. People say in support of this myth that able students understand and apply the skills and information they have been exposed to. If the rest don't learn, they have a difficulty that the teaching cannot be blamed for; after all, they are in higher education now. This belief is associated with the view that unpopular, even dreadful, teachers in higher education are actually better than popular and helpful ones (because the latter force students to be 'independent', while the former 'spoon-feed').

Other fallacies about higher education teaching include the one that teaching undergraduates (especially first year ones) is easier than teaching postgraduates; that knowledge of the subject matter is sufficient as well as necessary for proficient teaching; and that the quality of teaching cannot be evaluated. There are good reasons why these myths persist: they serve specific interests, such as administrative convenience and the dominant cultures of academic departments; and they provide excellent excuses for not doing anything much to make teaching better. Not doing things about improving teaching, making things administratively easy, and educational values often conflict with each other. The prime examples are in the area of the evaluation of student and staff performance, as we shall find in Chapters 10 and 11.

Our knowledge of good teaching

The reality, as opposed to the mythology, is that a great deal is known about the characteristics of effective university teaching. It is undoubtedly a complicated matter; there is no indication of one 'best way'; but our understanding of its essential nature is both broad and deep. Research from several different standpoints, including studies of school teaching, has led to similar conclusions. The research supports what good teachers have been saying and doing since time immemorial. Among the important properties of good teaching, seen from the individual lecturer's point of view, are:

- A desire to share your love of the subject with students;
- An ability to make the material being taught stimulating and interesting;
- Facility for engaging with students at their level of understanding;
- A capacity to explain the material plainly;

- Commitment to making it absolutely clear what has to be understood, at what level, and why;
- Showing concern and respect for students;
- Commitment to encouraging student independence;
- An ability to improvise and adapt to new demands;
- Using teaching methods and academic tasks that require students to learn thoughtfully, responsibly, and cooperatively;
- Using valid assessment methods;
- A focus on key concepts, and students' misunderstandings of them, rather than on covering the ground;
- Giving the highest-quality feedback on student work;
- A desire to learn from students and other sources about the effects of teaching and how it can be improved.

Before looking at how these discrete attitudes and behaviours are interrelated, we might ask how they mesh with students' experiences and with the more persistent academic myths.

As a matter of fact, the research findings on good teaching mirror with singular accuracy what your students will say if they are asked to describe what a good teacher does. University students are extremely astute commentators on teaching. They have seen a great deal of it by the time they enter higher education. In addition, as non-experts in the subject they are being taught, they are uniquely qualified to judge whether the instruction they are receiving is useful for learning it. Moreover, they understand and can articulate clearly what is and what is not useful for helping them to learn. The evidence from students provided in Chapter 5 is perfectly convincing on this point.

There is also evidence of the authenticity of students' views from studies of evaluations of teaching, particularly in that they are known to be sensitive to variations in teaching processes (Dunkin 1986) and that they are associated with student achievement (Marsh 1987). Moreover, when students are asked to identify the important characteristics of a good lecturer, they identify the same ones that lecturers themselves do: organisation, stimulation of interest, understandable explanations, empathy with students' needs, feedback on work, clear goals, encouraging independent thought. Down at the bottom of the list are the lecturer's personality and sense of humour. Taken together, these findings tend to undermine the widespread views that students confuse popular lecturers with good lecturers and don't appreciate the hard work that goes on behind the scenes. Of course, students do not see every aspect of teaching, such as effort put into curriculum or web page design, directly; nor are they necessarily able to comment validly on matters such as the

relevance and up-to-dateness of the content. But those aspects they do see comprise a very important part of the whole.

Why is the academic myth about students confusing 'good performance' with effective teaching so persistent? Maybe because it feeds on a belief somewhere deep down in certain lecturers (perhaps a little of it is in us all) that learning at undergraduate level has got to be a severe and unhappy business. Some lecturers do seem to suppose, for whatever reason, that learning English or chemistry mustn't be made too attractive. Pleasure in learning, they appear to think, is something that comes later, when undergraduate tedium is well behind you. This belief may draw in its turn on the view that students will only come to see the true value of the teaching they received at university in subsequent years.

I assert that these beliefs are entirely wrong. If we cannot help students to enjoy learning their subjects, however hard they may be, we have not understood anything about teaching at all. It is abundantly clear from comparative studies of graduates' and students' reactions to courses (see, for example, Mathews *et al.* 1990) that anecdotes to the effect that bad teaching is 'really' good teaching (when students reflect on it a year or so later) have no foundation in fact. Graduates rate the same courses similarly to current students. And, in spite of attempts to popularise the view that students can be fooled into giving lecturers who are superficially attractive presenters of wrong content high ratings as teachers, it is evident from the correctly controlled inquiries that students rarely fall into the trap. They can easily differentiate the empty performer from the good teacher. (Marsh 1987 provides a ruthless critique of the studies saying that they can't.) These conclusions are important for choosing methods of evaluating teaching as well as for understanding its nature.

Different teaching strategies: two case studies

Later in this chapter, we shall examine the properties of effective teaching in more detail. It might be helpful first to make some of the assertions about good teaching more tangible by looking at two cases of actual teaching. In particular, we need to consider what it means to say that a teacher's application of knowledge about students' understanding, and her ability to focus on key concepts, is a vitally important part of high-quality instruction. The examples are not from universities; in fact, they are from American middle schools. However, I think that you will immediately understand their significance, particularly to tutorial and seminar teaching.

Neither of the teachers involved shows a lack of concern for her students, but there are important differences in their effectiveness. The two teachers in question were trying to help their pupils understand scientific explanations of light and seeing (Roth and Anderson 1988). The extract from Ms Lane's teaching is a good example of what occurs if a teacher does not consider what students might misunderstand about what she is trying to teach them.

Ms Lane's classes were carefully planned around what 'had to be covered' in the text that accompanied the course. Her lesson plans presented one idea after another, in rapid succession, without challenging pupils' common misunderstandings of science concepts. The breadth of coverage placed a heavy load on both teacher and pupils, especially as Ms Lane used many experiments and demonstrations to supplement her teaching. She did not attempt to integrate these hands-on activities with the concepts she presented, however. This lack of integration, combined with the mountain of information and the constant pressure to get through it, conveyed a clear message to pupils. This was that science was about memorising facts and ideas introduced in the classroom and the textbook, and that it had little to do with the real world outside.

In the extract shown below, the teacher's initial question asking for an explanation is changed into a series of factual questions. The teacher misses the opportunity to discover pupils' misunderstandings and structure the discussion around them, because she does not listen to what the pupils have to say. She hints at the right answers when they do not come up with them, and once the pupils have given her what she wants—even when the wording of her question has already given the answer away, and even when, as in Bob's case, the pupil is referring to the wrong thing (the colour of the iris of the eye, not the pigment-containing cells in the retina)—she goes on to the next topic, as if the answer signified understanding.

Ms Lane's teaching

MS LANE: What is the function of the optic nerve? [Waits; no response] What is it that a nerve does? What do they do?

HEIDI: Tells whether it is hot or cold

MS LANE: Uh...OK, they send what?

PUPILS (calling out): Messages.

MS LANE: Where do they send them?

PUPILS (calling out): To the brain.

MS LANE: Without the optic nerve, could you see?

PUPILS (unison): No.

MS LANE: Because it sends messages of the image to the brain. [She writes on the board: Optic nerve leads from the back of the eye to the brain]....

MS LANE: Then there are cells that contain pigments [in the retina]. What do you
    think they do?
JIM: They store.
MS LANE: What might they do? What does pigment have to do with?
BOB: The colour of the eye.
MS LANE: So you think they might help us see colour?
PUPILS: Yeah.
(Ms Lane goes on to the next type of cells, light-sensitive cells)

(Roth and Anderson 1988:121–2)

These students soon learned to respond to this learning context. They
learned that there was no real problem with how they understood; they
came to believe that they were just adding more details to what they
already knew. They learned that using isolated words and phrases from
their textbook would lead to more satisfactory answers than trying to
make sense of the ideas. They engaged with the task of learning about
light and seeing, in other words, in a way that ensured they could not
change their understanding. They performed poorly on tests of their
understanding of the application of their knowledge to everyday
phenomena.

Now consider Ms Ramsey's classroom. Ms Ramsey also used the science
textbook chapter about light and seeing, but she used it differently. She
made use of a set of overhead transparencies developed by a researcher
who was trying to help teachers improve their teaching of these topics.
These were specially designed to focus instruction on a few key concepts
that were known to be problematic for pupils at this level (fifth grade,
the equivalent of the top end of the primary school). Figure 6.1 illustrates
one of the transparencies, which each included an overlay showing the
scientific explanation of the problem so that pupils could immediately
contrast their own conception with the scientific one.

Ms Ramsey's teaching emphasised entirely different things from Ms
Lane's. As Roth and Anderson put it:

Ms Ramsey's teaching focused on getting key concepts across rather
than on covering all the pages in the text. Unlike Ms Lane, Ms Ramsey
focused on the important issues that seemed to represent critical
barriers to student learning. Her content coverage could be described
as narrow and deep compared to Ms Lane's. This focus conveyed to
students that science was about understanding and making sense of a
few ideas, rather than a process of collecting and memorizing facts
and words.

(Roth and Anderson 1988:127–8)
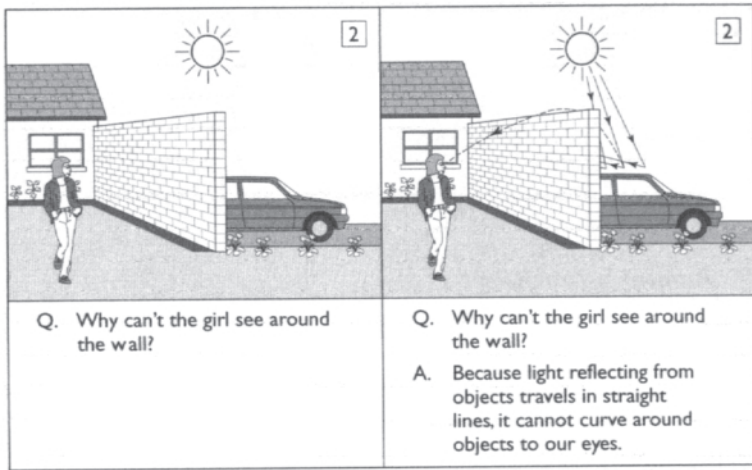
Figure 6.1 Transparency used by Ms Ramsey

This teacher's way of questioning and responding to her pupils was also quite different. Like Ms Lane, Ms Ramsey asked many questions, but her questions encouraged pupils to use scientific concepts to explain real-world phenomena; they *required* understanding if they were to be answered correctly ('Using what you know about light, why do you think your thumb looks bigger under the magnifying glass?'—for example). Like Ms Lane, she got pupils to talk about their everyday experiences, but she always prompted them to relate their stories to the relevant scientific concepts. This encouraged pupils to try to impose meaning on academic ideas and to see their relevance to the world: it gave the message time and time again that deep approaches were simultaneously more fun and what she would reward. Ms Ramsey listened carefully to her pupils' responses; this enabled her to detect the use of surface approaches and the existence of misconceptions. She could then challenge pupils who tried to get by with answers that merely involved reproducing facts or vague explanations, while hiding misunderstandings, and urge them to give responses that were more complete.

The interchange shown below, based on the overhead transparency illustrated in Figure 6.1, epitomises aspects of this teaching strategy and the different context of learning it created. Although 11-year-old Annie tries to show her knowledge off by using a 'big word' ('opaque')

she has memorised from the textbook—and many teachers might have been content with that answer—Ms Ramsey is not satisfied. She probes Annie's understanding, testing whether she has attached any meaning to the word. The teacher listens to the explanation, correctly diagnoses a misconception, and uses the class firmly but gently to help her underline the preferred conception ('I like that answer better. Why is it better?'). Notice that there is a real dialogue between teacher and pupils, rather than a set of questions and answers, as in Ms Lane's class. Do you see any implications for your own tutorial, seminar or practical teaching here?

Ms Ramsey's teaching

MS RAMSEY [puts up transparency]: Why can't the girl see around the wall?

ANNIE: The girl can't see around the wall because the wall is opaque.

MS RAMSEY: What do mean when you say the wall is opaque?

ANNIE: You can't see through it. It is solid.

BRIAN: [calling out] The rays are what can't go through the wall.

MS RAMSEY: I like that answer better. Why is it better?

BRIAN: The rays of light bounce off the car and go to the wall. They can't go through the wall.

MS RAMSEY: Where are the light rays coming from originally?

PUPILS: The sun.

MS RAMSEY: So you think her position is what is keeping her from seeing it. [She flips down the overlay with the answer.] Who was better?

PUPILS: Brian.

MS RAMSEY [to Annie]: Would she be able to see it if she moved out beyond the wall?

ANNIE: Yes.

MS RAMSEY: Why?

ANNIE: The wall is blocking her view.

MS RAMSEY: Is it blocking her view? What is it blocking?

STUDENT: Light rays.

MS RAMSEY: Light rays that are doing what?

ANNIE: If the girl moves out beyond the wall, then the light rays that bounce off the car are not being blocked.

(Roth and Anderson 1988:129–30)

Ms Ramsey also responded to pupils with careful, precise feedback; she gave them repeated opportunities to work with a single concept in many applications; and, although she taught the same number of classes as Ms Lane, she used experiments and demonstrations much less frequently. But when she did use them, she used them for a precise purpose:

observation and activity was only one step in 'doing' experiments in Ms Ramsey's class. They were structured so that they helped pupils to think about, test out and discuss with each other the relationships between concepts and everyday events.

Ms Ramsey's knowledge about her students enabled her to be a more effective teacher. She did not give them more ideas and facts to memorise; instead, she tried to diagnose their misunderstandings and use what she found out to help them change their conceptions. Her different teaching strategies led to better student learning outcomes. Her pupils easily out-performed Ms Lane's on tests of their understanding of scientific concepts.

Six key principles of effective teaching in higher education

The list of properties provided on pages 86–7 can now be usefully condensed into six principles related to students' experiences.

Principle 1: Interest and explanation

The first group of characteristics contains elements described in studies of student evaluations as quality of explanation and stimulation of student interest. Few people will disagree that a facility for giving clear explanations of complex subject matter is a mandatory part of a lecturer's repertoire. It is evident that this facility can be learned (see Brown 1978). Even more important, however, would appear to be the related ability to make the material of a subject genuinely interesting, so that students find it a pleasure to learn it. When our interest is aroused in something, whether it is an academic subject or a hobby, we enjoy working hard at it. We come to feel that we can in some way own it and use it to make sense of the world around us. We are more likely to focus on the subject matter itself rather than the institutional context surrounding it. And this is even more likely if an explanation of why the particular method or fact that has to be learned will be useful in the future is added. These attitudes and behaviours are, of course, part-and-parcel of deep-holistic approaches to learning. We can all be helped to find meaning if our teachers show us how it can be done, and how exciting it is to do it.

Our old friend Sawyer ensnares this aspect of good teaching, and its converse, and presents them with exactly the stimulating qualities they imply:

To master anything—from football to relativity—requires effort. But it does *not* require *unpleasant* effort, drudgery. The main task of any teacher is to make a subject interesting. If a child left school at ten, knowing nothing of detailed information, but knowing the pleasure that comes from agreeable music, from reading, from making things, from finding things out, it would be better off than a man who left university at twenty-two, full of facts but without any desire to inquire further into such dry domains. Right at the beginning of any course there should be painted a vivid picture of the benefits that can be expected from mastering the subject, and at every step there should be some appeal to curiosity or to interest which will make that step worthwhile.

<div align="right">(Sawyer 1943:9)</div>

Principle 2: Concern and respect for students and student learning

The second set of qualities is mainly about our consciousness of students and our consideration for them. These personal qualities are mandatory for every good teacher; it is sad that they are often scarce commodities in higher education. The consummately arrogant professor, secure in the omnipotent possession of boundless knowledge, represents a tradition that dies hard. Certain lecturers, especially new ones, seem to take a delight in trying to imitate him; I sometimes meet his images in classes designed to prepare new academic staff for teaching. They are under pressure to show toughness, stringency and inflexibility in the face of student mystification; they are full of the haughtiness that their effortless mastery of their subjects permits; and it presumably gives them a feeling of superiority to adopt a condescending posture like John Macdonald Mackay's (see Chapter 5, p. 73). The educational culture of some disciplines, notably engineering and medicine, and to a lesser extent the physical and some social sciences, adds further external pressure to behave in this way.

Exactly the contrary attitude and behaviour is desirable, no matter what the discipline. Eble calls it 'generosity':

Aristotle made much of what is commonly translated as magnanimity, the sufficiency of person or possessions that makes generosity possible …The right attitude toward knowledge is surely a generous one, an attitude powerfully urged from the fact that knowledge, while permitting feelings of acquisition and ownership, suffers no loss when it is shared with and given to someone else. Teaching, by this basic

attitude, is always a giving out, always a chance for benefaction. And as to generosity to students, few people are ever hurt by being regarded too generously. The shaky confidence about what one can learn, about how much one knows compared with someone else, needs constant shoring up.

(Eble 1988:207)

Research on higher education unquestionably upholds these views. Among many other studies, Feldman's meta-analysis of student ratings (Feldman 1976), the Lancaster investigation, and Entwistle and Tait's research on Scottish students (Entwistle and Tait 1990) all underline the vital importance of respect and consideration for students in effective university teaching.

In fact, truly awful university teaching is most often revealed by a sheer lack of interest in and compassion for students and student learning. It repeatedly displays the classic symptom of making a subject seem more demanding than it actually is. Some people may get pleasure from this kind of masquerade. They are teaching very badly indeed if they do. Good teaching is nothing to do with making things hard. It is nothing to do with frightening students. It is everything to do with benevolence and humility; it always tries to help students feel that a subject can be mastered; it encourages them to try things out for themselves and succeed at something quickly. The humility that every university teacher has felt in the presence of his or her subject, the honest awareness of what one does not know, is exactly the quality we need to display in our teaching. There is again nothing new in this statement; it embodies what good teachers have been doing, and say they have been trying to do, for thousands of years.

Related to generosity are honesty and interest in teaching, versatility in teaching skills, and availability to students. Of critical importance to students and student learning, as we have already seen, is the accessibility of staff for consultation about academic work. And if a teacher is to be generous and available, a sense of enjoyment in teaching one's subject and the adventures that teaching it presents are indispensable. Teaching like this therefore requires developing a keen interest in what it takes to help other people learn; it implies pleasure in teaching and associating with students, and delight in improvising. Teaching is nothing if it is not enjoying the unpredictable. It is futile to plead that these things are impossible to achieve in a climate of ever-reducing resources. If we want high-quality teaching and learning, we cannot do without them.

Principle 3: Appropriate assessment and feedback

Giving helpful comments on students' work is an equally essential commitment. It is plainly related to our accessibility to students. Of all the facets of good teaching that are important to them, feedback on assessed work is perhaps the most commonly mentioned. 'Quality of assessment procedures' was one of the key features of good teaching as perceived by students noted in Marsh's authoritative review of the student evaluation literature (Marsh 1987); similar factors also appeared in the Lancaster interviews. It is significant that the most salient question—the one that differentiated most effectively between the best and worst courses—in the Australian teaching performance indicator study (described below, p. 100) was concerned with the quality of feedback on students' progress.

Setting appropriate assessment tasks, as we have seen from students' experiences, is evidently a difficult but crucial skill. It implies questioning in a way that demands evidence of understanding, the use of a variety of techniques for discovering what students have learned, and an avoidance of any assessments that require students to rote-learn or merely to reproduce detail. We shall be looking in detail at how to assess students, applying these standards, in Chapter 10.

Principle 4: Clear goals and intellectual challenge

Principles 4 and 5 form a pair analogous to the 'rhythmic claims of freedom and discipline' in education that Whitehead identified. All education may be seen to proceed in a triple cycle of growth, from a stage of absorbing, discursive, romantic discovery, through a stage of precision (which, according to Whitehead, is the sole stage in the traditional scheme of university education) to a stage of generalisation and application, where again initiative and inquiry dominate. The teacher's task is to recognise these equal claims of freedom and discipline, and their cyclical ordering, without overemphasising one or the other; to create a system in dynamic equilibrium. 'The real point,' says Whitehead, 'is to discover in practice that exact balance between freedom and discipline which will give the greatest rate of progress over the things to be known.' The implication is that control over learning should reside both with the teacher and with the student.

Research into effective schooling overwhelmingly shows that consistently high academic expectations are associated with high levels of pupil performance. University lecturers should find this aspect of

effective teaching relatively straightforward, so long as they remember to make the challenge interesting rather than dull. Romance must never be presumed dead, even when there are definite truths to be learned. What they are likely to have more difficulty with is explaining to students what must be learned in order to achieve understanding and what can be left out for the time being. All too often students begin a university course with only the vaguest notion of what essential concepts they must master. Breakneck attempts to 'cover the ground' in the absence of a clear structure focused on key concepts intensify their confusion and deaden their excitement.

Principle 5: Independence, control and engagement

High-quality teaching implies recognising that students must be engaged with the content of learning tasks in a way that is likely to enable them to reach understanding. Perceptions of choice over how to learn the subject matter, and of control over which aspects students may focus on, are related to high-quality learning.

Good teaching fosters this sense of student control over learning and interest in the subject matter. It understands the truth of Bruner's statement that 'Instruction is a provisional state that has as its object to make the learner or problem solver self-sufficient' (Bruner 1966:53). It provides relevant learning tasks at the right level for students' current understanding; it recognises that each student will learn best in their own way; it avoids creating over-dependence. It helps students to understand the essence of scholarship and investigation in their subjects by providing an opportunity for them to practise the art of inquiry. Trying to practise inquiry is the only way to learn how to inquire. It is also a way of arousing the imaginative spirit, differently constituted within each individual intellect, without which deep approaches to learning are impossible. It is impossible to quantify how many students have been discouraged from pursuing the learning of their chosen subjects by denying access to the art and enjoyment of inquiry.

Again, the significance of independence and choice emerges repeatedly in research on student ratings and perceptions of favourable academic environments, at higher and upper secondary education levels. Yet most prevailing systems of learning in higher education adopt mass production standards; they handle each individual student in the same way, although we know for certain that they operate in different ways. Sharp engagement, imaginative inquiry and the finding of a suitable level and style are all more likely to occur if teaching methods

that necessitate student energy, problem solving and cooperative learning are employed. These kinds of method permit a degree of student control over learning and can thus accommodate individual differences in preferred ways of reaching understanding, as well as having within them the potential to free students from over-dependence on teachers. They are also likely to result in students becoming engaged with what they are learning at a high cognitive level.

The positive effects on achievement of cooperative learning as compared to competitive and individualistic learning are very well established in the educational literature (see Johnson *et al.* 1981). Tang (1990) reported similar effects for higher education students who cooperated in group discussions in preparing for assignments. They perceived their activity to be useful for understanding the content to be learned and used deep approaches to learning it. These were in turn related to higher-quality learning outcomes.

All this is rather bad news for the traditional lecture, practical class and tutorial, as well as for orthodox approaches to the professional curriculum, as we will see in Chapters 8 and 9. It seems that we often encourage poor learning at university through over-stressing individual competition while at the same time using teaching methods that foster passivity and ignore the individual differences between students.

It is worth stressing that we know that students who experience teaching of the kind that permits control by the learner not only learn better, but that they enjoy learning more. That is surely how it should be in higher education, as in any education; if we love our subjects, we must want other people to find them enjoyable rather than dull. Learning should be pleasurable. There is no rule against hard work being fun.

Principle 6: Learning from students

The foregoing principles are necessary but not sufficient for good teaching. Effective teaching refuses to take its effect on students for granted. It sees the relation between teaching and learning as problematic, uncertain and relative. Good teaching is open to change; it involves constantly trying to find out what the effects of instruction are on learning, and modifying that instruction in the light of the evidence collected.

That is the single most important message, the one you should remember if you forget everything else, of the case studies of the two science teachers summarised above. Like Ms Ramsey, a competent teacher should try to diagnose students' misunderstandings, in class and from the work they hand in, and then set about trying to change them through

structuring the curriculum and assessment correctly. Knowledge about students should be used to select and deploy teaching strategies.

This is what 'evaluation' in relation to teaching is about, though the term has gradually become debased so that it applies to the task of collecting data rather than collecting, interpreting and using it—both immediately, in the classroom, and in a more considered way when planning a curriculum. Evaluation of teaching in its true sense is no more or less than an integral part of the task of teaching, a continuous process of learning from one's students, of improvement and adaptation. Were we to lose all our knowledge about the nature of good teaching, it would be possible to reconstruct every other principle from a complete understanding of this one.

It is not likely that lecturers will find out much from students unless they arrange opportunities for finding out, such as talking to students and studying the products of their learning. We cannot change our understanding of anything, including our students' learning, unless we spend time and effort learning about it and going over it in several different ways.

Good teaching in different disciplines and departments: students' perceptions of academic courses

Most of the discussion in the present chapter has implicitly focused on one level—the individual lecturer and his or her teaching skills and approaches. I have said nothing either about how good teaching might vary in different subject areas. But we are dealing throughout with matters that can be conceptualised at more than one level, and which should be seen in relation to the cultures of different fields of study. It is relevant to conclude with some evidence that sheds light on these issues, especially as this evidence brings us firmly back into the area of accountability and the evaluation of teaching quality. The principles outlined above are just as applicable to academic departments and programmes of study as to individual lecturers.

In Chapter 5 we saw how the Lancaster investigation into British students' perceptions of teaching showed that study orientations, or general approaches to studying, were associated with the quality of teaching in different academic departments. The interview results, some extracts from which were also given, confirmed that these relations were functional-students learned better in departments that had better teaching because of the effectiveness of the teaching. But how different are different courses? What is the range of quality, and how is it related to subject

areas? What are the characteristics of a good course, a good degree programme, as seen by students?

Investigations of Australian university students' evaluations of their courses provide some of the answers. Annually since 1993, all graduates have been invited to complete a Course Experience Questionnaire (CEQ). There are several versions of the CEQ; the one used in the graduate survey is the shortest. The questions fall into five groups: Good Teaching, Clear Goals and Standards, Appropriate Workload, Appropriate Assessment and Generic Skills. With the addition of another measure called Emphasis on Independence, these roughly correspond to the important aspects of teaching in higher education identified in previous work, such as the Lancaster study, and, of course, they represent many of the principles of good teaching outlined above. There is also a single item that measures overall satisfaction with the degree. The meaning of each of the groups of questions is shown in Table 6.1.

During testing of the CEQ some years ago as part of a trial of performance indicators and a national review of the accounting discipline (Mathews *et al* 1990; Ramsden 1991b), three important things were discovered. First, students' perceptions of the relative quality of teaching varied by field of study. Fields of study such as medicine and engineering

Table 6.1   Categories and examples of questions in the Course Experience Questionnaire

Category	Examples of questions
Good teaching	The teaching staff normally gave helpful feedback on how I was going
Clear goals and standards	The staff made it clear right from the start what they expected from students
Appropriate assessment	To do well in this course all you really needed was a good memory (negatively scored)
Appropriate workload	The workload was too heavy (negatively scored)
Generic skills	The course helped me develop my ability to work as a team member
Independence in learning*	The course encouraged me to develop my own academic interests as far as possible
Overall satisfaction	Overall, I am satisfied with the quality of this course

* This category is not included in the graduate CEQ currently used in Australia.

were rated below average; natural sciences were about average; while humanities and visual arts were rated above average. There were also differences observed within the fields of study. Students typically rated electrical engineering lower than other branches of engineering, for example, and psychology lower than other social sciences. These between-subject area differences have also been found in related studies of academic staff attitudes to teaching and research (for example, Ramsden and Moses 1992).

Second, we found that differences in students' evaluations existed within subject areas and disciplines. In the original CEQ studies, and in numerous analyses of the survey since then, there were excellent, average and poor examples of teaching within social sciences, medicine, engineering and so on. Look at Figure 6.2, for example. It depicts the substantial range of quality among thirteen departments of accountancy on the 'Good Teaching' scale. Statistically speaking, the few extreme departments at each end of the distribution differ from those at the other end by from one to two standard deviations—certainly a formidable variation, whose validity was confirmed by interview and graduate survey data.

Another way of looking at these differences within subject areas is to compare the proportions of students in the highest-rated and lowest-rated
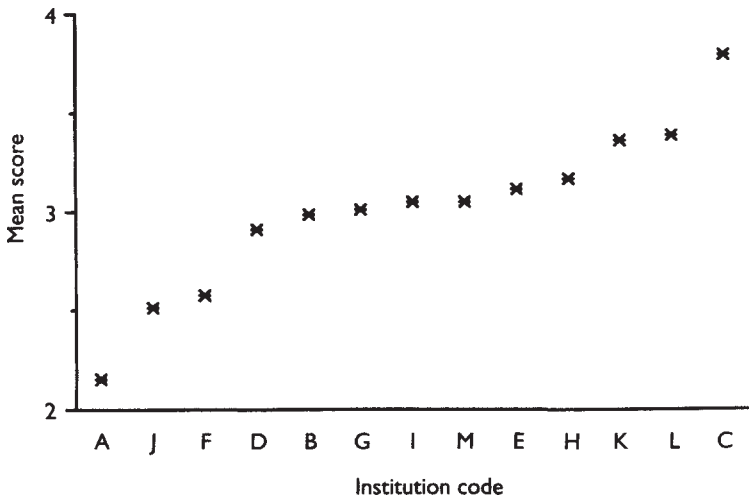
Figure 6.2 Scores on the Good Teaching scale of the CEQ for thirteen Australian accountancy departments

courses agreeing with the questions appearing in Table 6.1. Then we find, for example, that 70 per cent of commerce students at Institution L agreed with the defining item of the 'Good Teaching' scale (Teaching staff here normally give helpful feedback on how you are going'); at institution A, only 8 per cent agreed. Sixty-four per cent of education students at Institution D agreed that The sheer volume of work to be got through in this course means you can't comprehend it all thoroughly' compared with only 31 per cent at institution L. Differences of this size are not only unlikely to have occurred by chance; they are unquestionably of substantive importance. These departments really do have, in their students' experiences, different standards of teaching.

Third, since there are differences within subject areas as well as across them, it makes sense to look at what constitutes more and less effective teaching by looking at students' answers to each group of questions, and comparing the highly rated courses with the lowly rated ones. The answers to the 'Good Teaching' group of items, for example, show that the courses differ in the following ways:

- Teaching staff here normally give helpful feedback on how you are going. (In the best courses, students agreed with this statement. In the worst courses, students disagreed with it. This question most clearly differentiated the best and worst courses.)
- The staff make a real effort to understand difficulties students may be having with their work. (Good courses: students agree.)
- Our lecturers are extremely good at explaining things to us. (Good courses: students agree.)
- Teaching staff here work hard to make their subjects interesting to students. (Good courses: students agree.)
- Staff here put a lot of time into commenting on students' work. (Good courses: students agree.)
- The teaching staff of this course motivate students to do their best work. (Good courses: students agree.)

The general conclusions to be drawn are that:

- There are real variations in teaching quality in different courses and subjects.
- It makes sense to talk about the relative effectiveness of teaching at the level of courses and combinations of courses as well as at the level of the individual teacher: the differences at aggregate (department) level mirror those at individual (lecturer) level.

- There are differences in teaching quality between different subject areas.
- But there are also differences within subject areas. As in the study of students' approaches to learning and perceptions of courses described in the previous chapter, there are better and worse departments in science, social science, humanities subjects.

These conclusions suggest two others—that comparisons of the effectiveness of teaching in academic departments and courses of study can legitimately be made, but should preferably be within subject areas, rather than across them; and that the less effective units can probably learn from the example of the more effective ones.

Subsequent CEQ research has examined the relations between approaches to studying, experiences of teaching, and academic outcomes, formalising and confirming the original work carried out nearly a quarter of a century ago at Lancaster (Long and Hillman 2000; Ramsden 1998; Wilson *et al.* 1997). I have illustrated some significant findings in Figures 6.3 and 6.4, and in Table 6.2. The charts show associations between approaches to learning and the CEQ measures of Appropriate Assessment and Good Teaching. Each dot represents the average responses of the students in one first year subject. Table 6.2 shows the relations between experiences, approaches and outcomes including academic achievement—the bigger the number, the stronger the relationship, positive or negative—for a sample of 2,130 students at one university. I will discuss some general implications of these results for the measurement of performance and the improvement of quality in Chapters 11 and 12.

Table 6.2 Correlations between perceptions of the learning context, approaches to learning and learning outcomes

	Deep approach	Surface approach	Academic achievement	Generic skills development	Overall course satisfaction
Good teaching	24	−34	47	46	64
Clear goals and standards	12	−29	46	33	55
Appropriate assessment	21	−47	36	35	47

Decimals omitted.

Source: *Adapted from Wilson* et al. *(1997).*

$y = 18.960 + 0.35307 \times R^2 = 0.401$
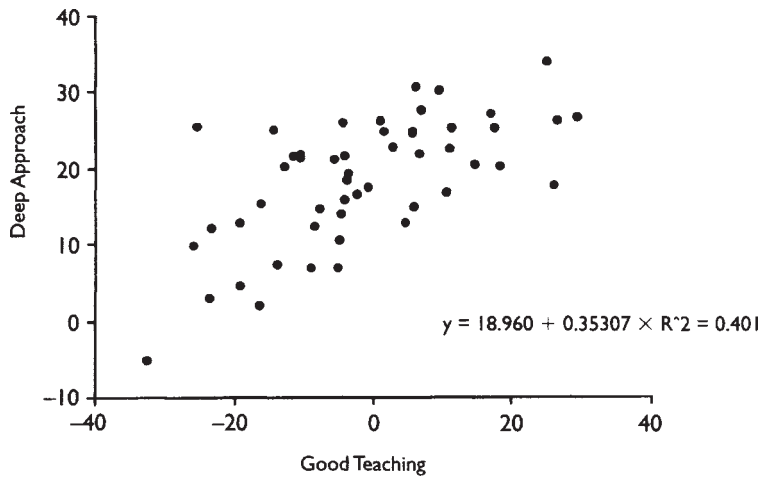
Figure 6.3 Association between deep approach and perceptions of good teaching

$y = 12.819 + 0.38979 \times R^2 = 0.472$
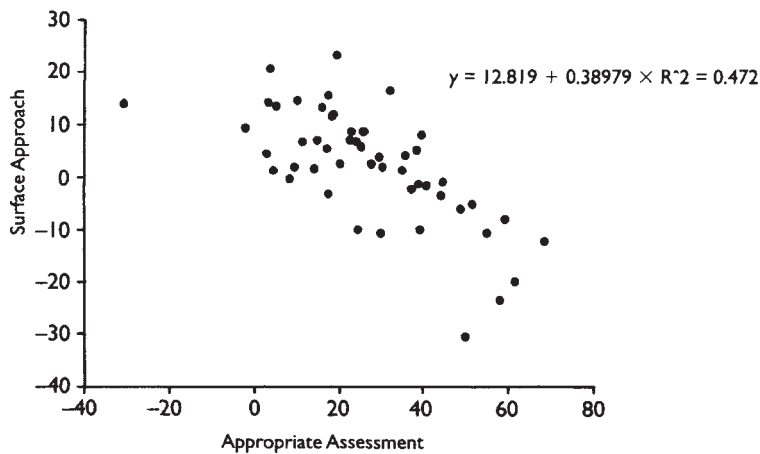
Figure 6.4 Association between surface approach and perceptions of inappropriate assessment

Further reading

An account of lecturers' views of the characteristics of good university teaching, and their views of how it should be recognised and rewarded, may be found in P.Ramsden *et al.* (1995) *Recognising and Rewarding Good Teaching in Higher Education* (http://www.autc.gov.au/caut/rrgt/titlepag.html).

Chapter 7

Theories of teaching in higher education

> I merely utter the warning that education is a difficult problem, to be
> solved by no one simple formula.
>
> (A.N.Whitehead)

We are now ready to develop the preliminary representation of different
theories of teaching provided in Chapter 2 into a more coherent model
of instruction in higher education that consolidates the principles of
effective teaching outlined in Chapter 6. Its propositions, each based on
our knowledge about how students learn, will guide the recommendations
made in Parts 2 and 3 of the book.

   This model is a simple one: it is a sort of ordered common sense. It is
built on the idea that there are different theories of teaching represented
in lecturers' attitudes to teaching and their instructional strategies. It
describes the most effective ways of teaching and implicitly criticises less
effective ways. It makes general statements about the conditions for
efficient and effective learning and teaching. These statements are
compatible with the descriptions of how students learn that we have
examined, but they go beyond them. The foundations of good teaching
outlined in this model can be applied to evaluating teaching performance,
to developing the skills of lecturers and to managing departments for
high-quality student learning.

Learning to teach

A chain of connections has been established between learning and
teaching in higher education. It should now be possible for you to see
how each component of good teaching helps to bring about the kind of

learning that leads to changes in understanding—and hence to the outcomes that lecturers and students value. Chapters 3 to 5 provided the basis for understanding these relationships. We saw how student learning was often of a mediocre quality, in terms of outcomes, approaches and student satisfaction. The conclusion was that its quality was a function of the context of learning—otherwise known as students' perceptions of what we do in teaching.

In Chapter 1 we met the idea of a 'conception of reality'—the way in which a student interprets a phenomenon, or structures and understands some aspect of the world around them. Learning is a change in your conceptions—a change in your understanding of something. University teachers can tell students what a right and a wrong understanding is; but only students can make sense of it for themselves. The same reasoning applies to teaching. I can tell you what good teaching is: but only you can come to realise what it means.

Thinking about teaching in the way described in the previous paragraph will imply for many lecturers a change in their conceptions—a change in their understanding of what teaching means. The case studies of the two middle school science teachers in the Roth study summarised in the previous chapter strongly suggest that the interaction between teachers and pupils described there is directed by this latent factor of the teacher's theory of teaching. Readers will no doubt agree that the instructional strategies used by Ms Ramsey, taught as a set of stand-alone skills to teachers like Ms Lane, would have small chance of success. The skills are important, but like a car without a steering wheel, they require something else; they only have effect when they are managed by a refined theory of teaching.

Thinking about teaching as a process of changing students' understanding in a general way is not sufficient to ensure that good teaching actually happens. Teaching always takes place within particular contexts (such as in the physics classroom, or in writing comments on your student's political science essay, or in discussing a new form of assessment with other members of your engineering department). And, of course, it always involves particular subject matter. Becoming skilled at teaching requires developing the ability to deploy a complex theory of teaching in the different contexts relevant to the teaching and learning

of that subject matter. We could say that a lecturer who is able to do this has changed his or her understanding of teaching.

University teachers' theories of teaching

Chapter 2 introduced the idea of different ways of experiencing and understanding teaching, presenting three vignettes based on what lecturers have said about the problems and possibilities of improving learning and teaching. The vignettes were derived from the structure of lecturers' theories of teaching suggested in early research and writing on the subject, notably the work of Margaret Balla, Gloria Dall'Alba, and Elaine Martin in Melbourne (all of whom undertook interviews asking lecturers to describe teaching and learning in their disciplines), and Biggs in Hong Kong. Bringing together these studies with work on students' approaches to learning, we can describe three generic ways of understanding the role of the teacher in higher education, each of which has corresponding implications for how students are expected to learn.

Theory 1: Teaching as telling or transmission

Many university teachers implicitly or explicitly define the task of teaching undergraduates as the transmission of authoritative content or the demonstration of procedures. The knowledge to be handed on to students at this level (in contrast to the knowledge constituted in research and scholarship at higher levels) is seen as unproblematic. Subject content exists *sui generis*. It must be instilled in students. Much of the folklore of university teaching follows a similar line; even the iconic Robbins Report defined key functions of higher education in terms of transmission of culture and instruction in skills. The traditional didactic lecture represents a perspective on teaching taken from the point of view of the teacher as the source of undistorted information. The mass of students are passive recipients of the wisdom of a single speaker. There are more modern versions of this theory too, represented in the idea of 'delivery' of courses and the belief that fundamental problems in the quality of university education can be solved by transferring knowledge more efficiently, typically using some form of information technology.

   This way of looking at teaching has been identified in several studies of schoolteachers in training (see, for example, Russell and Johnson 1988). It focuses on what the teacher does to students. The lecturer's role is seen as communicating knowledge smoothly; it is both necessary and sufficient that he or she should be an expert in the subject matter.

Knowledge about subject content and knowledge of the techniques for teaching it are kept in separate compartments. The theory shows some affinities with the superficial engagement with content that typifies a surface approach. Learning, it seems to be saying, will occur as long as a quantity of information gets across to students.

Consistent with this view of how learning occurs, lecturers who use this theory of teaching will typically attribute any failure to learn to faults in the student (Biggs (1999) calls this the 'blame-the-student' theory of teaching). These lecturers conceptualise the relationship between what the teacher does and what the student learns as a non-problematic one, a sort of input-output model with the works hidden away. If no student learning after exposure to teaching takes place, their theory cannot really explain why it does not. Occasionally I hear of lecturers, on being presented with evidence of student ignorance on a topic that has been the subject of a previous series of lectures, saying to the students (with astonishment) 'But you did go to the lectures last term, didn't you?'

We are also reminded of the lecturers in Chapter 3 who appeared to believe in the existence of 'good learners' and 'poor learners'—who thought that the quality of student learning was categorically determined by ability and personality, and could not be changed by teaching (see Bloom (1976) for convincing arguments against this belief). Laziness, unwillingness to work at a particular topic, inability to absorb new material—the metaphor is significant—and poor preparation at an earlier stage of education are among the reasons adduced. This theory implies that all problems in teaching and learning reside outside the lecturer, the programme of study, or even the university. It is at heart an additive and quantitative way of conceptualising teaching and learning.

Theory 2: Teaching as organising student activity

In theory 2, the focus moves away from the teacher towards the student. Lecturers see teaching as a supervision process involving the articulation of techniques designed to ensure that students learn. Authoritative subject knowledge, so salient in the first theory, recedes into the background.

Student learning is now seen as a perplexing problem. How can ideals (developing independence and critical thinking, teaching in a way that is more exciting than the teaching that oneself experienced, etc.) be translated into reality? Activity in students is regarded as the panacea. It is assumed that there is a finite set of rules which may be infallibly applied to enabling them to understand; they imply that students will learn through reacting and doing. The methods may include ways of motivating

students so that they are in the right psychological frame of mind to learn dull subject matter; simple 'rewards and punishments' approaches to assessment ('If you don't learn this, you'll fail the exam; if you do, it will be useful next year'); techniques for promoting discussion in class; and processes which require students to link their theoretical knowledge to their experience, such as forms of experiential learning.

This theory represents in many ways a transitional stage between theories 1 and 3. Ms Lane (Chapter 6) is probably working from this theory. Teaching is seen no longer as being mainly about telling or transmission: it is also about dealing with students, and above all about making them busy, using a set of efficient procedures to cover the ground. This theory is the level at which many attempts to innovate in higher education are presented and at which much staff development takes place. University teachers often complain that they lack the skills to help students become more able; but they often want at the same time a set of methods that are fail-safe: tested, tried and true for all terrains. Improving teaching from this point of view is about extending a lecturer's repertoire of techniques rather than about changing his or her understanding. Learning teaching techniques is, in this theory, a sufficient basis for improving teaching. If we learn how to do something, it is assumed that learning how to reflect on what we do and to apply our knowledge to new situations naturally follows.

The view of student learning corresponding with this theory of teaching is that there are certain conditions that will guarantee learning. Student learning it is no longer seen as solely the learner's responsibility. If learning does not occur, something is wrong outside the learner as well as inside. Therefore, we should get students to do things. Theory 2 underlies the notion of 'active learning' that remains one of the central ideas of much staff development in higher education.

Theory 3: Teaching as making learning possible

If theories 1 and 2 focus respectively on the teacher and the student, theory 3 looks at teaching and learning as two sides of the same coin. Theory 3 is a more complex view. In this conception, teaching, students and the subject content to be learned are linked together by an overarching framework or system. Teaching is comprehended as a process of working cooperatively with learners to help them change their understanding. It is making student learning possible. Teaching involves finding out about students' misunderstandings, intervening to change them and creating a context of learning that encourages

students to engage with the subject matter. Note that this theory is very much concerned with the content of what students have to learn in relation to how it should be taught. As we saw in the previous chapter, a teacher who uses this theory will recognise and focus especially on the essential issues that seem to represent critical barriers to student learning. The content to be taught, and students' problems with learning it, direct the methods he or she uses. The method is secondary to the problem.

The teacher's conception of his or her role differs radically in this theory. This is because it draws on a different epistemology from theories 1 and 2. The teacher recognises that knowledge of the content is constituted by the learner, and that this process of constituting reality is not qualitatively different whether the learning is of accepted fact and theory in a first year course or whether it takes place at the frontiers of knowledge in the same subject. The nature of obtaining knowledge does not differ. Learning is applying and modifying one's own ideas; it is something the student does, rather than something that it done to the student. 'Transmission' of existing knowledge is at best a half-true description of education; all information is new and requires to be decoded if you have not met it before; all facts must be interpreted imaginatively. This is no doubt what Whitehead had in mind when he spoke of 'imaginatively imparting information' in university teaching:

> A university which fails in this respect has no reason for existence. This atmosphere of excitement, arising from imaginative consideration, transforms knowledge. A fact is no longer a bare fact: it is invested with all its possibilities. It is no longer a burden on the memory: it is energising as the poet of our dreams, and as the architect of our purposes. Imagination…enables men to construct an intellectual vision of a new world, and it preserves the zest of life by the suggestion of satisfying purposes.
>
> (Whitehead 1929:139)

Jerome Bruner makes a related point that neatly expresses the central idea of this theory:

> A curriculum reflects not only the nature of knowledge itself but also the nature of the knower and of the knowledge-getting process… A body of knowledge, enshrined in a university faculty and embodied in a series of authoritative volumes, is the result of much prior intellectual activity. To instruct someone in these disciplines is not

a matter of getting him to commit results to mind. Rather, it is to teach him to participate in the process that makes possible the establishment of knowledge. We teach a subject not to produce little living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to take part in the process of knowledge-getting. Knowing is a process, not a product.

<div align="right">(Bruner 1966:72)</div>

We are a long way away from surface approaches in these views of education and this theory of teaching.

Improving teaching is an integral part of theory 3, precisely because it expresses a notion of teaching as a speculative and reflective activity. Using theory 3 means listening to students and listening to other teachers in an effort to teach better. Continuous improvement of skills through constructing increasingly elaborate professional knowledge becomes part of teaching from this perspective; the teacher understands the need to identify critical obstacles to student learning for different topics and give them special attention in the curriculum. This implies a certain attitude to educational principles and research: while theories 1 and 2 typically regard these as separate from the 'real' world of classrooms and teaching strategies, theory 3 recognises a complementarity between teaching and research on how to help students learn. Teachers working from this perspective are interested in learning from a variety of sources, including research evidence, about how they might improve their teaching (see Marton and Ramsden 1988).

The lecturer using this theory will realise that he or she must include a variety of methods to help students learn, so that individual differences between learners can be fitted into the general goal of helping all students to change their understanding. The corresponding view of student learning is clear: there are certain favourable conditions for learning which, however, need to be reinterpreted to fit specific students and subject matter. The activities of teaching, in other words, are seen as context-related, uncertain, and continuously improvable. Unlike theory 2, this view of teaching does not accept that there can be a protocol to ensure that learning happens.

The structure of the theories

It is important to see that these theories have a hierarchical structure. The higher levels imply the strategies and actions of the lower ones, but

not vice versa. Thus, theory 1 assumes that content knowledge and fluent presentation are enough for good teaching. Theory 2 complements this picture with additional skills focused principally on student activity and the acquisition of extra teaching techniques. Theory 3 presupposes all these abilities and extends the understanding of teaching so that it becomes embedded in the nature of subject knowledge and the nature of how it is learned.

The most complex theory therefore includes aspects of both the others: in other words, teaching does involve presenting information, motivating students and creating opportunities for them to learn; good lecturing does imply clear and orderly presentation; and in the last analysis, only the student can do the learning—it is his or her own responsibility. But good teaching as represented in theory 3 does not stop at doing these things, nor does it place all the responsibility on the student's shoulders all the time. In contrast, theory 1 is locked into a notion of teaching as information transmission or skills exposition and it focuses on the actions of the teacher in isolation from the student. The relation between teaching and student learning is taken for granted. Formally, it implies rejection of the six principles of good teaching described in Chapter 6, and it logically leads to behaviours in the classroom and elsewhere which reduce the probability of changes in students' understanding.

Theory 2 occupies an intermediate position, accepting the need to orchestrate teaching skills and to get students to carry out various exercises, as well as a requirement to present information. But it fails to integrate these activities with students' learning of subject content. Student activity does not itself imply that learning will take place. Theory 3, which is about making learning possible, exemplifies the qualities of effective university teaching previously described. It delineates a way of thinking about teaching that is qualitatively different from the others. It is associated with better-quality learning: it represents the goal towards which efforts at improving university teaching should be directed. Changing lecturers' understanding of teaching is a necessary condition for improving teaching in higher education.

The theories, of course, are logical constructs rather than descriptions of every individual or every course—although we shall see, in Part 2, how good teachers really do teach from something close to the perspective represented by theory 3. There is a rational line of development from one theory to the next which accords with a process of an individual lecturer's learning about teaching. Each higher theory expresses a twofold and seemingly contradictory development—towards an increasingly

relativistic and problematic understanding of the relations between teaching and learning, on the one hand; and towards recognising the unity between what the lecturer does and what the student learns, on the other. It is as if the development itself denotes an acceptance of the restless tension of opposites in education.

The extent to which these different ways of understanding teaching are more common among lecturers in some subject areas than in others is obviously a provocative issue. No one has yet satisfactorily answered the question. It seems possible that theories 1 and 2 may be more often represented in those subject areas that typically receive lower student ratings (such as engineering) than in those that usually receive higher ratings (such as humanities). But it would be very unwise indeed to jump to the conclusion that any differences are inherent in the nature of the subjects, or that the social organisation of disciplinary cultures determines the theory its teachers *should* use. It is easy to think of courses and teachers that illustrate each way of understanding in all subject areas, and variations in student perceptions of courses within the same subject area, as we saw in Chapter 6, definitely confirm these impressions. It may be that good teaching is more common, and perhaps even easier to achieve, in some subject areas than in others; its principles, however, apply to all of them.

Towards a model of university teaching

Table 7.1 summarises the three theories of teaching in terms of the teacher's focus, associated strategies, typical activities and reflection on how teaching might be improved. Lecturers' general theories of teaching are realised in their approach to teaching: what they intend, and how they actually go about designing and undertaking specific activities, such as teaching a particular topic in a tutorial, setting an assignment question or marking an examination.

Like their students, lecturers work within an academic context; this includes their discipline as well as the academic organisational unit and university in which they work. Approaches to teaching and actual teaching activities are influenced by the lecturer's experiences of the context of teaching. (As I shall emphasise later, their approaches and activities are not completely determined by it.) The quality of a teacher's reflections on how his or her teaching is working affects the approach and the actions taken. For example, Ms Ramsey in Chapter 6 clearly listened to the ways in which learners tried to make sense of the ideas about light and seeing she was trying to teach them, and used that

Table 7.1 Theories of university teaching

	Theory 1 Teaching as telling	Theory 2 Teaching as organising	Theory 3 Teaching as making learning possible
Focus	Teacher and content	Teaching techniques that will result in learning	Relation between students and subject matter
Strategy	Transmit information	Manage teaching process; transmit concepts	Engage; challenge; imagine oneself as the student
Actions	Chiefly presentation	'Active learning'; organising activity	Systematically adapted to suit student understanding
Reflection	Unreflective; taken for granted	Apply skills to improve teaching	Teaching as a research-like, scholarly process

information to structure both how she thought about teaching and her interaction with the pupils.

In Chapter 5 we looked at a model of student learning that linked together students' previous experiences, their approaches to studying and the outcomes of their learning. A similar model could be developed that made predictions about the effects of different policies and evaluation procedures and training programmes on the quality of lecturers' teaching, just as forecasts about the outcomes and processes of student learning can be derived from Figure 5.1. These issues, however, are ahead of us: we need to look first at how a lecturer who understands teaching as making learning possible will go about teaching in higher education.

Further reading

Empirical research verified the concept of lecturers' theories of teaching in the 1990s. Moreover, observable differences in lecturers' classroom activities have been found to be associated with their understanding of teaching. As we shall see later (Chapter 12), there is also evidence to substantiate the idea that the different theories are related to students' approaches to learning, with deep approaches being more common in learning contexts where theory 3 is being applied. Key sources include:

Kember, D. (1997) 'A reconceptualisation of the research into academics' conceptions of teaching', *Learning and Instruction* 7:255–75.

Martin, E., Presser, M., Trigwell, K., Ramsden, P. and Benjamin, J. (2002) 'What university teachers teach and how they teach it', in N.Hativa and P.Goodyear (eds) *Teacher Thinking, Beliefs and Knowledge in Higher Education,* Dordrecht: Kluwer.

Prosser, M. and Trigwell, K. (1999) 'Experiences of teaching in higher education', Chapter 7 of *Understanding Learning and Teaching,* Buckingham: SRHE and Open University Press.

Trigwell, K., Prosser, M. and Waterhouse, F. (1999) 'Relations between teachers' approaches to teaching and students' approaches to learning', *Higher Education* 37:57–50.

Part 2

Design for learning

Chapter 8

The goals and structure of a course

> Surely, in every subject in each type of curriculum, the precise knowledge required should be determined after the most anxious inquiry …I am sure that one secret of a successful teacher is that he has formulated quite clearly in his mind what the pupil has got to know in precise fashion. He will then cease from half-hearted attempts to worry his pupils with memorising a lot of irrelevant stuff of inferior importance.
>
> (A.N.Whitehead)

Introduction to Part 2: applying theory to practice

This chapter begins Part 2 of the book, in which we examine some applications of the theoretical material considered in Part 1. You should by now be familiar with some principal ideas about how students learn and the relations between their approaches to learning the quality of their learning, and the context of learning in higher education. We have seen how these concepts could be used to clarify the nature of good teaching and how they might be linked together into a way of understanding the process of instruction which explains variation in teaching quality using the simple device of different theories of teaching.

How can we use our understanding to improve the practice of university teaching? There are five issues we need to address:

1   What do I want my students to learn, and how can I express my goals to them and make these goals clear to my colleagues and myself? This is the problem of *goals and structure*.
2   How should I arrange teaching and learning so that students have

the greatest chance of learning what I want them to learn? This is the problem of *teaching strategies*.

3   How can I find out whether they have learned what I hoped they would learn? This is the problem of *assessment*.

4   How can I estimate the effectiveness of my teaching, and use the information I gather to improve it? This is the problem of *evaluation*.

5   How should the answers to 1–4 be applied to measuring and improving the quality of higher education? These are the problems of *accountability and educational development*.

The present chapter and the two that follow it deal in turn with problems 1 to 3. In each chapter in Part 2, I illustrate the application of the principles of effective instruction by referring to case studies that show how lecturers in several subject areas have addressed these questions. Since our preferred theory of teaching maintains that evaluation is an inseparable part of the enterprise of higher education, implicit within each of these chapters is the idea that good teaching involves monitoring and improving the effectiveness of the curriculum, how it is taught and how students are assessed. This means that we shall also be addressing the fourth question as we go along. A more general discussion of evaluation will be postponed until Part 3, where the focus widens to include the fifth problem as well. In Part 3 we shall consider measures of teaching performance, the political issues surrounding the measurement of quality, and the challenge of improving university teaching and learning.

A word is necessary about this approach before beginning the main part of this chapter. Few books about university teaching adopt it. They focus instead on methods of teaching and assessing students (practicals, online learning, lectures, small groups, examinations, assignments and so on) rather than on students' experiences of how they learn the subject matter. Naturally, no one can write much about teaching strategies without referring to content: we always teach students something. However, the content and the students remain in the back' ground in most treatments of university teaching. The same is true for many investigations of the effectiveness of university teaching. They are concerned with questions such as whether lectures are more effective than independent study, or whether students prefer online learning to textbooks.

As I think you must now be aware, I believe that these are mistaken approaches. This book looks at teaching from the opposite viewpoint. From this perspective, in the foreground is what students are expected to learn and how they go about learning it. Methods form the background.

Decisions about which methods to use to teach and assess our students should be based on their effectiveness as means of encouraging high-quality learning outcomes, which by definition are concerned with subject content and the experiences of the people who learn that content.

If the argument that all teaching and learning is concerned with specific content and how students address it were to be carried too far, however, we would end up in the incongruous position that we could never give any generic advice on teaching methods. Every topic is unique: every topic therefore requires a different teaching strategy. This would evidently be an impossible conclusion as far as improving teaching is concerned. There are generally applicable principles for good teaching such as those described in Chapters 6 and 7. Despite variations in effective learning and teaching between different subject areas, we found that there was a core of principles, ways of thinking and activities that was common to all successful educational experiences.

How can this be, if the content is in the foreground and the method in the background? The answer is that we were looking at principles, not techniques, in those chapters. We were not considering how to lecture: we were considering how we should help students to learn what we wanted them to learn. We were not examining whether to use multiple choice tests or essays: we were examining the educational importance of feedback on learning and the uses of assessment as a way of helping us to learn how to improve teaching. Principles of good teaching do not prescribe or proscribe certain methods, but rather point us towards or away from certain procedures in particular situations.

All effective teaching methods will realise—in their different ways-the principles of student responsibility for learning, the teacher's concern for students, clear structure, cultivation of student interest in the subject matter, and so on. The choice of any particular method, and the way it is applied, should be based on positive answers to the question of whether the principles are maintained. Yet no one can predict with certainty whether a certain method will work in a particular context. The inevitable conclusion of this argument is recognition that we, as teachers, cannot avoid the professional responsibility of constantly making decisions about student learning. There can never be a set of techniques that will ensure good teaching and learning.

Students' expectations of courses in higher education

To begin a university course is for many students to begin a period of

uncertainty and confusion. Whether the transition is from school or work, or even from a previous year of study in the same institution, students often have only the slightest idea of what to expect. When I became an undergraduate for the first time, while I was surprised at the extraordinary freedom the experience afforded, I happened to fall in with a group of fellow students who were extremely interested in the subjects they were studying. The experience was liberating. I was lucky. Many students find the experience utterly confusing, especially if they come from school systems where attainment in the qualifying entrance examination is seen as something close to an end in itself.

We easily forget how students can experience a sense of disorientation owing to a rapid shift from an ordered and familiar environment to one of considerable freedom. It is apparent from several studies of transition from school to university and students' early experiences of higher education that the first few weeks of their studies are critical to success. However, the effects sometimes do not show themselves until the second year of a programme of study or even later (see, for example, Entwistle *et al.* 1989; Entwistle 1990). It is clear that students often spend a lot of their time simply trying to discover what we want them to learn, while many fail to perceive the links between the academic knowledge they have acquired in school and the work they do at university (Martin *et al.* 1989). Students may also be encumbered by naive conceptions of what learning consists of, as we saw in Chapters 3 and 4.

The first question in teaching anything should be 'What do I want my students to learn?' It should be closely followed by a second question: 'How can I express my requirements to my students?' I cannot emphasise too strongly that satisfactory answers to these questions must precede attempts to address problems such as how to present a lecture, manage a tutorial, or use ICT. To appreciate the significance attached by students to the clear expression of the pattern, content and expectations of a course, consider again some of the items from the Course Experience Questionnaire study (see Chapter 6) that differentiated the 'good' courses from the 'bad' ones:

- It's often hard to discover what's expected of you in this course.
- The aims and objectives of this course are not made very clear.
- You usually have a clear idea of where you're going and what's expected of you in this course.
- It's always easy here to know the standard of work expected.
- The staff here make it clear right from the start what they expect from students.

In the good courses, students tended to disagree with the first two statements listed and to agree with the rest. Additional examples that made clear the meaning attached by students to unambiguous aims and an orderly framework to the curriculum appeared in Chapter 5. It is indisputable that, from the students' perspective, clear standards and goals are a vitally important element of an effective educational experience. Lack of clarity on these points is almost always associated with negative evaluations, learning difficulties and poor performance. Indeterminate goals and lack of feedback on progress towards them are major determinants of failure, especially in the first year of a degree (McInnis and James 1995).

Weak teaching will acquit itself of responsibility for student confusion arising from unclear structure with the kinds of excuses we dismissed in Chapter 6. Some students will always do badly for reasons beyond our control. What teachers *can* do is to make sure that they do not falter for reasons within our control. If we intend to teach well, in accordance with a theory 3 approach to teaching, we must help students to adapt to higher education by making plain what our requirements are, and by providing an explicit set of constraints which is gradually relaxed as students gain more experience. Thoughtful teachers understand that highly structured initial experiences provide students with confidence and a sense of purpose; these experiences tend to make subsequent freedoms all the more fruitful and exciting. Specific examples of teaching strategies for achieving these general aims will be discussed in the next chapter.

Content and aims

The content of a course is traditionally communicated through its syllabus. 'Intermediate cartography', 'An introduction to clinical decision analysis', 'The developmental psychology of Jean Piaget', 'Theory of partnership and company accounting', 'Advanced topics in thermo' dynamics', 'Quattrocento Venice' are all examples of course content as it frequently expressed. There is nothing wrong with them—except for what they leave unsaid.

Syllabus topics easily obscure the fact that content embraces the range of theories, ideas, processes, principles, concepts, facts and skills that a lecturer expects students to learn. The less sophisticated theories of teaching fail to recognise that content is not identical to knowledge of a list of topics, or that the higher-level aims typically expressed by university teachers must needs be incorporated in our expectations for student learning. At their most extreme, lists of topics to be 'covered' invite

students to adopt a narrow strategies aimed at gathering quantities of information that will permit assessments to be negotiated—to use, in other words, an essentially quantitative approach to learning. No wonder that students sometimes waste valuable time trying to discover the implicit criteria on which they will be assessed, or that they often focus on issues which the lecturer did not intend them to concentrate on.

You will remember from the studies of lecturers' expectations summarised in Chapter 3 that university teachers normally speak of two elements of their subject when they describe their intentions for student learning—the substantive (the key ideas) and the procedural (the typical ways of arriving at understanding in the discipline). The most important aspect of course content follows directly from a perspective on education as changing conceptions: what changes in understanding do we expect students to undergo as a result of experiencing the course? What will students be able to do after they complete the course that they could not do before?

Logically, there can be no such thing as teaching if the teacher does not know what he or she wants students to learn. Few lecturers would be unable to describe the progress they expect students to make during a course. Yet many of them, as we also saw before, may be diffident about expressing the goals of their teaching in terms other than syllabus topics or general statements such as 'critical thinking' or 'independent judgement'. In answer to questions about student learning, they will often point to a series of items listing what they will be teaching rather than what the students will be learning.

Lennart Svensson and Christian Högfors (1988) described their experiences of trying to persuade engineering lecturers to articulate the aims of a mechanics course, and its place in an engineering programme at a Swedish university, as being just like this. The academic staff were able to talk in detail about the discipline of classical mechanics and its relationship to engineering, but did not link the knowledge and skills gained by students in the mechanics unit to the aims of the entire programme. They assumed that specifying the content to be taught in each specialist area, such as mechanics, automatically implied its contribution to the general aims. Specification of the content to be taught, not how the content enabled students to become engineers, was seen as 'the problem' by these lecturers. Svensson and Högfors call this view an 'administrative' conception of course design. The starting-point of this perspective is the division of the curriculum into subjects and their component parts. Mastery of the parts constitutes the aim of the whole course:

What it *means* to master or know these units is considered non-problematical. How to further and control this knowledge are seen as practical problems that do not have to be treated during discussion of the goals…Discussion…indicated that when people thought of better ways of meeting the aims, they mainly considered new courses that would fill the gaps.

(Svensson and Högfors 1988:174–5)

Aims and objectives

Svensson and Högfors' experiences are ubiquitous. What can be done to change these views of course content, and thus begin to change the context of student learning? Much fruitless debate has been expended on debates about *aims and objectives* in education without reaching what seems to me to be the core of the problem, which is that lecturers often do not reflect on what they want students to learn and why they want them to learn it. A typical misconception is that students do not need to know about the goals of a course: the content of the syllabus plus attendance at lectures will be enough. We have seen that it is frequently not enough.

One of the central arguments of this book is that all aspects of university teaching should be driven by the changes in understanding we want to see occur in our students. The purpose of expressing aims and objectives is to improve the quality of education, in two senses. The activity should enable teachers to think more critically and deliberately about student progress, and the manner of its connection with what they do in their teaching. Second, the results of the exercise should make clear to students exactly what they have to learn to succeed, and what they can leave aside. Aims and objectives are no magic wand, but neither are they the dangerous witchcraft that some people seem to think they are. They will not necessarily cause teachers to reflect on their teaching or improve their students' learning, but they may be a useful technique for making those ends possible.

As in so many other things about teaching in higher education, it is unwise to be dogmatic about the techniques of using aims and objectives. The principle of being clear about the key elements of competence that students should acquire is what matters. Objectives do not have to consist of 'things that students can be observed to do', as some proponents of behavioural objectives would try to have us believe. It is quite acceptable to think directly about the concepts that a student who has successfully completed his or her course will have understood—such as 'opportunity cost' in economics, 'the Avogadro constant' in chemistry, or 'metaphor'

in literature—and how they will have arrived at an understanding of them (see also Rowntree 1981:68–85).

Aims are best thought of as general statements of educational intent, seen from the student's point of view, while *objectives* are more specific and concrete statements of what students are expected to learn. The medical course at the University of Melbourne, for example, includes the general aim '[To achieve] an understanding of principles in the analysis of human behaviour and functioning relevant to health and disease'; within the list of objectives for the subject of behavioural science which forms part of this programme is a specific example of what this entails: '[The student should understand] family structures and their impact on patient care, particularly in regard to primary medical care…'

The rationale for using statements of aims and objectives would seem to be based on three linked assumptions:

- that education is about changes in students' thinking and knowledge;
- that it is useful at the start of a course to inform students plainly, methodically and accurately what they need to learn;
- that it is what students do, rather than what teachers do, that ultimately determines whether changes in their understanding actually take place.

Writing aims and objectives, and thinking systematically about the concepts that students will need to understand and how they will understand them, becomes a perplexing task if instruction is seen from the point of view of teaching theory 1 (telling or transmitting knowledge using efficient teaching skills). Looking at what the *student* has to do in order to learn is not part of this way of considering teaching.

Like most tasks in education, devising and articulating objectives can be done in a superficial way. It is frankly not worth the bother: it is an imitation of teaching as surely as surface approaches are an imitation of learning. It is easy when struggling with the idea of aims and objectives to fall into one of three traps. One is to attempt to restate syllabus topics using the language of aims and objectives. For example, a lecture topic in introductory economics might be 'Exchange rates and trade'. The 'objective' then becomes 'To acquire knowledge about exchange rates and trade'. Needless to say, this sort of thing provides students with no extra information about what they have to do. What does it *mean* to acquire knowledge about exchange rates and trade? It presumably implies an understanding of key concepts and their application to real situations; we might try, as two objectives related to this topic To explain the meaning

and function of flexible and fixed exchange rates in relation to the concept of equilibrium' and 'To explain the significance of a current account deficit'. Students may not know what all these terms mean at first, but they will help direct their attention to what is relevant in a lecture or text, and provide them later with a useful means of reviewing their knowledge of the topic.

Almost the opposite of this error (but with an equally unhelpful effect) is to provide another kind of imitation goal—vague, extremely general aims that are practically content-free. 'To become more critical of established theory', 'To improve written communication skills', 'To understand links between the practical and the theoretical', 'To become an independent learner'. There is a place in exhaustive declarations of educational goals for very comprehensive statements like these, but they need to be combined with more precise statements related to a particular profession or discipline if they are to be useful to students and helpful in planning teaching. These general aims only gain meaning when they are actualised in specific subjects: the historian's understanding of links between theory and practice will be very different from the chemist's. It is certain that students do not acquire competences like this except in association with particular subject matter. General intellectual development arises from students' relationships with the content. In Perry's scheme of levels of thinking, for example (Chapter 3), the general categories derive entirely from students' interaction with domains of knowledge; students come 'to "realize" through the necessities of intellectual disciplines' as Perry puts it (Perry 1988:158).

The third kind of imitation objective is the one so roundly criticised by those who are against the whole idea of aims and objectives. They have a reasonable point. This type of objective describes only observable student behaviours and is extremely narrow and specific. It thus excludes, for example, statements beginning To understand…' (understanding cannot be observed). It has also regrettably been assumed by some of those who take this approach that every valuable educational aim can be specified in advance, that a good list of objectives only contains skills and knowledge that are 100 per cent achievable.

These assertions are contentious. To concentrate only on observable behaviours in writing objectives trivialises learning. It narrows courses to the things that are easily measurable rather than to the things that are educationally important. It encourages surface approaches by giving exactly the wrong message to students: that achieving the signs of learning is more important than achieving the changes in understanding that should underlie them. It is equally mistaken to

think that every important objective, particularly less concrete ones concerning changes in attitudes, can be pre-specified. It is impossible to predict exactly what outcomes will occur from a course of study, and it is inadmissible to think, particularly in higher education, that anything that is learned that was not foreseen is worthless. The practical effect of focusing only on objectives that can be fully mastered is to concentrate on low-level changes in students' knowledge. Many important skills and understandings are infinitely improvable. Aims and objectives should rather describe progress towards understanding. If a minimum standard needs to be achieved (for professional practice, for example) this should be separately specified.

Try to describe concepts and relations between concepts if you write objectives for your courses. If course objectives concentrate largely on procedures and facts, students will inevitably receive the message that higher-order outcomes (including both an understanding of key concepts and the development of complex skills such as a systematic approach to experimentation or historical argument) are less important than an ability to categorise and reproduce disconnected pieces of knowledge. Imitation objectives imply surface approaches.

Some examples of aims and objectives which avoid these mistakes, and which are likely to be useful both to students and staff by providing a methodical structure for a course of study, appear in Table 8.1. In Table 8.2 we see an example of a well-thought out list of general aims for a professional programme. Note how much further the aims shown in Table 8.2 take us than the abstract aims of 'independent analysis' and 'critical thinking': they describe subject-specific intentions for student learning which resemble the kinds of general goals expressed by lecturers when they are asked to talk about what they expect from their students (see Chapter 3).

While we may avoid all the errors listed earlier in this chapter, it is necessary to remember something else if we want to use the technique of writing aims and objectives to plan a curriculum. Listing aims and objectives alone, and perhaps giving out the list at the first lecture, is an entirely unsatisfactory means of describing to students what we want them to do. Objectives must be connected quite forcefully to the learning activities that are designed to enable students to achieve them; they must be embodied in the actions and words of the teachers who profess them; they must be continually presented to students in order to provide a clear framework in which they can work. The most compelling reason for using aims and objectives, or some similar method of describing content, is that it forces us as teachers to make our intentions for student

Table 8.1 Some examples of aims and objectives

Aims
Students should:
- Acquire skills of economic analysis and reasoning (Economics)
- Develop their ability to pose purposeful questions about the past and answer them imaginatively (History)
- Develop the capacity to think creatively and independently about new design problems and make a realistic estimate of their own potential for solving them (Engineering)

Objectives
Students should:
- Recognise and explain the role of government in planning through a detailed examination of the 1947 Planning Act (Environmental Planning)
- Be able to explain, using graphical and algebraic methods, the meaning of elasticity in different contexts (Economics)
- Appreciate the range of normality in the living human body due to age, sex and body build, and the effects of posture, phase of respiration and pregnancy (Anatomy)
- Understand the properties of ionising radiation (Physics)
- Comprehend fundamental concepts in the historical study of the French Revolution: be able to examine, for example, eighteenth-century meanings of 'bourgeoisie' and 'feudalism' and distinguish them from twentieth-century interpretations (History)
- Be able to interpret contemporary human activities in the light of the psychology of memory (Psychology)

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learning explicit. There ought to be a definite educational justification for every activity, every piece of content, that is present in a course of study. Tradition and habit are *not* satisfactory educational reasons. This leads me naturally to consider ways of selecting the content that a list of educational goals is designed to express.

Selecting content and aims

How should we select appropriate content for a university course? How are aims and objectives generated? Even if someone else has fixed the syllabus, even if they have provided you with a list of topics, it is still useful to reflect on the content using the approaches described in this chapter and to consider ways in which it might be interpreted and structured. There is nearly always room for some manoeuvre. A colleague of mine who used to be a high school physics teacher has recently been

Table 8.2 The aims of a law course

Students should:
(a) Understand, and be able to identify, use and evaluate rules, concepts and principles of law, their derivation, and the various theories that attempt to systematise them
(b) Acquire the techniques of legal reasoning and argument, in oral and written form
(c) Understand the institutions of the law, and their social, economic and political context
(d) Learn to find the law, to carry out independent research and analysis, and to think creatively about legal problems
(e) Develop a continuing interest in the law, and obtain satisfaction from its study and practice
(f) Develop a critical interest in the reform of the law
(g) Appreciate the responsibilities of lawyers to the courts, the legal profession, the community and individuals within it
(h) Develop a commitment to promoting justice

Source: Based on the aims of the undergraduate curriculum in Law, the University of Melbourne.

working as a part-time tutor of first year students in a university science department. There, although the content is defined by the full-time lecturers, he has been able to deploy his own knowledge of typical student misconceptions derived from his secondary school experiences to focus particularly on certain areas of the subject that students often have problems with. His *de facto* curriculum gives much more time to some topics than others. This approach is quite compatible both with the requirements of the department and with the principles of effective teaching.

It is probable that most readers will have more freedom than this in deciding the content, either in devising an entirely new course or in revising an old one. I do not propose to look at all the possible sources of content in this chapter. A good general review appears in Rowntree (1981); an excellent description related to the specific area of laboratory teaching is to be found in Boud *et al.* (1986). It is important to stress that different ways of devising course content will suit different subjects, different students and different lecturers. Among the numerous sources of raw material for content are:

- Recognised problems in educating students in this particular field (reports of review bodies and external evaluators, for example);
- The requirements of a professional or licensing body;
- Examinations of similar courses in other institutions or departments;

- Discussions, more or less formal, among colleagues and/or practitioners and employers about key skills;
- Discussion with students doing similar courses elsewhere;
- Research reports and more informal studies of students' misconceptions and typical errors related to the subject matter;
- Conceptual schemes devised by educators for a particular series of topics (such as Novak's 'concept maps' in biology (Novak 1981));
- An academic department's statement of its educational values and goals;
- Essential texts in the subject;
- Examination and assignment questions, and examiners' reports;
- Reflection on the main activities students will have to undertake in order to learn the topics in question, and on the assessment methods that will be used to find out whether they have learned them;
- Considering the amount of time required to achieve complete understanding of the topics;
- Thinking about the relation between the particular unit or subject and a student's entire programme of study.

It is all very well to collect this information: how is it to be used? Again it is valuable to return to first principles of good teaching in determining a curriculum based on data from any or all of these sources. Good teaching involves finding out from students and other sources about the difficulties students experience in learning the subject matter, finding out about key outcomes that are not achieved or are only partially achieved, and considering the needs of particular groups of students. High-quality education cannot occur unless these activities take place. The continually growing numbers of students entering higher education from non-traditional backgrounds imply that increasing attention will have to be paid to studying the variety of understandings and skills with which students begin a course of higher education. The principle of good teaching as learning about where students are in relation to where we want them to go, however, remains the same.

Excessive workloads

Much the easiest mistake to make in deciding upon content and aims is to include too much content. We should rather strive to include less, but to ensure that students learn that smaller part properly. Resisting the temptation to add more and more content is extremely difficult if a lecturer sees undergraduate student learning as an obstacle course or as a process

of acquiring huge quantities of information for later development and use. Facts and details have no life outside those who interpret them. That the presence of abundant information implies neither knowledge nor wisdom is evident all around us. The idea that students must lay down a basis of fact and detail on which to build understanding is an aspect of the mythology of teaching theory 1 (see Chapter 2), which tends to regard content as fixed and students as consumers and receivers of information. But more reflective teaching recognises that content is fluid, information is nothing except organised data, and that students have to make sense of it. We cannot just tell students what is right and wrong, if we expect them to understand for themselves.

We noted in Chapter 5 how many courses are saturated with detail and over-demanding on students' time, so that little space remains for the essential activities of thinking about and integrating the content. Some lecturers seem to think this approach has the effect of a kind of perverted commando training course, sharpening the powers of the strong and eliminating the weak. I hope they may grow out of this unfortunate view of student learning, for its documented effects mean that it represents the lowest possible rating on any scale of teaching quality. Anyone who has ever done any academic research will be aware of the devastating influence on the quality of output of an excessive number of small but different demands on one's time. The inevitable result of too much busy work is that many students adopt minimising strategies and complete their courses with sketchy and confused knowledge of the topics they have 'learned'. Busy work is bad for hard work—and bad news for the quality of education. A.N. Whitehead once again encapsulates the whole idea in three or four memorable sentences:

> We enunciate two educational commandments, 'Do not teach too many subjects,' and again, 'What you do teach, teach thoroughly.' The result of teaching small parts of a large number of subjects is the passive reception of disconnected ideas, not illumined with any spark of vitality. Let the main ideas which are introduced into a child's education be few and important, and let them be thrown into every combination possible. The child should make them his own, and should understand their application here and now in the circumstances of his actual life.
>
> (Whitehead 1929:2)

I appreciate how hard it is to reduce the amount of content in many courses, especially science-based ones. While it is easy to plead for

increasing the quantity because of the enlarged amount of knowledge in a subject, it is a lot harder to have the courage to argue for avoiding some topics altogether. This is particularly true when resources and power in an institution are tied to contact hours with students. There is then an incentive to stuff the curriculum to bursting point in order to justify more contact time. In selecting judiciously, it is important to appreciate that a curriculum should give special attention to the important ideas in a subject which students find especially difficult to understand. We saw in Chapter 6 how good teachers are typically very aware of these particular elements, and give special attention to them at the expense of 'covering' the subject matter. Keep in mind again that a lecturer's 'covering of the ground' does not imply that the students will cover it.

Organisation and sequence

After the broad structure and aims of a course have been decided, teachers face the question of how to arrange and sequence the content. We can deduce from our analysis of good teaching that the quality of a course's organisation can be understood in terms of its focal point. A less effective course will focus primarily on *content* (with the main emphasis on the teacher's knowledge). In contrast, a soundly structured course will focus on *aims for student learning* (with the emphasis on the relation between students and the content to be learned).

The taken-for-granted structure of the majority of courses in higher education is probably of the first type. It is consistent with the 'administrative' view of course goals described by Svensson and Högfors and summarised earlier in the chapter. It is common for courses to be structured around a series of lectures, seminars, tutorials and practicals purely because of tradition and administrative convenience. This structure represents a highly teacher-centred view of subject content. Exactly how students will use these opportunities to learn the content does not come into it. It is often assumed without question, for example, that lectures will be the dominant mode of teaching and that students will learn from them. An object of this book is to encourage its readers to feel uncomfortable about this kind of assumption and to acquire the knowledge that will permit a more sensible approach to be undertaken. What will a more effective course structure look like, in general terms?

Many thousands of words have been written about the rules for sequencing in education, and discussions of it are often highly theoretical. Proceeding from the simple to the complex, from the particular to the general; structuring around inquiry, the order of events in the physical or

social worlds, or the use of knowledge; strategies involving linear sequences, chronological ones, or symbolised by the relation between the core of an apple and its flesh…Few of these expositions, however logical, reach the heart of the matter, which is that there are two vital principles to bear in mind whatever sequence and organisation is adopted. First, the ordering of content should be educationally justifiable. In other words, it must be possible to defend the particular order and structure in which material is tackled from the point of view of its favourable effects on student learning. The second, related point is that the logical ordering of topics that is 'obvious' to a subject expert is not necessarily the best way for a novice to go about learning that subject.

An 'administrative' view of course content is the enemy of an educationally sound sequence. An effective course will have its material arranged in such a way that the issues addressed generate confidence and interest in students. Developing confidence in one's ability to learn a subject is essential to success. At the start of a course students should be given a few tasks to perform at which they can succeed quickly (this is one of the reasons why it is so important to inquire into students' understandings before teaching). They should feel they could gain some new knowledge simply by linking it to what they are already confident about. It does not matter if these tasks seem trivial to the teacher, or even to the student three months later. Revision of what is known in a helpful environment, and successfully going a tiny bit beyond what is known, helps to give a sense of assurance of one's own capacities. Without a feeling of security that the next step will be achievable, learning anything is a trial and is often a failure. It is our responsibility as professional teachers to provide that security. The same rules apply to the structure within a topic as to the relation between topics and a course.

We know from our discussion of effective teaching that any course which does not engage students' interest, especially at the start, is heading for trouble. Material should preferably be ordered in such a way that it proceeds from common sense and everyday experiences to abstractions, and then back again to the application of the theoretical knowledge in practice. Good teaching is certainly aware of the desirability of building an understanding from basic ideas, and of getting the fundamental ideas of the subject clear in students' minds early on. But the basics do not have to be dull, as some lecturers appear to assume. Students should always feel they are doing something useful, something that they find stimulating; good teaching always makes the essentials interesting. Moreover, it recognises that in real learning one goes 'back to the basics' time after time; learning subject matter properly involves several passes

through the same material. But the journey of exploration should be made different, and more difficult, each time. Nothing is more lifeless than simple 'revision' of the same material in the same way. Again, it is our task to arrange these experiences in the design of courses.

In order to decide on which prerequisite concepts really are essential for further work, it may be useful to work backwards from each objective for student learning and to decide which operations a student would not be able to perform without a certain piece of knowledge. For example, you cannot understand calculus unless you understand algebra; you cannot understand algebra unless you have a clear knowledge of the rules of arithmetic.

However, this procedure requires a self-critical approach if it is not to mislead. It is easy to be deceived into confusing actual prerequisites with traditional ways of presenting a subject. Sometimes the conclusions reached from actual studies of how students learn produce findings that go completely against tradition and seem, at first sight, to contradict common sense. It is not at all clear, for example, that students should *first* understand concepts, facts and theories and *then* apply them to actual problems. Trying to tackle a real problem may provide the motivation needed to learn the concept required to solve it. Moreover, different students prefer different routes through the same material (see Laurillard 1987 for example). Nor is it clear that techniques and concepts are 'naturally' applied once they have been learned. They must have meaning to students before they can be used. Numerous studies have documented the enormous difficulties students have in applying scientific knowledge to professional practice in medicine and engineering. Eraut *et al.* (1975) show how discarding the traditional view that the concepts of economics should be learned before applying them to the kinds of problems economists try to solve improved students' learning. Giving them an opportunity to analyse actual problems made learning the techniques and concepts easier and more satisfying. Problem-based learning makes use of precisely these principles to encourage students to engage with the content of the subject.

Case studies of effective course design

What happens when these ideas are put into practice? The remainder of this chapter looks at several examples of courses that apply the principles suggested here. Surely, you may say as you read through these cases, anyone can do the kinds of things these teachers do. Precisely. Every lecturer can teach as well as this. But most do not.

A unifying theme in all these illustrations, and those in Chapters 9, 10 and 11, is the particular understanding of teaching and learning which they represent. All the 'answers' are context-related, dynamic and student-focused. The focus on students' experiences is perhaps the important thing. These teachers set explicit goals and use appropriate teaching methods, but this is less important than the fact that their students experience clear structure and feel supported in their learning. Another property of effective teaching shown in each of these examples is that its practitioners reveal a thoughtful rather than a taken-for-granted approach to content and aims. They see their students' understandings of the subject matter as a puzzle that students need help to unlock.

Designing a course in materials for interior designers

Elaine Atkinson teaches materials technology to design students. She describes the purpose of her third year course as being to help students explore relationships between design and technology through the study of materials and through investigating how designers make decisions about interior detailing. Traditionally, the course in materials had been taught as a series of lectures describing the technical details of the strength of materials and their related characteristics. Observe here how the teacher reflects on her aims, identifies problems, and communicates the goals of her teaching to her students:

> I found that teaching the course in this way, as an information-dispensing subject, bored me and failed to interest the students. I decided it was time to look at the curriculum afresh and to question the assumptions behind it. I realised that the important thing was to forget about imposing new gadgetry or just improving my presentation skills and think about what I wanted students to learn. That took me back to my own definition of interior design practice. What I wanted students to learn was how designers actually use materials. That implies something fundamentally different from just knowing about materials; I wanted students to understand the nature and technical details of materials so that they could perform as designers and appreciate how designers think. It became important to think about what students already know about materials. It was necessary to devise a programme that really confronted their current conceptions of materials, and to make explicit the idea of 'thinking as a designer'. We are dealing with a lot of factual material and students get overwhelmed by information in the traditional way of running a course like this. I explained that

this course was different, and why, and tried to underline this in the subject guide provided to students. For example, one of the objectives was a negative one [see below]. I explained that they would not be able to pass the course unless they had really started to think about how designers work with materials. You might know the tensile strength of granite, but that wouldn't be enough to pass the assessment. I also emphasise 'key understandings' and try to work from the misconceptions students have of materials. For example, a specific misunderstanding about stone is that all stones are basically the same—they're all expensive and have similar properties as materials. I use this idea to start off the presentation of details about metamorphic, sedimentary and igneous stones. Then, this is linked to a guest speaker talking about how different stones are actually used in design practice.

The objectives for Atkinson's course, as presented to students, are as follows:

At the conclusion of this course you should—
(a) Be able to relate design objectives to the selection of materials using appropriate performance specifications;
(b) Understand test methods and measurement procedures for the materials studied;
(c) Understand the structure of existing resources for the investigation of materials properties and be able to evaluate the information from these sources for new or developing materials;
(d) Be familiar with custom design services and procedures and be able to identify appropriate design situations for these services;
(e) Detail competently with the materials studied.
NOTE: The specific objectives do not include the memorisation of large bodies of factual information about materials.

We shall look at how this lecturer teaches and assesses this course in the next two chapters.

The aims and content of an anatomy course for medical students

Eizenberg (1988) described an orchestrated set of interventions in curriculum based on research into student learning and his own experience as a teacher. An understanding of the anatomical structure of the human body is regarded as an essential basis for the subsequent study of pathology

and many of the clinical disciplines, and in traditional medical curricula it forms clinical practice. Students often see anatomy as a mass of factual material that must be committed to memory; they frequently use the approaches to learning it which we now know will lead to poor retention of detail and to the inability to apply the knowledge that is remembered to realistic medical problems. But anatomy is actually a highly structured subject with many important concepts that link the details together. It explains how the structure of the body developed, uncovers patterns of distribution and develops an appreciation of the basis of variation (Eizenberg 1988:187).

The purposes of the revised course are to encourage students to comprehend this structure, to display to students and teachers the importance of understanding key concepts rather than memorising details, to clarify goals and standards by matching the aims and their assessment, and to reduce the sheer volume of knowledge to be understood by selecting those parts of the discipline which are crucially important to medicine. These purposes, of course, are congruent with our theoretical understanding of good teaching and our knowledge derived from the experiences of students in higher education.

Students are encouraged to view the subject as an integrated whole, and to use deep-holistic approaches, by means of careful sequencing and explicit frameworks for study. The previous course encouraged students to see the subject as the accumulation of isolated facts. The revised course begins with the basic principles of general similarities of each type of anatomical structure (such as the arteries). Students are required to construct organisational frameworks to help make sense of the information about each structure. A study guide is used to describe each set of learning tasks, in which the relative importance of each topic is clearly shown. The sequence of presentation enables students to coordinate their study of anatomy with other subjects studied at the same time. This allows students to focus on the same organ systems simultaneously across different subject areas.

Making the aims of a humanities course explicit

How important are aims and objectives in arts subjects? Whether we use the formal language of aims and objectives or not, making clear to students what is required of them and showing that teachers care about student learning is just as important in history or English as in chemistry or engineering.

When Hazel Lybeck and Barbara Yencken revised a course in

fifteenth-century Italian art, they made changes to the subject matter and to the structure of seminars which they connected explicitly to their aims for student learning. They wanted to overcome some common misconceptions of, and negative attitudes to, the subject—specifically, the uncritical acceptance of the positions and methodologies represented in authoritative historical texts; the related belief that there were right and wrong answers about Renaissance art that had to be discovered and repeated in assessments; and students' passivity and lack of initiative in researching and presenting their ideas. All these problems, we know from our analysis of students' experiences in Part 1, are predictable responses to teaching which is perceived to be inadequate. As we shall see in the next chapter, specific instructional strategies quite different from the usual tutorial or seminar were used to address them.

Lybeck and Yencken represented their aims to students both in a study guide and in the structure of the teaching programme. The guide clearly stated their expectations, and what they did not intend, using concrete examples:

> The course is designed to overcome what is seen to be problematic in the teaching of Renaissance art, namely that it can produce an uncritical acceptance of received texts and methods, and that it can produce a nervousness about looking at the art independently because of what is perceived as its remoteness from our present culture. Hence we will encourage students to think about the issues presented by art historians and theorists in relation to visual material and to examine their worth. The ability to read texts critically and to work towards freedom from the 'dogma of the written text' will be stressed. For example, in Week Two we examine Michael Baxandall's concept of the 'period eye' (*Painting and Experience in Fifteenth Century Italy*, chapter 2) in relation to a range of fifteenth century paintings, as well as in relation to other theories of visual interpretation, for example those of Leo Steinberg and John Berger *(Ways of Seeing)*. While understanding of scholarship in the area of study is essential, the course emphasis will be on developing the student's intellectual independence within the context of traditional Renaissance art theory/history. The ability to ask questions intelligently will be stressed, rather than providing 'correct' answers. For example, the emphasis of the class cited above will be on understanding the assumptions that underlie Baxandall's thesis, the selection of material he provides and the use he makes of it, rather than assuming that the categories and analyses

he provides for visual experience are correct and can be used uncritically in other studies.

A basic statistics course for planners

The aims and sequence of John Dunn's statistics course are geared to his knowledge of his students. They are preparing to be environmental (town and country) planners; most have studied mathematics (including some statistics) to a high level at school, yet he knows from pre-tests that three-quarters of them are unable to remember most of what they have learned, far less apply it to the analysis of planning problems:

> I asked them to write down what a standard deviation meant. Nobody, nobody was able to hazard a guess as to how to define a standard deviation! They had learned the techniques, the formulae, of each isolated statistic, but they had no idea of how to put it together, how they were derived, or how they are used in real contexts. It is possible to go on learning quantitative subjects like that in higher education, without properly understanding the meaning. That is exactly what was lacking in my own education [in physics and mathematics] and I have reacted to that in planning this course. I've tried to design it with that problem in mind.
>
> Before I came, the course was taught by the statistics department in first and second semesters. I changed that, spreading it over two years and four parts. The first part is now about descriptive statistics; the second part is about measures of association; the third involves students in doing a survey; the final part is inferential statistics. That has less emphasis than in most courses, for a special reason. It is important to gear the statistics to the needs of the students. Ninety percent of them won't need inferential statistics; 8 percent will need to read material with inferential statistics in; only 2 percent will need to do it. Of those, most will learn quite quickly given a context for it at work. So the emphasis is on building up basic skills, numeracy skills, and coping with those students who come in without maths, so that by the end they can all handle the sophisticated thinking needed, such as an intuitive understanding of the nature of probabilistic statements. A thorough understanding of descriptive statistics plus that intuitive sense is more important than half-understood powerful statistics.
>
> Another idea of structuring it this way is to encourage repeated bites at the same topics so that students can develop an understanding

gradually. One of the principles was to make it a circular thing, so that I'd do standard deviation in the first semester, but of course I'll keep on talking about standard deviation all the way through; correlation also, once initially introduced will then be gone through again in terms of various problems that they meet at a later stage. So the idea was that, having some control over the course, I would spread it out and encourage recurrent attempts at the same concept in order to develop understanding.

Here we see the application of several principles of designing an effective course: unambiguous specification, for the benefit of both teacher and students, of what will and what will not be learned; learning from students about their current understanding; careful pacing; and a sequence where the curriculum returns to consider the same concept on more than one occasion.

Problem-based learning in literary studies

Problem-based learning (PBL) is a form of education that embodies several key principles of effective teaching and is particularly relevant to professional training. Such courses focus on problems of the type which are typically met with in professional life—particularly medicine and related heath sciences, where the problems converge on patients—and students are required to identify the nature of the problem, collect the information needed to tackle it and synthesise a solution. In more conventional professional courses, discipline knowledge is taught separately from its application to actual problems. In problem-based courses, knowledge, skills and professional attitudes are simultaneously addressed. There is powerful evidence that such courses increase the use of deep approaches (see Chapter 4), improve the retention of information and develop student independence and motivation. All these outcomes are to be expected from our previous analyses of student learning and its relation to teaching in higher education.

There remains some scepticism about the relevance of PBL in non-professional fields and disciplines. The key to its use in all fields lies in its focus on realistic issues that bring together teaching, research and practice. As a matter of fact, academic research in applied areas shares many features with PBL.

Bill Hutchings, from the University of Manchester, set up a curriculum in his course units on eighteenth-century poetry and on Samuel Johnson that used a form of PBL to emphasise the continuity between literary

scholarship and undergraduate learning. He was motivated to do so when he was struck by the differences between the way in which he approached his work as a professional literary scholar and the way in which he had set up the curriculum for his students to learn about literary studies (Hutchings and O'Rourke 2002).

He had felt that in teaching he was acting according to principles that were the exact opposite of those that informed his literary scholarship. His work as a literary scholar involved him in conducting exploratory research, exploring a variety of interpretative contexts and actively and creatively engaging with the literature. In teaching, he had set students tasks within rigid limits that constrained the textual and critical boundaries of their reading. He believed that he had imposed the limits of interpretation by proposing what students should read. Finally, by setting a specific question and by selecting the reading list accordingly, he had prescribed a particular reading methodology for the students.

He therefore introduced an inquiry-based curriculum in the two courses as a way of aligning the approach to scholarship he adopted in his research with the types of activities he designed for his students to engage in literary studies. For example, in the eighteenth-century poetry course unit, the aims of the course are:

- To promote the study of a variety of the kinds and forms of poetry written in the eighteenth century;
- To encourage students to examine the function of poets' adoption of different poetic styles and verse forms in the creation of meaning;
- To encourage students' skills of close reading and creative analysis of poetic language and form;
- To encourage students' capacity to work independently and in groups;
- To foster skills in oral and written expression, critical and analytical thinking and research, at a level appropriate to work that will form part of the final degree assessment;
- To encourage students to have the confidence to take responsibility for their learning and self-development.

An animal science course for the twenty-first century

Rosanne Taylor and Michelle Hyde's course in animal science is a compulsory second year module for agriculture students. It aims to provide students with an integrated understanding of the basics of structure, function and production of agricultural animals as well as an introduction

to the major breeds of agriculturally important animals. The emphasis of the course is on how animals maintain a steady state in the face of large variations in the environment.

The course was purposely redesigned over a period of several years to synthesise practical expertise, scientific principles, and generic skills such as information retrieval and writing. There is evidence that courses like this increase the use of deep approaches, improve the quality of learning outcomes and develop student independence and motivation. These results are to be expected from our previous analyses of student learning and its relation to teaching in higher education.

The course's redesign made explicit use of evidence from research into student learning combined with student perceptions of the inadequacies of the previous version. The emphasis moved from a focus on providing introductory factual information and animal-handling skills to a focus on helping students to experience relevance and engagement with the subject matter in preparation for careers in agronomy, animal nutrition and research. The themes are developed through the study of specific topics that are of significance to agricultural scientists.

> We were troubled by the fact that students were not performing well and that many were focusing on reproducing factual content rather than on applying material to the kind of problems faced by professionals in animal production. We devised a set of graduate attributes as a guide to what students should know and how they might reach a holistic understanding of animal science in the context of animal production. We started from core themes that students could relate to from their personal experience: for example, how does a dairy cow maintain homeostasis? What happens when the balance is tipped? We re-arranged things, trimming out a lot of content in order to focus on key ideas to which factual knowledge was attached.

By the end of the course students are expected to acquire the language necessary to discuss body structure and function and have an understanding of fundamental internal processes which interact to maintain normal function. The specific objectives are to:

- Describe the major body structures in agricultural animals and their interrelationships using appropriate terminology;
- Identify the major organs of the body and be able to describe important features of their structure;
- Explain the significance of the interdependence of tissue structure and function, particularly in the digestive and reproductive tracts;

- Define homeostasis and negative feedback; describe the components of a homeostatic system and explain why they are essential to maintaining normal body functions;
- Describe how neural and hormonal mechanisms maintain homeostasis in each of the body systems;
- Analyse animal diets and advise on their suitability for production animals;
- Devise and implement a breeding management program for agricultural animals;
- Demonstrate skills in oral and written communication;
- Demonstrate skills in independent library research and problem solving;
- Critically evaluate your own work;
- Handle production animals (sheep, cattle and poultry) safely and effectively;
- Identify major breeds of agriculturally important animals.

How the teaching and assessment were amended to address the aims and objectives, and enable students to demonstrate their achievement, will be described in Chapters 9 and 10.

Further reading

Toohey, S. (1999) *Designing Courses for Higher Education*, Buckingham: SRHE and Open University Press.

Chapter 9

Teaching strategies for effective learning

> A lecturer should appear easy and collected, undaunted and unconcerned, his thoughts about him and his mind clear for the contemplation and description of his subject…. His whole behaviour should evince a respect for his audience.
>
> (Michael Faraday)

At the beginning of Part 2 I argued that applying research to improving the practice of university teaching involved addressing several related issues. These were summarised as five groups of problems: defining goals and structure; using appropriate teaching strategies; assessing students; evaluating teaching; and educational development and accountability.

In this chapter we are concerned mainly with the second of these issues. Most of us probably think of teaching strategies in terms of the different teaching methods used in higher education, such as the lecture, the practical and the tutorial. I have already argued that this is an unhelpful way of conceptualising the problem: it locks us into an 'administrative' way of looking at learning and teaching. However, I shall start this examination of teaching strategies using this framework, precisely because it is a good way of highlighting the problems that it raises.

As the chapter proceeds, I shall try to show how in good teaching the method used is secondary to the teacher's aims for student learning and the extent to which the particular strategy realises the principles of effective teaching. My object is not to provide solutions to the problems of selecting and using teaching strategies; such absolute remedies do not exist, and anyone who offers them is open to an accusation of deception. It is rather to help readers to understand what the problems are, so that they may find their own ways of tackling them.

Teaching for understanding: some difficulties with current views

From the theory of learning and teaching described earlier in the book it is no large step to the proposition that sound teaching strategies encourage students to relate to the subject matter they are studying in a purposeful way. As we saw in Part 1, the university lecturer who would succeed in making this kind of relationship possible is faced with two main tasks. The first is to discourage students from using surface approaches: this implies avoiding excessive workloads, busywork and unnecessary time pressures; shunning assessment practices that require recall or rehearsal of trivial detail; abandoning all attempts to devalue students' tentative steps towards understanding; avoiding cynical comments (explicit or implicit) about the subject matter and students' grasp of it.

To do these things is far from easy. Encouraging deep approaches through engaging students responsibly and dynamically with the subject matter is even harder. There are several ways in which we can try: helping students to become aware of their current conceptions, so that they become conscious of the fact that there are different conceptions of the phenomenon in question; highlighting inconsistencies in learners' conceptions and their consequences in real situations; focusing on central issues that are most problematic for students; finding ways of integrating the 'knowing how' of a subject (such as how scientists approach experimental inquiry; how political scientists analyse information) with the 'knowing what' (such as Newton's laws of motion or Weber's concept of authority), and so on (see Marton and Ramsden 1988). The impact of each of these strategies will depend on the teacher's ability to reflect on its effectiveness and limitations.

If we now put together these general comments about teaching strategies for understanding with the principles of good teaching articulated in Chapter 6, we find that the focus on intense student interaction with content, clear curriculum structure, engagement of interest, cooperative student endeavour, responsible choice, the lecturer's concern for students and his or her commitment to developing professional competence as a teacher, fit rather tidily into the picture. The entire system can be seen to point in the direction of approaches to teaching that encourage deep approaches to learning. It is critical, however, to appreciate that teaching strategies themselves do not tell the whole of the story. Many teaching strategies can help to encourage deep approaches. What matters, apart from the necessary facility with technique that is part of all good teaching, is the approach adopted to selecting and deploying the strategy.

Readers will now I hope be able to see one step ahead in the argument and confront the inevitable truth that many popular methods, such as the traditional lecture-tutorial-discussion-laboratory-class method of teaching science and social science courses, are inappropriately applied. In fact, not to put too fine a point on it, the way in which several university teaching methods are used is detrimental to the quality of student learning. Inappropriately used methods are driven by theory 1 or 2 approaches to teaching.

Problems with lectures

Biggs (1999:79) makes a useful distinction between teaching and learning activities that are teacher-directed, peer-directed (students learning from each other) and self-directed. The three types are associated with different aspects of learning: explaining, clarifying and interaction between students and teachers to assist comprehension; comparison of different levels of understanding; and independent monitoring and self-assessment. Notice that these differences are in a different category from the deep—surface distinction. Each type of teaching and learning may help or hinder deep approaches, depending on how well we adjust the strategy to the content to be learned and the student's needs.

Most conventional university teaching strategies, including lecturing and laboratories, fall into the first class of activities. It is hardly an overstatement to say that lecturing remains the pre-eminent method of teaching in most subjects in on-campus institutions. The majority of university teachers still seem to favour it; many timetables are organised around it; lecturers will argue that students, especially first year students, are unable to learn without it; numerous books have attempted to justify it, to improve it, to change it. Arguments against lecturing are likely to meet the same withering replies that other arguments which cut across tradition in higher education meet: it is not realistic to abandon or even substantially to modify it; it is not economical to change it; it might reduce standards if we tampered with it.

The conventional one-hour lecture frequently represents a rigidly teacher-centred conception of teaching and learning. Many of its adherents see it as a way of transmitting information at relatively low cost. Knowledge is information; information is a product delivered to the student. The information transmitted and the learning that takes place are simply unproblematical; they cancel out of the calculation, so to speak. This is about as far away as one can get from the outlook of the present book.

One book for lecturers argues that student learning in a lecture demands that the lecturer should 'get accurate information into [students'] short-term memory' and that this process can be helped by increasing the students' level of arousal ('a general state of readiness of the brain to accept new information'). 'Getting information into students' memories' discloses an interesting theory of teaching and learning. Learning, in this view, plainly stands in a direct relation to teaching, is measurable on a single quantitative scale, and consists in portions of information transferred from the lecturer's mind to the students' minds.

This may all seem rather old-fashioned; isn't the day of the lecture as an uninterrupted discourse for about an hour now dead? Unfortunately, more modern national guides, including some published under the auspices of the Institute for Learning and Teaching, echo exactly these conceptions. One manual defines the problem as how to 'cause students to learn during lectures', appearing to suggest that they will be caused to learn by transmission of knowledge (theory 1) combined with getting them to do things (theory 2). Such advice implies that student learning is linearly related to what the lecturer does. In this view of university teaching, the technique and the teacher take precedence over the learning objectives and the students.

These ideas about teaching and learning are congruent with Roger Säljö's description of the simplest conception of knowledge and learning demonstrated by students. We will recall that these students see learning as an increase in the amount of knowledge the learner possesses (Säljö 1984:85). The research into student learning is clear about the effects of this view of learning on the quality of learning outcomes. As we shall see later, research on university teaching is equally clear about the effects of a view of teaching as 'what the teacher does' on students' approaches to learning.

It is better to lecture well than to lecture badly. I personally enjoy lecturing (though I tend to make too many points and sometimes wonder whether the audience remembers much of what I said). It is important to appreciate that lecturing itself, despite the evidence presented above, does not lead to poor learning. You can use any teaching method in an information transmission way or in a way that makes learning possible. It is how lecturing is used—the underlying approach adopted—that determines its effectiveness. Lectures can be a particularly useful way to introduce a new topic and provide an overview of the relation between topics. Moreover, a university teacher should be capable of using lectures to inspire his or her students through linking personal insights from research and the excitements of scholarship to the process of learning.

Problems with small groups

It is revealing of prevailing theories of instruction in higher education that small group work, in which students are expected to participate in the process of learning, is still seen as a supplement to lecturing. When I was a part-time tutor in a university department twenty-five years ago, I was provided with a list of lecture topics and a series of questions written by the lecturer for weekly tutorial discussion with a group of twelve students. The dominant and highly valued part of the teaching was the lecture programme (undertaken by the permanent lecturers); the tutorials (taken by both the tenured staff and a mixed bunch of research students, research assistants and contract lecturers) were a convenient extension of the 'real' teaching. The general view was that tutorials were much less time-consuming and challenging than lectures.

These experiences are still both common and relevant. Some lecturers regard discussion and the practice of tasks in tutorials as luxury items designed to reinforce information transmitted in lectures. The authority of the lecture and the lecturer, epitomising the overarching command of the discipline over those who would learn it, remains paramount.

We need search no further for the causes of the most typical problems in seminar and tutorial teaching, identified by both lecturers and students, and addressed in virtually every educational development workshop on small group teaching and every book about teaching and learning in higher education. The difficulties, all interrelated, are predictable outcomes of a learning context created by a theory 1 or 2 approach to teaching:

- The teacher gives a lecture rather than conducting a dialogue.
- The teacher talks too much.
- Students cannot be encouraged to talk except with difficulty; they will not talk to teach other, but only respond to questions from the tutor.
- Students do not prepare for the sessions.
- One student dominates the discussion.
- The students want to be given the solutions to problems rather than discussing them.

The ideal and the reality of small group work are exemplified in two descriptions, one on the art of questioning pupils (published in 1879), and the other from an article on university seminars of more recent date:

[The teacher] must not attempt, even for the sake of logical consistency, to adhere too rigidly to a series of formal questions, nor refuse to notice any new fact or inquiry which seems to spring naturally out of the subject…For indeed, the whole sum of what may be said about questioning is comprised in this: It ought to set the learners thinking, to promote activity and energy on their part, and to arouse the whole mental faculty into action, instead of blindly cultivating the memory at the expense of the higher intellectual powers. That is the best questioning which best stimulates action on the part if the learner; which gives him a habit of thinking and inquiring for himself; which tends in a great measure to render him independent of his teacher; which makes him, in fact, rather a skilful finder than a patient receiver of truth.

> (Fitch 1879; quoted in Eble 1988:91)

The average seminar runs like this. There are two types. In the first, the seminar is related directly to the course of lectures. It is conceived as a way of giving students the opportunity of discussing problems that they have confronted in the lectures. The tutor meets the class. 'Have you any questions?' he asks. Silence. The tutor says, 'These are dim students', while the students sit embarrassed and anxious and, thus, less ready to join in discussion…

The tutor may try another tack: 'Did you understand what Professor X said about social structure?' But students often don't know what they don't understand: or if they do, find the atmosphere of the seminar not conducive to admitting their ignorance. Hence: silence, embarrassment and anxiety!

The second type of seminar begins with one student reading a paper. The others relax, it's his worry, not theirs, and it is doubtful if they will be pushed to make a contribution. So, the paper is read and the tutor poses questions to the student who has read it and discusses it with him, while the rest sit quietly and undisturbed by the tutor. Finally the *viva voce* ends: and once again, silence, embarrassment and anxiety.

So, the tutor is now 'on the spot'. He, accordingly, begins to talk and frequently feels compelled to fill the gap of silence by giving a mini-lecture…

> (Broady 1970:274)

At this point, it is usual to provide a list of recipes designed to overcome these familiar difficulties. There are many effective techniques (see Habeshaw *et al.* 1984; Biggs 1999). But none of them will succeed for

long unless you clearly understand the reasons for the problems. Just for now, forget about detailed solutions: think about what effective teaching consists of and how you would try to implement its prescriptions in the situation described in the second extract above. If you can work out one or two things that might follow from what you know about teaching, they will be worth as much as ten books full of recipes you have not arrived at for yourself.

Problems with online learning

The adaptation of technology in various forms to the task of teaching has been going on in higher education at least since Gutenberg's time— and some would say, given the continuing predominance in many courses of oral instruction over other methods, at a geologically slow rate. ICT should in theory provide a learning environment which permits intensive and relevant engagement with the subject matter, being individualised and self-paced, allowing immediate access to large amounts of data, encouraging student-student interaction to enable peer learning, asking questions to test student understanding, and providing expert guidance when errors or misconceptions are noted (Laurillard 1987, 1988, 2002).

It may be the potential for interaction and for encouraging deep approaches, or for providing a more student-friendly, flexible environment, or (less charitably) the vision of an easier and cheaper form of information-transmission that looks up to date, that has led to extraordinary claims being made for the impact of ICT on university teaching. The wilder predictions of the demise of campuses, the redundancy of lecturers, the end of face-to-face teaching, and the standardised production of curriculum from a digital nucleus somewhere in North America have not been realised. More seriously, we have yet to harvest most of the educational fruits of ICT. The most serious inadequacies are closely associated and again derive from the false assumption that the method is the key to good learning. They concern the failure to articulate principles for designing teaching materials of these types, naive technological determinism, and the use of potentially interactive media in a passive way that takes no account of the individual learner.

At its worst, ICT is used to enable the passive reception of quantities of information. 'We risk, therefore', said Andrew Hart presciently,

> becoming rich in information but poor in knowledge. The spread of information is dangerously entropie. It may lead to uncertainty and

insecurity rather than confidence and self-assurance. What we need from educational technology is forms of knowledge which may lead to understanding, rather than information overload and confusion.

(Hart 1987:172)

ICT should offer students an opportunity for a conversation involving listening as well as talking on both sides (see Bork 1987). Good programs, like good teachers, are designed to listen and learn from students as part of the process of instructing them. This implies a measure of student control. Poorly used ICT offers the learner no control over decisions about the sequencing of content and learning activities, or the manipulation of the content, nor does it allow the student to create his or her own perspective on the subject. In fact, it may reduce rather than enhance the quality of learning.

Although some writers have suggested that student control leads to inefficient learning, research into ICT in higher education quite clearly demonstrates that learner control may be more effective than program control. Diana Laurillard has shown that when students are given freedom to work through the learning material in their preferred way, they exhibit a wide range of routes. Some begin by looking at what they already know; others start with the least familiar topics. Some work through systematically; others leave an exercise to look at another section, then return to the first exercise. Some take a test before an exercise to check how well they know the material before going on to do only those exercises on which they perform badly; others take the test after the exercise. A single path imposed by the program designer, thinking perhaps that he or she knew best about how students should learn, would seriously inhibit students' access to the content and the potential for understanding it (Laurillard 1987).

You may easily extrapolate several of the difficulties identified above to other aspects of ICT. No teaching medium, however useful, can solve the fundamental educational problem of teacher-student communication. 'A university is defined by the quality of its academic conversations, not by the technologies that service them', as Laurillard so adroitly puts it (Laurillard 2002). ICT cannot alter the way teachers understand teaching. In using it sensibly, the least we can do is to try not to reinforce existing pedagogical errors; but we should aim for a great deal more.

Problems with textbooks

Few discussions of media, and few books about university teaching, say much about the medium through which many students will continue to learn for the foreseeable future—the book, in either its print or digitised versions. The book is a remarkably flexible learning resource. Reading materials of various sorts occupies varying amounts of time for students in different institutions and disciplines, but the time is always substantial, even in laboratory-based subjects.

When advice is given, what is said tends to focus on strategies for helping students to read better. Two of the most worrying issues—the quality of the reading materials themselves and their selection—are usually left untouched. Works on teaching and learning that include discussions of open and flexible learning (such as Rowntree 1981) are among the few exceptions. It is often the case that reading lists underline the view of a subject presented in lectures that every fact, every interpretation is of equal and great importance, and that nothing must be left out. This approach has the expected effect of excessive workload: it invites students to neglect material indiscriminately and to adopt a superficial approach to what they do read (and of course to receive the lecturer's criticism that students can't be trusted to read anything properly). Selecting a major text for a course also presents difficulties; it is often not made clear why a particular text or texts has been chosen, or what the student is expected to learn from it (is it a supplement to the lectures? A substitute? Is every chapter important? Which parts are mandatory and which inessential?).

The impersonal, dense and formal nature of the language of many textbooks in science and social science is an added difficulty. The issue is well defined by Black and his colleagues in their label of 'Scientish' for the special language used in scientific writing which has spilled over into undergraduate texts (Black *et al.* 1977). The use of the terms of formal argument ('let' 'assume' 'consider'); the highly economical use of specialist terminology and explanation; the fact that things are said in one way, and once, rather than in several different ways and more than once (as in speech); the tendency to use many concepts at once, some of which have only lately been introduced to the reader; the fact that the abstract is regarded as normal and the concrete as unusual; the habit of making the reader feel that all is unarguably true and correct, and never tentative and uncertain. Rowntree (1981:166) gives an example from an economics text, and Black *et al.* have one from a physics text; they are by no means unusual:

Let us now consider what will be the shape of the supply curve of the industry where entrepreneurs are heterogeneous, but all other factors are homogeneous. So far as the short-run supply curve is concerned, the fact that entrepreneurs are heterogeneous will make little difference. It will still represent a lateral summation of the short-run marginal cost curves of the individual firms…

If a vertical line is drawn at some arbitrary chosen pressure, it will intersect the isenthalpic curves at a number of points at which μ may be obtained by measuring the slopes of the isenthalps at these points…

These ways of writing may conduce to a feeling of inadequacy in the student who is not made of stern stuff. They assume a great deal about the reader's knowledge, not only of the subject matter but also of how its textbook writers write. Because everything is apparently true and clear and correct and not in doubt, students are led to feel that any lack of understanding on their part must be their fault. Neither can the student ask for guidance: the flow of information is one-way and the experience is frequently passive. No wonder some students develop a negative attitude to the subject and to their own abilities as learners of it through studying textbooks. In brief, textbooks are often poor teachers—because they are written using an inappropriate approach to teaching.

Problems with practical and clinical work

How far does practical work—including clinical experience, projects, fieldwork and laboratories—actually fulfil the expectations that lecturers have for it? Laboratory teaching, in particular, is extremely expensive of resources; its existence goes a long way towards accounting for the fact that engineering, science and medical courses are several times as expensive per student as humanities ones. The main aims of practicals are generally agreed upon; most lists would include:

- Developing an understanding of the process of scientific inquiry, or its equivalent in other subjects (such as the process of design in architecture);
- Learning relevant manipulative and technical skills (examining a patient, for example);
- Learning information and scientific concepts;
- Learning relevant procedural and observational skills;

- Developing a capacity for independent problem solving and learning;
- Understanding the connections between the theoretical and the practical;
- Developing relevant professional values and attitudes;
- Learning how to interpret and present experimental data;
- Learning how to work cooperatively with colleagues.

This is already a formidable list of aims, though more could be added. It is clear from many investigations (see, for example, those summarised in Boud *et al.* 1986) that practical work often does not help the student to achieve them. Moreover, several whose achievement is thought to require laboratory classes could be addressed in different ways. For example, learning how to interpret data and present reports do not require any expensive apparatus; science students can and do pass science courses without doing any laboratory work at all; students report highly negative attitudes to practical work in science until the final year of their undergraduate programme (Bliss and Ogborn 1977); conventional laboratory classes are probably no better than other methods (including lectures) at teaching problem-solving skills (Hegarty 1982); laboratory work is not a cost-effective way of teaching factual information and concepts (Boud *et al.* 1986).

Beard and Hartley (1984) summarised several studies that are critical of the tendency of practical work in science to emphasise low-grade skills, to reduce student responsibility and to foster a superficial and mechanistic approach to the relations between theory and practice. Balla (1990a) described a rather similar situation in medical education, where the knowledge taught in the pre-clinical years is often not integrated into the practical methods learned during the clinical ones; students perceive the two areas to be unrelated, and have difficulty in applying their scientific understanding to clinical problems. These effects are all familiar concomitants of surface approaches.

The cardinal difficulty with practicals, apart from their expense, is similar to the problem with lectures and some applications of ICT; it is also evident in repeated calls for 'active learning' in undergraduate education. Just as in lectures it is taken for granted that students will learn if they are presented with information, so in practicals it is taken for granted that students will learn if they do things. This is somewhat reminiscent of Ms Lane's approach to teaching (see Chapter 6), and of the theory 2 approach to teaching described in Chapter 7. But doing things does not imply understanding the processes of inquiry or relating practice to theoretical knowledge. Just as it is possible to reproduce ideas

and facts without understanding them, so it is possible to learn how to do things without understanding the reasons for doing them.

The key to the problem is to appreciate that the traditional practical, like the lecture, is a highly teacher-centred form of instruction. It focuses on teaching rather than learning. It leaves too little room for students to engage with the content in a way that will help them to understand it. Too much of the real work, such as deciding what procedure should be used to test a hypothesis, how to relate the basic skills together to tell a story, or what a client or patient requires in a particular case, has often already been done by the lecturer.

Towards more effective teaching strategies

Any teaching method—from an expensive ICT-supported simulation to a one-hour lecture—is only as good as the person who interprets it. There are no sure-fire formulas in university teaching.

The weaknesses in teaching described above represent the inverse of the principles of good teaching described in Chapter 6 and the theory 3 approach to instruction outlined in Chapter 7. Tutorials and seminars should encourage confrontation between students and with ideas, and feedback on a student's progress towards grasping those ideas—all within a clear and supportive structure. However, they regularly create passivity, anxiety, repetitive activity and silence. Practicals should serve to integrate, interest and challenge. But they are frequently dull exercises that involve students minimally. ICT ought to foster interaction, excitement, independence and choice in learning. Yet it is still too often used non-interactively as an expensive way of presenting information. The lecture too rarely stimulates thinking or gives students a sense of being part of a community of scholars; it is more likely to promote a view of learning as remembering masses of isolated detail, to underline an impression of the lecturer as a remote authority concerned with 'getting information into students' memories', or to be remembered as a time when students had to talk to their neighbour for five minutes.

In many ways, these difficulties in teaching also reinforce the comments on ineffective experiences of learning made by students in Chapter 5. It is worth looking at students' responses to some of the teaching performance indicator questions (see Chapter 6) to re-emphasise the characteristics of courses where poor-quality teaching is the norm:

• Lecturers here frequently give the impression that they haven't anything to learn from students (agree).

- To do well on this course all you really need is a good memory (agree).
- Staff here show no real interest in what students have to say (agree).
- The staff make a real effort to understand difficulties students may be having with their work (disagree).
- Our lecturers are extremely good at explaining things (disagree).
- Teaching staff here work hard to make their subjects interesting to students (disagree).
- This course really tries to get the best out of all its students (disagree).
- We often discuss with our lecturers or tutors how we are going to learn in this course (disagree).
- The course seems to encourage us to develop our own academic interests as far as possible (disagree).
- We are generally given enough time to understand the things we have to learn (disagree).

It is certain from the results of investigations of university teaching that students in all subject areas express dissatisfaction with, and learn less from, teaching strategies which are perceived to be impersonal, to focus on the transfer of information, to paralyse responsible attitudes to studying, and to encourage low-level intellectual endeavour. We can expect improvement only when the message gets home to everyone that university teaching must encourage students to experience dynamic and responsible learning within a cooperative, clearly structured and accommodating environment.

Some lecturers seem to have a natural sense of the necessary coherence between teaching and learning that renders the kind of advice given in this book superfluous. The vast majority of us have to operate at a more terrestrial level. We need to stipulate in some detail how and why our proposed pedagogical changes will improve student learning. To put this in another way, we ought to be able to see through to an endpoint and keep it clearly in mind as we try out different strategies. At this point you may find it valuable to consider the implications of the resemblance between this focus in teaching on the parts in relation to the whole and the characteristics of a deep approach to learning (see Chapter 4).

In the remainder of this chapter I shall first look at some general advice, derived from our theoretical knowledge of teaching and learning, on how to improve some current methods. I shall illustrate the practical application of the advice by means of several examples of actual teaching strategies that embody the principle of good teaching as the nurturing of student learning. Working from the perspective I have adopted in this book, it is neither necessary nor practicable to consider every teaching

technique separately. Good teaching implies that what students are expected to learn and how they go about learning come first.

The examples focus especially on small group and large group teaching, and readers should be able, with the help of the suggestions on further reading, to apply the same ideas to other methods—including the choice of textbooks and online sources of information. The basic elements of effective teaching illustrated below concern clarity in structure, methods of sustaining interest and involvement (including the use of a variety of different learning methods to reduce tedium and link theoretical ideas to practice), engagement and responsibility, and the use of knowledge about students' approaches and current understandings—what they already know—in designing teaching. It could be useful to think about these fundamentals in relation to the three forms of teaching and learning activity (teacher-directed, peer-directed and self-directed) mentioned previously.

Good class management and careful preparation can improve the *expository lecture*. Every lecturer should study and apply techniques for managing large groups and speaking publicly. Nearly every good lecture is meticulously planned. It is designed to engage the audience's interest. It stimulates their thinking and their desire to find out more about the subject, explains phenomena at the audience's level, restricts its material to one or two main points, and uses many concrete examples. Its deliverer shows respect for and sensitivity to the audience and is deeply concerned with how to reach them and share knowledge with them. Moreover, the effective lecturer reflectively learns from the experience of lecturing.

Many years ago R.V.Jones, the physicist, perfectly captured these central principles in relating his own experiences of lecturing to wartime RAF personnel:

> Subconsciously I acquired the two secrets of lecturing from which everything else follows: first, to believe that you have something worth telling your audience, and then to imagine yourself as one of that audience. Nearly all the advice that I have ever seen given to would-be lecturers deals with the trimmings without mentioning the fundamentals: but if you get these right, they entail all the rest. You must, for example, talk in terms that appeal to the background experience of your audience. You must be audible at the back of the room, where the details of your lantern slides must be visible and your blackboard writing legible; and you should not distract your audience with antics and fidgeting. You must also detect by the change in tension when you are in danger of losing its interest. But all these follow from

the simple consideration of trying to regard yourself from the point of view of a member of the audience in the back row.

(Jones 1978)

The examples of how students respond positively to effective lecturing that appeared in Chapter 5 point the way to how it can be done.

Excellent practical advice on presentational techniques and the lecturer's role in transforming knowledge through scholarship is given by John Biggs (1999: Chapters 5 and 6), who also considers how to upgrade large class teaching through introducing interaction and questioning.

Interactive large classes require skilful organisation. The lecturer working from a student-focused perspective will often apply strategies that result in lively communication between teacher and students. He or she will always remember, however, that activities in themselves are no guarantee of learning. Lecturers thinking in this way will usually provide very clear signals to help students appreciate the links and points of separation between parts of the content, and to enable them to disentangle principles from examples. They tend to explain what they are doing and why.

In short, these teachers work from an understanding of teaching as encouraging deep approaches to learning. Dialogue, structured goals and activity that is expressly linked to the content to be learned are typical concomitants. An example of how one teacher has successfully applied these ideas appears later in this chapter.

Similar advice may be applied to improving teaching in *groups*, *practicals* and other classes. Everyone can provide the answers to the dilemmas of 'small' group teaching described on page 149 if they will look at the problem with a fresh eye for a moment. For example, the reason why students do not talk in tutorials and seminars is to be found by asking: whom do *we* like to talk to? (see Black *et al.* 1977). The answer? We like to talk to people who are responsive and inquisitive about our ideas. We do not feel like talking freely to people who dismiss them or who seem unsympathetic to us. Tradition in university teaching, it seems, may have temporarily blinded us to an obvious truth.

The solutions also follow immediately from the principles of good teaching and its relation to deep approaches. The supreme purpose of small group work is to encourage students to confront different conceptions and to practise making sense for themselves—'to promote activity and energy on their part'—whether this involves learning through cooperating with other students or in direct contact with the teacher.

Teaching is a sort of conversation. In a conversation, listening and talking are equally important. Teaching properly in a small group implies listening to students and using the information we gather to help them understand. Helping understanding does not mean correcting every mistake. Often it is better to say nothing at all; time and reflection, or discussion with peers, may serve the purpose of correcting errors much better, as well as fostering the independence of thought that every university teacher desires.

Above all, students must feel that they are part of the interaction and you must not make them experience a sense of inadequacy. This requires the tutor to show true interest in all student responses, not just the 'right' ones; to ask questions that are genuine questions (which move students towards understanding rather than just eliciting right answers—however trivial they may appear to an expert in the discipline); to have a nice sense of the social climate of the group; to know each member's predilections; to get students working; to provide absolutely clear expectations and standards without inhibiting freedom. Desultory chitchat results from unclear work expectations. Without a very explicit structure and agreed goals, effective discussion in groups is usually doomed. This is why books about the techniques of running small groups place a lot of emphasis on setting ground rules and agreeing contracts between students and teachers.

Because the answers appear simple from this analysis does not mean that they are simple to apply. This is an exceptionally difficult collection of teaching skills to master. Whatever else small group work is, it is hard work, and most of us will make many mistakes and have our share of disasters, however experienced we are.

The extent to which the cultures of different subject areas influence typical patterns of group work is a topic that has not been thoroughly explored. Science lecturers are usually more likely to see tutorials as ancillary to lectures than humanities teachers; physical scientists are more likely to define their role as authorities who answer student questions; social scientists are somewhat more likely to expect a more free-ranging discussion; and so on. These generalisations would not be very helpful in themselves, except that they point up an important source of misunderstanding about improving teaching in different subject areas.

As I have been at pains to stress the important role of subject content in deciding teaching strategies, it may be useful to clear up this source of confusion now. It is sometimes asserted that existing practices are in some way determined by the nature of the subject matter—for example, because

physical sciences are generally more paradigmatic and cumulative than social sciences, then didactic teaching in tutorials is inherently more appropriate. I am sure that this argument, though very convenient to lecturers who do not want to modify their existing routines, is entirely wrong. It confuses the existence of different approaches to teaching in different disciplines with their inevitability. The typical culture of teaching in a discipline, as I argued in Chapter 6, cannot fairly be used as an excuse for not improving instruction within it. The principles of good small group work do not change, even though the way they are actualised in different subjects must differ.

A classic study of tutorial teaching in science to which I have already referred several times (Black *et al.* 1977) articulates clearly this distinction between the need to focus on content (the tasks carried out in a physics tutorial will include ones not usually found in a history one, for example) and the requirement to suspend belief in 'necessary' discipline differences (there is usually too much teacher talk and teacher-student question and answer talk, and not enough open discussion between students, in science tutorials).

The principles of effective large and small group teaching may be extended to the application of techniques such as peer learning, which, correctly applied, is an extremely powerful method involving students teaching each other. Peer and self-directed learning are the bedrock of curricula that require students to integrate generic skills, technical knowledge and professional development through issues-based and problem-based learning (Biggs 1999).

The promises and constraints of *online learning* require a more extended treatment than I can give here. Readers should turn to the best single text on the subject (Laurillard 2002) for research-based advice from a similar perspective to that adopted in this book. Effective online learning enables students to access information in an inquiry-based mode; it can provide a medium for high-level communication and collaboration through peer learning; it can involve interaction with content in a way that enhances understanding (through simulations, for example); it can provide a means by which students can produce material for assessment to complement existing products such as essays and examination answers. Properly used, it can realise the indispensable principle of learning and teaching as a conversation.

In very simple ways, such as email discussions and by using learning management systems such as WebCT wisely, online learning provides additional structure and information to support campus-based learning and provides more flexibility to meet the needs of students. Challenges

that remain embrace the familiar one of matching the technology to the learning goals in a way that ensures a high-quality learning experience (once again, it is not the method, but how skilfully it is used, that matters); the issue of increases in academic staff time and changes in its distribution between tasks; the problem of changes in the proportion of support staff needed; and the initially high costs of adaptive systems. Minimum standards for the quality of online learning should always include stability of the technology, its demonstrated coherence with other parts of the curriculum, clearly defined expectations about access to teachers, and integrated monitoring of the student experience.

Case studies of effective teaching in action

We are now ready to consider some specific teaching strategies which university lecturers in several different subject areas have used to help their students learn. We begin by returning to the experiences of the teachers whose courses were described in Chapter 8. Most books about teaching in higher education present an idealised picture of how it should be done in an unblemished world. But teaching in the real world is always messy, unpredictable and sensitive to context.

Remember, as I mentioned in the last chapter, that these 'solutions' are examples of real teaching, uncertainties and imperfections and all. They demonstrate the application of the principles of good teaching and the ways in which lecturers who use developed theories of instruction teach, but they are not examples to be slavishly copied. I intend them to be used as sources of ideas and hope that you will be able to learn from them.

Structure and cooperation in a humanities course

In the preceding chapter we saw how two fine arts teachers reflected on their aims for student learning and devised a new set of goals which helped their second year students understand exactly what was required of them in a course on Italian art in the fifteenth century. How did they help students to achieve these goals? The changes to teaching involved different approaches to the subject matter and alterations to the seminar structure, each of which was systematically linked to the intention to encourage students to develop a critical and questioning attitude to texts and images. The two teachers came to discover through this process the integration between how a class could be run and the sort of material that could be taught and learned in it.

The main change instituted was the use of collaborative class papers. Two students cooperated in research and presentation for these papers, although the paper each subsequently produced for assessment purposes was written independently (it emerged that each student often took a quite different viewpoint in the written paper). This was not the usual presentation of seminar papers; students were given entire responsibility for 'teaching' the topic to the rest of the group, under the guidance of their lecturers. Thus, the role of the student leaders was not to deliver a formal paper, but to explore a range of ideas about a topic, to give necessary information and to inaugurate questions and group discussion related to the key ideas.

Students were placed in a challenging situation where they were accountable to their peers as well as their teachers for the quality of their work. It was therefore essential to provide a good deal of support. The teachers structured each class carefully in terms of material to be covered and aims to be achieved, and spent time with each pair of students prior to the class discussing how the material could be arranged and the seminar run. Techniques for initiating group work—such as having students discuss questions in pairs and fours, or having one half of the group work on an article or painting and the other on another article or painting, prior to sharing information—were considered in these pre-class sessions. The aim was to have work actually done in class by all class members, and to put the responsibility on to students for ensuring that it was done; the teacher intervened only minimally once the class was under way. The first two seminars were led by the teacher in order to give students a model of how to proceed, and to establish a sense of group commitment and identity.

A critical approach was built into the teaching programme by exacting selection of content. The material for each class was chosen to develop wide reading and to ensure that the viewpoint of any particular writer under discussion would be critically questioned. Twentieth-century images were used to explain the unfamiliar by way of the familiar and to break down the isolation of the Renaissance both in its images and the theories applied to them.

The effects on students' attitudes to the subject and on their learning were extremely favourable. Although some students found themselves unsure and anxious about the structure of the course at first, comments at the end of the course were extremely positive; there was also evidence of changes in students' understanding of important concepts related to the critical study of Renaissance art.

Teaching strategies in a materials technology course

Atkinson's course (see pp. 136–7) uses a range of different methods to achieve its goals, each carefully chosen to help students towards more sophisticated understanding of essential ideas. These methods are intended to stimulate students to change their view of materials technology from one that focuses on 'getting information that might be useful in the future' to one that emphasises the application of facts and concepts about materials to professional practice. In teaching this course, Atkinson gives a great deal of her time individually to her students; a strategy that is made easier since the group is quite small (about thirty).

The programme reduces the amount of class time devoted to transferring information (in what has previously been regarded as a dry and factual subject that could be taught in no other way; compare Eizenberg's course below, p. 165) and increases the amount of time devoted to the use of ideas to make sense of, apply and remember the information. It thus reflects a theory of teaching close to the preferred one that I described in Chapter 7.

A particularly important and innovative strategy to note is the use of the 'User's Guide' as a form of teaching and assessment. Students are placed under an obligation to produce a guide to the advantages and disadvantages of a particular material that would answer the kind of questions a young, practising interior designer would be likely to want answers to. The class under the supervision of the teacher decided on the format for the guides collaboratively. Also of interest is the use of practical exercises that involve the study of actual design problems and their solutions as undertaken by practitioners. These strategies address well the problems of the traditional practical and laboratory class, helping students to understand the nature of the links between practice and basic knowledge.

This teacher's experiences also exemplify aspects of the process of evaluation in relation to teaching, an issue we return to in Chapter 11:

> Improving the course proved to be interesting and not at all easy. It is a continuous process of development which I never expect to end. There are still problems in fitting everything in. There are three strands to the teaching: one involves looking at key concepts in different areas, such as textiles, stone, ceramics and glass. This is a whole class session and involves some presentation and discussion. The details related to these concepts are not dealt with in this part, but in a piece

of cooperative work done by students. Groups of students are required to produce 'User's Guides' to particular materials: this encourages them to think about the information, make sense of the details, and consider how the data might be used in the process of design. For example, it is very helpful to understand how far marble can be cantilevered in construction. These guides provide resources for other students and practitioners.

The next part involves students in studying the actual process of design by professional interior designers. I have lined up 15 different practices. Pairs of students look at one product and the whole process from conception to production of that assignment. These case studies are then presented to the whole class. This strategy entirely removes students' naive belief that there is a simple sequence from working drawings to final product: they realise how messy the real process of design is. The third strand involves talks, followed by discussion, by guest speakers who are experts in particular materials. These are experts in industry. This introduces students to a group of people they will be working with and the kinds of thinking they will have to understand.

It should be possible for you to trace each of the principles of good teaching through these comments, and it would be helpful to consider how these ideas might be applied to a course which was not aimed at developing professional skills, but rather at the mastery of a specific discipline.

Improving student learning in anatomy

Norman Eizenberg's aims for his medical course were also described in Chapter 8. Through studying his students' experiences of learning, he has been able over a period of fifteen years to restructure the teaching of an anatomy course so that it encourages them to appreciate the relevance of anatomy to clinical work and enhances their ability to integrate basic science knowledge with medical practice.

A difficulty in traditional medical education is that discipline-based knowledge is often separated from clinical practice. Eizenberg (1988) found that many of his students were using surface approaches to learning anatomy. They saw the subject as a mass of facts that had to be rote-learned. They failed to see its relevance to clinical work. This approach seemed to be reinforced by an academic culture which regarded the subject as being one where no alternative existed to learning factual information prior to understanding its application, and

by a teaching programme that followed the most expedient order for dissection, rather than the most appropriate order for learning the subject. This made it difficult for students to distinguish underlying principles from details and led to them being unable to relate the various parts of the same structure. Eizenberg changed this by linking his aims and objectives directly to the teaching programme. His object was to encourage students to view anatomy as an organised whole, rather than a collection of discrete parts. He therefore analysed the derivation of new terms in lectures, engaged students in problem solving, continually stressed the importance and efficiency of learning concepts and principles, and altered the sequence in which the material was presented in order to give students repeated opportunities to develop an understanding of key concepts. Each major section of the body (thorax, neck, head, and so on) was considered in four stages:

1 The structures forming the musculo-skeletal framework (*what* they are, and *how* they are interlocked together);
2 An analysis of the structures contained within the musculo-skeletal framework (each structure's position and how it relates to its neighbours);
3 The vessels and nerves supplying the region and how they are laid out;
4 The focus returns to structures that are supplied by the vessels and nerves, and how effective, exclusive and variable the supply to each is.

I described in Chapter 8 the deliberate manipulation of the content of the subject to make it relevant to the practice of medicine. Readers should refer to Eizenberg's own description of his original teaching programme (Eizenberg 1988) for further details and evaluative data concerning this important example of how reflection on and analysis of students' experiences of learning can be used to improve instruction.

Subsequently, Eizenberg developed a CD-ROM to support the course. His students had found that the course's value in encouraging deep approaches was limited by the primarily descriptive materials then available. The software incorporates high-quality images of, for example, radiographs; it includes integrated clinical questions and answers; and it allows students to examine anatomical concepts from multiple perspectives using multiple pathways—systemic (why), regional (what/where) and two views of studying anatomy through construction or deconstruction (how). Students reported that the

CD-ROM helped them to understand anatomy from multiple perspectives as well as helping them to interpret anatomy rather than merely describe it (Kennedy *et al.* 2000).

Teaching strategies in a problem-based literature course

Unusually for courses in arts and humanities, Bill Hutchings' course units on eighteenth-century poetry and Samuel Johnson are structured around issues or problems. The course involves a weekly one-hour tutor-led session and a weekly two-hour student-led session. Over the first three weeks of each unit, the initial tutor-led sessions are used to offer students an informal introduction to eighteenth-century poetry or the work of Samuel Johnson. In the student-led sessions, the students work their way through an initial non-assessed problem, which is designed to introduce them to the idea of, and give them experience of engaging in, this kind of learning. The students are then given a choice of the particular task that they are going to work on; these are assessed for grading purposes.

The tasks they can choose from include:

1   Preparing a script for presentation to the *Times Higher Education Supplement* on the effects of university undergraduate teaching on students' understanding and appreciation of literature.
2   Organising a debate at a major conference on an issue related to eighteenth-century poetry or Samuel Johnson.
3   Making an oral presentation to an Open University course team who are commissioning a course reader.
4   Writing a specimen introduction to a book for Manchester University Press. The market for this new edition includes undergraduates and 'the common reader' and the volume is to be both scholarly in method and of appeal to a wider readership.
5   Writing a review article for the *London Review of Books* focusing on the opportunities and problems presented by the need for editions to provide a selection from a longer work.
6   Creating a specimen example for a new edition of a work of Samuel Johnson or a selection of eighteenth-century poetry with students choosing their own format, commentary and annotation as appropriate to their conception of the aims of the new edition. Students are asked to accompany their specimen edition with a statement of the rationale for their choice of selection and critical apparatus.

Initially, students choose one problem that culminates in an oral presentation (examples 1 to 3) and, subsequently, one problem that results in them producing in a piece of written work (examples 4 to 6). The students work on each of these problems for three weeks, during which time the tutor-led sessions are designed to support their work. In these sessions, Hutchings responds to ideas and issues that students come across in the problems they are working on.

In the student-led sessions, students engage in a variety of activities including appointing a chair and note-taker, agreeing on a method to approach the problem, allocating roles, tasks and responsibilities, feedback on their progress with addressing the problem, and reconsidering the problem in the light of this progress. This involves students in assessing their initial understanding of the task and identifying what existing knowledge they are able to share. The students determine their learning objectives and the method of inquiry that will enable them to explore relevant material within the proposed timescale. The group work generates a diversity of potential responses to the material and a range of perspectives. This allows students' interpretation of the texts to become freer because they construct their own reading lists and are encouraged to approach critical material with a less deferential attitude. Hutchings and O'Rourke (2002) argue that 'By adopting PBL methods, a learning strategy has been produced that reflects the scholarly process that literature teachers would take for granted as informing their own academic scholarship'.

Modifying teaching to link goals to methods in animal science

Taylor and Hyde skilfully applied ideas about effective student learning to amend their teaching of an animal science course so that the strategies accurately reflected the aims of the curriculum and addressed issues that students had raised about relevance and clarity of goals. As we saw in Chapter 8, these lecturers wanted to improve second year agriculture students' skills in using scientific knowledge to solve real problems in animal production. Generic attributes such as information retrieval and practical skills were not being properly developed in the old course, nor were they integrated with technical knowledge; the new course sought to enhance students' analytical and critical skills and their ability to communicate solutions using a holistic approach focused on key concepts.

The teaching strategy mirrors these goals and reflects our principles of good teaching. Students had said in feedback that the previous teaching methods—lectures and some basic practical classes—had encouraged a passive and superficial form of learning. The regime was revised to engage students from a broad range of abilities with realistic problems in a variety of different forms. Table 9.1 illustrates the coherence between objectives and strategies.

Problems are structured around the central idea of animal science in the context of animal production using the three core themes of equilibrium, disequilibrium and life cycle. A typical sequence is a brief introductory lecture to provide an overview of central questions related to personal experience, followed by workshop sessions in class, which are triggered by short videos. Students are required to interact with each other in small groups to solve problems and apply concepts to new

Table 9.1 Alignment of objectives and teaching strategies in animal science

Objectives	Strategies
Anatomical terminology	Lecture, dissection, web-based self-assessment
3D anatomy/organ identification	Lecture, dissection, web-based self-assessment
Relationship of structure to function	Lecture, dissection, web-based self-assessment, practical, tutorial, video, quiz, assignment
Homeostasis principles	Plenary discussion, web-based self-assessment, computer-simulated practical, video, quiz, assignment
Neural and hormonal regulation	Lecture, web-based self-assessment, practical, tutorial, video, quiz, assignment
Evaluation of animal diets	Lecture, practical, video, assignment
Devise breeding management plan	Lecture, tutorial, practical, web-based self-assessment, assignment
Oral and written communication	Lecture, tutorial, plenary discussion, quiz
Library research/problem solving	Online library workshop, assignment, tutorial
Self and peer evaluation	Web-based self-assessment, peer evaluation of assignment
Handle production animals safely and effectively	Practical class, oral presentation
Identify major breeds of agriculturally important animals	Practical class, oral presentation, assignment

situations. Plenary sessions provide feedback on the quality of responses. Online materials and printed notes provide additional background. The assessment is directly linked to the objectives, giving a clear message to students about what is required from them. Assessment tasks are used to support learning in each core theme (see Chapter 10). There is a gradual movement of emphasis away from dependence to student responsibility as the course proceeds.

Using variety and improvisation in teaching statistics

I have argued that all good teaching recognises the primacy of content over method, focuses on the relations between students and subject matter, is responsive to student needs and requires the teacher to live with uncertainty. John Dunn's teaching expresses these principles very well. The aims of his statistics course for environmental planners (see p. 140) are made real through a variety of different methods. As he said in an interview:

> I basically treat every week differently according to the topic. I put a programme on my door at the beginning of the week which says whether it will be a lecture followed by tutorials, or two tutorials, or perhaps a three-hour problem class. I literally design the three or four-hour block in a way that suits the topic; there is no model that I adopt every week. On occasions, I start with a lecture, or I might start with exercises in groups. For example, I'm talking about crosstabulations tomorrow. What I'll be doing is using a small questionnaire that I handed out to the class at the beginning of the last semester, which was a little survey on travel and place of residence. I'll present the results and explain ways of reporting them separately, but then say that you're really interested in issues of causation and relationships. They will then be asked to work out some crosstabulations individually, based on the raw data they supplied. After a suitable time I'll ask for some examples, put them on the board, and start talking about measures of association, giving a short lecture. In a follow up on a later day in small groups, we'll tackle some more rigorous problems and get them working together on them. That's a combined workshop-lecture-tutorial. But I might do a lecture first followed by tutorials when there's something like regression analysis, which is fairly hard conceptually to understand—they'll need to know some basics which this group

may not have such as X—Y coordinates on graphs before tackling this topic – the style then will be delivery followed by exercises…I'm constantly reappraising how I did it last year, changing it and I hope improving it. I'll vary it. I'm neither highly rigid like some of my colleagues, nor so flexible that the students don't know where they're going. If it doesn't work, I'll write down at the end of the day the lessons I've learned from it.

Dunn summarises the various strategies he uses to teach basic statistics in the example that follows. Notice how formal presentation, discussion, student activity and different ways of addressing the same material are used to help students connect with the subject matter and understand the relations between theory, procedures and applications:

> The following activities will typically proceed through several two-hour sessions:
>
> 1   *Class exercise:* run a small sample survey in class.
> 2   *Prompted discussion* exploring with the class ideas for analysing the data.
> 3   Discuss the type of questions asked (level of measurement) and the purpose of the analysis.
> 4   *Lecture* on appropriate techniques for basic analysis (for example: graphing, stem and leaf plots, means, medians, and modes).
> 5   *Class exercises* to help students grasp basic skills in producing plots and calculating means and medians.
> 6   *Lecture* to emphasise the formal steps of calculation; subsequently explain the meaning and value of the statistics that have been covered, using examples.
> 7   *Exercises* to take home; these are then studied in tutorials.
> 8   *Computer packages* to practise skills further.
> 9   *Formative test* (not counting towards final marks) is used as a learning tool and to provide guidance to the teacher concerning material that is not understood and needs additional or different teaching.

(See Chapter 10 for further details.)

Learning Middle East politics through Internet-based simulations

The principles of good teaching do not alter when information technology is appropriately used to help make learning possible. Andrew Vincent and John Shepherd describe how ICT can add a new dimension to student learning in Middle East politics (Vincent and Shepherd 1998). Students undertake extended role-play simulations through email and chatrooms in order to develop their understanding of diplomacy in general and Middle East politics in particular. Vincent had earlier decided (see the first edition, p. 178) that students' understanding of the intricacy of Middle East diplomacy and the impossibility of arriving at any simple solutions could not be adequately developed unless they could grasp the connections between practical action and ideology.

Simulations give students the opportunity to have direct experience of processes in complex, dynamic systems. The politics of the Middle East has been taught through the use of role-play simulations played out via the Internet with students from the US and Egypt. The role-play simulations are conducted as an integral assessed component of Middle East politics and replace the examination.

The aims of the course are:

- To improve students' understanding of the political interplay in the Middle East;
- To give them experience with high-level problem solving and decision-making;
- To reveal the complexities of international relations and the nature of executive decision-making.

The teaching strategy has gradually developed from pre-Internet computer technology to the use of modern methods. The teaching of the course has four phases. In the 'set-up' phase, the lecturers determine a broad scenario for the simulation and from this develop a list of roles for the students. Groups of three to four students are given the role of a prominent political, religious or social leader in the Middle East, Europe or the United States. The teams then undertake research to develop a role profile for their character describing their background, political agenda, and so on. The role profiles are made available to all participating students throughout the simulation. The students are presented with the written scenario in the 'simulation phase', which details a hypothetical situation occurring in the Middle East. The

students then respond to this using electronic mail, online chat systems and telephone communication to develop the political situation to their advantage. Tutors and senior students act as game controllers to prevent excesses and resolve disputes.

The average simulation lasts for three weeks. The third phase of the simulation is the teleconference in which an international telephone link-up is established between the classes involved in the simulation. These are run by the students who jointly work out the agenda, the order of the speakers and the amount of time they will be allocated. In the final phase of the simulation, the students making up each role produce a final report on the simulation, detailing their character's approach in the simulation, discussing the lessons learned and the difficulties they had in achieving the aims set out in the initial scenario. The aim of the report is for the students to reflect on what they have learned about Middle East politics, international relations and diplomacy.

The students are assessed as teams. Each character receives a single mark, which the students making up that character share. This is to encourage better cooperation within teams. The teams are assessed on their role profile, the quantity and quality of their communications in the simulation, their performance in the teleconference and their final report. The simulation replaces the examination for the course, but students are still required to write essays and attend normal lectures and tutorials.

Depth of understanding in students' essays has improved considerably after the simulation. Students' comments about the exercise have included: 'I finally "saw the light" with regard to diplomacy, after two years studying politics. The labyrinthine process finally became understandable.' An evaluation of the course found that:

- Students developed a solid understanding of the complexity of Middle East politics and the conduct of international diplomacy in general.
- Students learned about working in a team.
- Students gained skills and confidence in using modern information processing technology.

Encouraging interactive learning in large groups

Daniel Charman set up a series of interactive lectures aimed at introducing students to the nature of science and some basic philosophical approaches to scientific thought on a geographical concepts course (Charman and Fullerton 1995) The course had previously had a reputation amongst students and staff for being

difficult for students to understand and appreciate. In particular, students had problems understanding and applying the theoretical ideas as well as appreciating their importance.

The new approach to teaching the course aimed to improve students' understanding of the material, to make the atmosphere of the lectures more stimulating, and to increase the amount of time the students spent thinking about the conceptual ideas. The lecturer also wanted to create opportunities for dialogue with the 135 students in the lecture. In order to support this:

- A set of notes was issued to students at the start of each lecture covering the important points of the class and the associated case studies. This was so that students could concentrate on understanding the ideas rather than taking notes.
- At the start of each lecture, the lecturer discussed questions that students had placed in a 'questions box' at the end of the previous lecture and would relate them to the central issues in the next part of the course.
- The lecturer then introduced students to the conceptual ideas for the particular lecture.
- Students were then asked to work in small groups to discuss case studies related to these ideas directed by specific questions from the lecturer.
- The students fed back their responses to the questions and different answers and interpretations were discussed. Good points were extended and references made to further materials to draw upon.
- Students were then given time to reflect on their notes and to check their understanding with others. They were also given time to write questions to place in the 'questions box'.

A survey of the students found that 73 per cent of them agreed that the changes represented an improvement on traditional lectures. Perhaps more significantly from a student learning standpoint, 66 per cent of the students felt the course had improved their understanding of the concepts.

Further reading

For general advice and examples:
Biggs, J. (1999) *Teaching for Quality Learning at University*, Buckingham: SRHE and Open University Press.

For an account of how one teacher addressed problems in group work:
Abercrombie, M.L.J (1960) *The Anatomy of Judgement,* Hutchinson: London.

For the use of ICT:
Laurillard, D. (2002) *Rethinking University Teaching: A Conversationalist Framework for the Effective Use of Learning Technologies,* 2nd edition, London: RoutledgeFalmer.

For problem-based learning:
http://www.chemeng.mcmaster.ca/pbl/pbl.htm#Books and Resources to Help you with PBL

Assessing for understanding

> I was examined in Hebrew and History: 'What is the Hebrew for the Place of a Skull?' said the Examiner. 'Golgotha', I replied. 'Who founded University College?' I answered, 'King Alfred'. 'Very well, Sir', said the Examiner, 'then you are competent for your degree'.
>
> (Lord Eldon, quoted in James Woodforde's
> *Diary of a Country Parson*)

The assessment of students is a serious and often tragic enterprise. Less pomposity and defensiveness and more levity about the whole business would be an excellent starting point for improving the process of evaluating and judging our students' learning. Some lecturers become stuffy and formal when the talk turns to student assessment. It is as if they measure their own worth as teachers in terms of the difficulty of the questions and the complexity of the procedures they can devise to test and grade their students and to deter cheating. Assessment is all hedged around with a thick bureaucratic mystique designed to form an effective barrier against the inquisitive. The mystique often lightly clothes a profound ignorance about measurement and testing and their relation to teaching and learning.

Assessment, as Derek Rowntree defined it in the classic book on the subject (Rowntree 1977), is about getting to know our students and the quality of their learning. We can get to know people in different ways. One way is to label and categorise them—women, men, clever, ignorant, English, German, weight 60 kilos, weight 80 kilos. Another way is to understand them in all their complexity, considering how their various strengths and weaknesses contribute to what they know, and

what these strengths and weaknesses imply for their potential as learners of the subject.

The proper assessment of student learning requires teachers to combine these forms of knowing. We shall nearly always have to grade students in some way so that we can provide them and others with a summary of progress and performance. Grading and categorising is not in itself a 'bad thing', as some people seem to believe. And yet we should recognise that assessment is a way of teaching more effectively through understanding exactly what students know and do not know. Assessment is about several things at once. It is not about simple dualities such as grading versus diagnosis. It is about reporting on students' achievements and about teaching them better through expressing to them more clearly the goals of our curricula. It is about measuring student learning; it is about diagnosing misunderstandings in order to help students to learn more effectively. It concerns the quality of teaching as well as the quality of learning; it involves us in learning from our students' experiences, and is about changing ourselves as well as our students. It is not only about what a student can do; it is also about what it means he or she can do. This perspective on assessment is compatible with the view of teaching and learning permeating this book.

Simple models of assessment

I now want to try and unpack this rather complicated-sounding way of thinking about assessment by contrasting it with simpler ones. We have seen repeatedly (especially in Chapter 5) how assessment plays a critical role in determining the quality of student learning. If students perceive that their learning will be measured in terms of reproducing facts or implementing memorised procedures and formulae, they will adopt approaches that prevent understanding from being reached. The widespread use of surface approaches to learning, and the related fact that students may successfully complete their courses while never gaining an understanding of fundamental ideas which the teachers of those courses themselves desire their students to gain, together indicate that much assessment in higher education is flawed.

The main source of the deficiency is our own ignorance about how to do the job properly. University teachers frequently assess as amateurs when the task demands grave professionalism. The majority of courses and lecturers do not operate from the understanding of assessment outlined above, in which assessment is fundamentally about helping students to learn and teachers to learn about how best to teach them.

Using a theory 1 or theory 2 understanding of teaching, they subordinate the task of comprehending the quality of student learning to the requirement to define, select, classify, motivate and report on students. They regard assessment as an addition to teaching, rather than an essential part of it. It is symptomatic of this view that assessment techniques come to be regarded as being more important than the subject matter that the methods are assessing and whether they are assessing that subject matter properly. Questions such as 'How can I write a multiple choice item?' become more important than 'What effect on the outcomes of student learning is my use of this type of multiple choice test having?'

A view of teaching as the transmission of authoritative knowledge has little space to accommodate the idea that different methods of assessment may be appropriate for the evaluation of different parts of the subject matter, or that assessment techniques themselves should be the subject of serious study and reflection. In such a conception, lecturers see teaching, learning and assessment as tenuously related in a simple linear sequence. Assessment is something that follows learning, so there is no need to consider its function as a means of helping students to learn through diagnosing their errors and misconceptions and reinforcing their correct understandings. Assessment, like teaching, is something done to students. As teaching tells information and procedures, so assessment classifies the students on the criterion of how well they have absorbed the data thus transmitted. What could be simpler?

In this view, because most students are fundamentally lazy, and the bright ones few and far between, assessment performs a vital secondary function of motivating students; the threat of failure in a competitive situation is required to stimulate them to attend lectures and practicals and to do at least some private study. From this perspective, it is believed that whatever assessment method is used, the clever students are likely to come out on top, as long as opportunities for cheating (including plagiarism, copying and collusion) are minimised. Whether the questions are tests of understanding or of basic facts, the same thing will happen. From this perspective, it is in any case necessary to test students' knowledge of facts and details to ensure that they have a foundation upon which they can proceed to relate them to the actual problems in the discipline that they will confront later in the course. (This 'building block' conception of curriculum, as we noted in Chapter 8, makes use of an assumed identity between the established structure of knowledge in a subject as it is represented in textbooks and the best way to teach and learn that knowledge).

'Learning', from this perspective, is adding quanta of knowledge to

one's store of knowledge: thus, assessment is seen as an activity that should test how much has been added. From this point of view, good assessment will provide objective data about the amount of a student's knowledge relative to that of other students in the class. It is valuable to describe this knowledge in terms of a single grade or number. Because students are always out to subvert the system by doing as little work as possible, an apparatus of security and privacy must be erected against fraud. Highly controlled assessments, typically unseen closed-book examinations, measure how much knowledge has been acquired, while at the same time ensuring that cheating is kept to a minimum and reducing the subjectivity attached to attempts to grade essays, reports and project work.

Although the above description may appear to some readers to be a parody of good practice, I meet plenty of lecturers who would assent to most of these propositions. It is still common to see courses assessed entirely by final examinations, which in some subject areas consist chiefly of multiple choice and true/false items. It is quite usual for lecturers to regard assessment as having a purely 'summative' function (serving to report on students) and as having nothing to do with teaching them at all. And no unbiased study of the written machinery of assessment procedures could fail to conclude that we think students are at heart plagiarists and cheats.

People sometimes argue that the feedback function of assessment—its teaching aspect—and the process of making judgements about students' ability should be kept strictly separate from each other. Similarly, it is occasionally asserted that grades based on comparisons between students (known as 'norm-referenced assessment' in measurement jargon) should be seen as distinct from grades based on whether a student has achieved a particular standard ('standards-referenced assessment' or less correctly, 'criterion-referenced assessment'). What is happening in these cases is that their protagonists (including several writers on teaching in higher education) are seeing the world of assessment in terms of absolutes: diagnosis vs. judging, or teaching vs. reporting, or comparison vs. categorical standards. It is helpful for us as teachers to be aware that many educators tend towards these rather dogmatic views on assessment. The open-minded and more complex understanding represented in Rowntree's book (1977) is unusual.

These conceptions of assessment run, in their different ways, almost exactly counter to the principles of good teaching that we considered in Chapter 6. They ignore the disastrous effect of threatening assessment procedures on approaches to learning. They consider the different aspects of teaching and assessment as independently selectable,

unrelated pieces, not bound together by any concept of educational quality. Nothing is said about evaluating teaching through assessment; about using assessment to encourage interest, commitment and intellectual challenge; about using it to make our expectations unequivocal; or about using it to enhance independence and responsibility. They often focus on the divisive and competitive elements of grading, and instead of showing respect for learners as partners on a road to understanding, treat them as unworthy of trust; they may reveal an obsessive interest in security and cheating and exalt techniques for reducing the incidence of fraud. They seem to maintain that some kind of absolute standard of validity in assessment is possible, as if every measure and its interpretation could be set free of its errors— in student assessment if not in any other field of human endeavour. Instead of seeing feedback on learning as a primary task of all teaching, they either ignore it altogether or place it in a rigidly separate category from making a judgement about a student's achievement relative to other students.

Seen from the point of view of our understanding of good teaching, these are upside-down views of teaching and learning, administratively convenient perhaps, but educationally impotent. They ignore what we know about students' perceptions of effective university teaching, and they demonstrate a flagrant disregard of our knowledge of the relation between educational practice and high-quality learning.

More developed models of assessment

There is a connection between different ways of thinking about assessment and the quality of student learning. A view of assessment as being primarily about the allocation of rewards and punishments to students through the grading process is part of undeveloped theory of teaching. These ideas are reflected in students' cynical and negative attitudes towards the subject matter and in superficial approaches to studying it. Seeing assessment as an external imposition to be negotiated in order to earn a grade, rather than a way of learning and of demonstrating understanding, is an optimal recipe for surface approaches.

Assessment that is the servant rather than the master of the educational process will necessarily be viewed as an integral part of teaching and the practice of improving teaching. A sophisticated theory of teaching leads directly to the proposition that the assessment of students is above all about understanding the processes and outcomes of student learning, and understanding the students who have done the learning. In the

application of these understandings, we aim to make both student learning and our teaching better.

Now this implies that assessment is happening continually, both formally and informally. Listening to what students say in a tutorial is as much assessment as reading their exam scripts and assigning marks to them. Assessment always involves making fallible human judgements, whether its chief purpose is to report on students or to give them guidance on how to improve. This just as true for the design of a practical test in surveying as it is for marking a history essay. There are no error-free tests. Assessment does not just occur at the end of a course, whether we use continuous assessment methods or not; judgements are being made by students and teachers about progress all the time. By no means does this view of assessment exclude the use of complex measurement procedures or multiple-choice questions to evaluate what students learn; but these quantitative techniques are seen as media through which fuller and more useful descriptions of these different outcomes can be achieved.

Assessment is not a world of right or wrong ways to judge or diagnose, of standards versus improvement, of feedback versus certification. It is in reality a human and uncertain process where these functions generally have to be combined in some way. For example, although we may say that we wish to assess only whether a student has achieved the objectives of a course, rather than how well he or she does compared with others, in practice we consolidate the two functions. It is impossible to interpret a student's performance unless we compare it against a standard of some kind. The standard is inevitably, and quite validly, derived from what we know about other students at a similar stage of their progress—ideally, the whole population of other students at a particular stage of learning a particular subject.

Unless we understand assessment in this essentially relativistic sense— as a series of relations between the person whose work we are assessing, the quality of the outcomes he or she demonstrates in comparison with others, and our own understanding of what students know and do not know—there is little hope of using it to improve teaching. How will a teacher who understands assessment in this way go about defining what he or she will assess, and selecting and using assessment techniques? What help is available to teachers? In the remainder of this chapter, I want to examine aspects of this desirable understanding of assessment, by means of a general discussion of the connections between underlying principles and their realisation, and through considering some examples of good practice.

Assessment and the content of a course

What is worth assessing? It is tempting to take a nonchalant approach to this question, and simply to answer that assessment should test knowledge of the content of the syllabus. But if we operate with a well-developed understanding of assessment, we will remember one of the principal lessons that we learned from looking at students' experiences of the context of learning. It cannot be repeated too often. From our students' point of view, assessment always defines the actual curriculum. In the last analysis, that is where the content resides for them, not in lists of topics or objectives. Assessment sends messages about the standard and amount of work required, and about which aspects of the syllabus are the most important. Too much assessed work leads to superficial approaches; clear indications of priorities in what has to be learned, and why it has to be learned, provide fertile ground for deep approaches.

Good teaching thus implies a considered selection among the content of the subject area of which aspects will be formally and informally assessed, together with explanation of their relative importance. The aims and objectives of the course should be devised at the same time as the teacher thinks about their assessment (see the advice and examples in Chapter 8). The central outcomes of the course—those fundamental concepts and skills that define competence in the subject at this stage of progress—will have been carefully articulated and linked to the assessment methods used. The teacher will have made every effort to make the criteria for assessment explicit and public rather than hidden and vague.

A great deal has been written about different levels of cognitive activity in relation to assessment, much of it based on the work of Benjamin Bloom and his associates (Bloom *et al.* 1956). The scheme most often discussed contains six levels, ranging from knowledge, through comprehension, application and analysis to synthesis and evaluation. What is often not understood is that in Bloom's scheme the levels are strictly hierarchical; being able to work at what he calls the 'transformational' levels (that is, at the level of analysis and above) implies an ability to operate at the lower ones. It is often not necessary—and it may be detrimental to student learning—to have separate assessments at each level.

Unfortunately, it is so much easier to set assessment questions at the lower levels of recall of knowledge than at the higher ones of its analysis and evaluation, especially in subjects that involve mastering quantitative procedures. Sometimes we deceive ourselves into thinking that these sorts of questions really do test understanding. Naively, we frequently

infer higher-level skills from lower-level ones. Writing and marking questions that require understanding is like all good teaching: it is challenging, tricky and time-consuming. It is scarcely surprising to find numerous examples of university examination questions—generally in science and social science subjects—that can actually be answered without any understanding at all of the fundamental principles which the lecturer says he or she is testing. Many lecturers will deny that this happens; yet the facts could not be plainer. Beard and Hartley (1984) and Elton (1982), for example, quote several studies over the past thirty years that have analysed the content of examinations in university science and medicine courses. These analyses show how the majority of questions test no more than the isolated recall of factual knowledge or the straightforward application of principles to familiar problems.

A primary danger avoided by the teacher who thinks about assessment in terms of what essential understandings he or she wants students to acquire is this tendency to focus on assessing isolated parts of the curriculum at the expense of the higher-order principles that link the parts together. Although it may well be important to know whether a student can remember a formula and substitute correctly into it in chemistry, or identify the effect of a specific drug on an animal in pharmacology, or connect an artist's name and dates to a painting in art history, it is generally preferably to assess these matters as part of the measurement of broader, more integrative concepts and skills. This is mainly because the separate assessment of basic skills and knowledge, unless clearly flagged as a relatively unimportant part of the whole assessment process, may lead students to focus on these activities rather than on ones related to understanding.

The teacher with a developed understanding of assessment will strive to connect his or her goals for learning firmly with the assessment strategies he or she uses. Questions in every formal examination will be carefully reviewed to ensure that they cannot be answered merely by recall; the proportion of questions that involve elementary applications of principles to problems will be kept small.

This teacher will also be thinking carefully about the related need to assess students' values and commitments to the subject area (see Rowntree 1981:188–90). These aspects of competence, whether implicit in other objectives or explicitly stated in the curriculum, are too rarely addressed in formal assessments. Their achievement is generally revealed in how a student applies knowledge to unfamiliar situations—an experiment that refuses to work, an author that has not previously been read, a new problem in the analysis of an economy's performance.

Teachers who teach from this perspective will assess commitment to and interest in the subject, the extent to which the student values ideas and procedures in it, and the progressive development of independent thinking in relation to it. This implies that attitudinal aspects of subject competence must be included in a course's aims and objectives; courses operating with a well-developed conception of teaching include such goals, and assess them systematically. Among the original objectives of the problem-based medical course at Newcastle (Australia), for example, were requirements such as being prepared to invest time in the further development of medical knowledge and skills over and above the pursuit of higher qualifications, having a positive attitude to preventing illness, and having an awareness of how one's own anxiety and prejudices may alter patient attitudes and behaviour. The assessment methods were designed so that they explicitly tested each of these objectives (see Engel and Clarke 1979).

We will consider the application of these principles in more detail when we look later in the chapter at several examples of how teachers have gone about assessing their students.

Choice of assessment methods

Just as we should inform our choice of teaching methods by the nature of the subject matter we are teaching, so in our choice of assessment methods we should consider our goals for student learning. There are two things to remember in selecting methods of assessment for any course. First, the methods themselves are not what determine learning; it is how students experience the methods that matters. Second, there will rarely be one method that satisfies all educational objectives. A willingness to experiment with a variety of methods and to monitor the effectiveness of each method in helping students to learn, and in helping the teacher to measure their progress in an area of learning, is characteristic of a thoughtful approach to teaching.

If we see assessment as being about finding out what students have failed to learn, or as a way of comparing the weakest against the brightest, variety in assessment has decided disadvantages. It is so much more difficult to combine the results from different methods than to add up the marks from one method; students have an awkward habit of performing inconsistently on different tasks. It is by no means unusual to find that the marks from practical assignments and project reports correlate poorly with examination results, for example.

Our understanding of the way students learn leads us to see that these are not educational problems at all. They are actually desirable outcomes:

any one-dimensional measure of a person's achievement in many different tasks is almost certainly inadequate, and may be entirely misleading. Uniformity of methods makes comparisons superficially easy but forces students into a situation where they may not be able to display what they have learned, and where there are often hidden rewards for conformity rather than originality. Thus we observe a well-known phenomenon in assessment: the marks come out in a handily consistent and easily comparable way, but judgements made about student ability on the basis of these marks are frequently invalid. The measuring instrument is perfect, but it is measuring a trivial or irrelevant thing.

Generally, the more predictable, more narrow, and the more conventional the learning outcome that is measured is, the more likely it is that assessment will produce consistent results. This consistency is known in measurement terminology as the 'reliability' of a test. Tests of simple recall are usually highly reliable (see Elton 1982:115). An additional incentive for lecturers to test like this is the fact that, as we have seen above, it is rather easy to think up hard questions about specific information, procedures and details. It is more difficult to construct questions that demand and reward an understanding of concepts, disciplinary or professional processes of thinking, and their related evidence and procedures. It also takes more time to mark such questions. No wonder we sometimes beguile ourselves into thinking that imitation assessment is the real thing, especially in large undergraduate classes.

An alternative approach is to think about assessment less as a way of getting a single score for comparative purposes, and more as a means of providing opportunities for students to demonstrate how much they understand. A conception of assessment for learning first and grading second implies the use of a spectrum of methods. A greater variety of methods may be administratively inconvenient, but it offers more latitude for students to display their knowledge, and it has the potential to provide a more accurate—though more complex—depiction of each student's achievement. We have seen how students' perceptions of the degree of choice and independence offered in a course are associated with positive evaluations and deep approaches to learning. An important way in which we can accommodate students' preferences is through providing a variety of assessment methods. Variety in method, which we may usefully combine with a degree of student choice over the methods themselves—such as examination vs. essay—will tend to encourage greater responsibility for self-direction in learning.

Yet variety in methods is insufficient in itself; how do we decide which methods, and in what proportions? Contextual features such as the

number of students we are assessing will partly determine these answers. But the most important criterion that a competent lecturer will use in choosing a method is its relevance to the aims and objectives it is supposed to test. No rules can be given for applying this criterion, any more than rules can be given that will avoid subjective decisions about a student's achievement; we have to exercise professional judgement to decide whether a project report, an examination, an observation of a practical activity, or any combination of the dozens of possible methods is the most applicable to a particular situation. This is not the place to give a detailed description of different methods themselves; the further reading given at the end of the chapter provides good sources of ideas. At the very least, all teachers should be aware of the existence of an assortment of methods in all subject areas, ranging from multiple choice questions, online tests, short answer examinations, essays and lab reports, through to quizzes in class, student presentations, simulations, clinical exercises, self-assessment and assessments based on the products of groups.

We should think carefully about the possible dangers of using some methods rather than others. Ease and tradition are no more likely than innovatory methods to be efficient and effective. Many conventional practical tests and traditional assessments that occur regularly throughout a course consume prodigious amounts of staff resources in marking and student time in preparation. Much wider use could be made, with educational as well as economic benefits, of methods which emphasise students' cooperative work, rather than competition against each other; of self-assessment techniques; and of short answer questions which are geared to measuring understanding (in preference to multiple choice tests). Rowntree (1977), Gibbs *et al.* (1988a) and Crooks (1988) are three important sources of further information about these techniques. Boud (1989) has given a particularly useful overview of the problems and possibilities of student self-assessment.

Feedback to students

Entwistle's investigation of first year engineering students in Scottish higher education (Entwistle *et al.* 1989; see also Chapter 8) showed that an important contributory cause of student failure was an almost complete absence of feedback on progress during the first term of their studies. Some students only realised they were in danger of failure after receiving the results of the first end-of-term examinations; even then, they were usually not given information that would enable them to improve. They simply suffered a sense of demoralisation and their problems became

compounded by an ever-greater reluctance to seek help (Entwistle 1990:10).

It is impossible to overstate the role of effective comments on students' progress in any discussion of effective teaching and assessment. Students are understandably angry when they receive feedback on an assignment that consists only of a mark or grade. I believe that reporting results in this way, whatever the form of assessment, is defrauding students. It is unprofessional teaching behaviour and we ought not to tolerate it. We will recollect that the most important question on the teaching performance indicator questionnaire was 'Teaching staff here normally give helpful feedback on how you are going'. It seems that beneficial information about progress is valued even more by students than qualities such as clear explanations and the stimulation of interest. What directs the actions of lecturers who give no information to students about their progress? It is probably a mixture of motives. Fear of losing one's authority by revealing the reasons for low marks; a mistaken notion that providing students with feedback is somehow helping the dull ones more than they deserve; sheer laziness about making the effort to compose model answers or meet students—these are among the reasons.

As we saw in our discussion of teaching strategies, there is no sharp dividing line between assessment and teaching in the area of giving comments on learning. A lecturer or course applying a sophisticated understanding of teaching is aware that every evaluation of a student should be valuable to the student as well as to the lecturer. Among the features of such assessment will typically be formal, timetabled opportunities for students to discuss their assignments, reports or examination answers with academic staff; repeated informal assessments of students in class, designed with the intention of understanding their achievements and informing them about their progress in a way that is readily comprehended; and written comments on work which are genuinely useful to students. No assignment should be set unless the lecturer who sets it is prepared to discuss with students what an appropriate answer to it would have consisted of. The prudent use of model answers, either taken from students' work or specially written by the lecturer, is an excellent form of feedback.

As we have previously seen, this way of looking at teaching conceptualises the relationship between student and teacher as an interaction or *dialogue* rather than a one-way communication. The teacher shows that he or she is interested in what the student is saying; he or she seeks evidence or clarification, or tries to persuade the student to think about the issue in a different way, perhaps by asking provocative questions.

Negative comments will be carefully balanced by positive ones; great delicacy is needed if critical feedback is to have the effect of helping students, especially inexperienced ones, to learn something rather than to become defensive or disheartened. Sarcasm comes too easily to many teachers. Learning how to find the right tone and level of specificity of feedback is another of the difficult arts of teaching that has to be mastered if we want consistently high-quality learning outcomes.

In large classes, lecturers find it difficult to provide this level of individual feedback quickly on practical reports or essays. As students generally find timely feedback far more useful than delayed comment, a possible alternative in this case is to examine the assignments for typical misunderstandings and to list these errors, together with brief explanations and recommended further reading, on a numbered feedback sheet, a copy of which is returned with every assignment. We can simply identify most errors by numbers on the student's script. Specificity of comment to the subject matter and the particular errors in understanding is very important indeed in this case: generalised comments ('Rambling construction, lacking continuity' 'Superficial treatment', 'Figure not necessary'—and the like) are quite useless. Multiple-choice questions provide another excellent opportunity to offer feedback in an efficient form. Comments on multiple-choice tests—if they are given at all—are usually limited to a score indicating the proportion of right answers obtained. Students do not know which questions they have got wrong, why they are wrong or what the correct answers should be. Yet it is a relatively simple matter to provide students with the marking key for such a test and to provide short explanations of the basis for the correct answer.

Gibbs described an early computer-based testing system of this type that still has relevance. The student takes the test at the computer, which is programmed to supply printed tutorial comments, written by the test author, for all the items that the student has answered incorrectly, as in the following example:

Student Progress Report
Student   A.N.Other
Survey No.   1
Biochemistry Test No.   3
You correctly answered 23 out of the 25 questions in this survey.

Amides are generally neutral. The carbonyl removes the basic properties from the adjacent-NH2 or-NHR.

Oxidation of a mercapton (thiol), RSH, causes two molecules to link to give a disulphide RSSR and water is eliminated.

(Gibbs et al. 1988a:77–8)

A similar example of generic feedback can be found at http://www.autc.gov.au/forum/papers/AUTCnn.ppt

An understanding of assessment as part of teaching will lead to the design of opportunities for students to make mistakes and advance their understanding through making these mistakes. Effective ICT of the simulation or intelligent tutorial type, some of whose characteristics I briefly discussed in the previous chapter, incorporates exactly this type of teaching.

It is worth emphasising that it is not always necessary for academic staff to give feedback: students can often learn more from formal or informal assessment by their peers or by themselves. Giving comments on another student's work, or being required to determine and defend one's own, not only increases a student's sense of responsibility and control over the subject matter; it often reveals the extent of one's misunderstandings more vividly than any other method. It is therefore an important form of cooperative teaching. Svensson and Högfors (see Chapter 8) have described how students' ways of thinking about physics concepts can be improved through this strategy. Svensson and Högfors recognised that telling someone else what you know about a concept is an excellent means of teaching yourself about it. We can all understand our mistakes better through having to put our ideas into words for the benefit of another learner.

Assessment should also serve a feedback function for teachers. I shall have more to say about the way in which assessment can be used to enable us to refine our teaching practices through telling us about our students' learning later in this chapter and in Part 3.

Making expectations clear and encouraging student autonomy

Discussing assessment expectations with students is a principal means by which a lecturer can reinforce the view he or she has expressed in the description and teaching of a course that understanding rather than recall of isolated detail is *required and will be rewarded*. Underlining this requirement cannot be done too often; students will have had many experiences of being told that a course is about comprehension, synthesis and application and of finding out that the assessment actually tests

reproduction of material presented in lectures (see Chapter 5). They will need some convincing that your course is different. If you use several methods, you will also need to explain the purpose of each method and how each method relates to the rest. If a particular assessment is to serve multiple functions, the precise arrangements should be made clear as well.

It is possible to help students to learn how to use assessments to display as much of their understanding as possible, and to develop a self-critical, independent approach to their work. For example, I—in common with many other teachers—have used assignments to encourage students to develop a self-critical attitude to their work through using feedback constructively. The same assignment is the basis for both feedback and a final mark that counts towards the course grade. Thus, there are two deadlines: students get detailed oral and written comments on the first draft and return an improved version that gets a mark. A similar approach involves students in being critics of their own work. They are provided with a grade, but no comments, in the first instance. They are then invited to write about the assignment or lab report's strengths and weaknesses and how they would improve it. In the second stage, complete feedback is provided and the grade may be improved—but never worsened— depending on the quality of the student's self-assessment.

Discussion of sample answers in class (see p. 187) or a dialogue focused on your meaning of such terms as 'discuss', 'evaluate', 'express your answer quantitatively' are useful means of making expectations clear, helping students to learn how to do their best in assessments, encouraging independence, and reducing the debilitating anxiety that assessment too often imposes. There need be no apprehension of reducing a student's anxiety too much: if a learner desires to understand, that inner pressure will always provide enough tension. The main point bears restating: good teaching helps students to become aware that educationally valid assessment is an opportunity to learn and to reveal the depth of one's knowledge.

Case studies of effective practice

We can now look at how some of these ideas have been applied to improving assessment in higher education. The first set of illustrations returns us to the experiences of teachers whose methods have been considered in earlier chapters. The remaining examples concern the use of new ideas about measuring learning to improve the diagnosis of misunderstandings and to make more valid judgements of achievement.

Assessment in an anatomy course

Eizenberg's assessment methods are explicitly designed to encourage and permit students to demonstrate their understanding of anatomical concepts; at the same time, they purposely discourage surface approaches. He appreciates that the wording of a question (for example asking for a description, or 'brief notes') may restrict the opportunity to show understanding; similarly, asking closed questions in oral examinations ('What is this structure?') dismays students who have struggled to understand. He does not use multiple choice questions, citing evidence from his own students that, whatever their other merits, their negative effect in reinforcing the idea that learning anatomy involves the indiscriminate recall of bits of information is unacceptable. If multiple' choice tests are used, students soon gain the impression from previous cohorts that the test is 'really about' remembering facts, however well it is constructed; this inevitably directs their learning strategies.

The assessment in Eizenberg's course is tightly linked to the goals of the programme and the associated learning tasks. Knowledge and skills requirements for each component are displayed in the course handbook. The requirement to understand is continually restated. A variety of methods is used. Open-ended written questions in examinations are used to provide students with an opportunity to give explanations, subsuming descriptive information, of important principles. Other written tests involve describing characteristics of specimens. In oral tests, he attempts to establish a dialogue with students and to help explain their answers; if they get a wrong answer, he tries to help them retrace their steps to the source of the mistake.

In these ways, instruction and assessment are closely connected, with the teaching function of assessment taking first priority. Eizenberg uses assessment deliberately to learn about students' conceptions and misunderstandings, and as we have seen, his entire course has been structured around the important problems that students experience in understanding the essential concepts in the subject. He explained in an interview that he was still learning, however:

> It's one thing to read the answers in order to give a mark and quite another to really read what they have written to see how much they understand. It's amazing from reading answers to what you might have felt was an absolutely watertight question that you felt could only be interpreted in a particular way, to find a whole range of levels of understanding. To see the ways students interpret these ideas is

incredibly illuminating too: it helps me to help them. We can return to some misunderstanding whose origins might be quite subtle, but absolutely fundamental to their future comprehension.

Assessment in materials technology for interior designers

The interior design students in Atkinson's course receive plenty of feedback on their work through personal consultations and other types of assessment; notice how assessment is seen basically as a way of helping students to identify important concepts and perform to their maximum capability, while at the same time the information gathered through assessment is used by the teacher to revise the course:

> At various points in the course, I have tried to build in ways of checking on how they are learning. With the development of the user's guide we went through in class the process of identifying key objectives and meeting performance criteria; I later saw them in pairs and we considered together what they had developed. That enabled me to get some idea of how they were thinking and to suggest directions they hadn't thought of pursuing. It helped them to understand more about the professional process. The individual tutorial type classes, where you actually have a chance to have a conversation with the student over a piece of work, seem to provide me with valuable feedback on students' understanding in the way more formal assessments don't. I actually feel quite comfortable with that sort of interaction: I enjoy it, and I don't find it difficult to relate to students in that way. My students are very used to that—sitting down with a piece of work and having a chat about it. I try and provide opportunities where that can happen, and I find it helpful to learn about the problems they experience from their perspective. The information is useful for improving the teaching next time round. Outside class time, students do come and talk to me quite a bit, though there is always a problem of time.

I have suggested that variety in assessment methods, and the close articulation of objectives to the different methods, is characteristic of many effective university courses. The formal assessment in this course comprises four parts: the user's guide to a particular material, described in Chapter 9; a case study of the process of design of an existing interior; a take-home exam consisting of several problems in detail design; and an assessment of the effectiveness of a student's critique of another case study.

Each method offers an opportunity to test different aspects of student performance, and each is justified and explained to students in terms of the particular outcomes it is intended to test, so that students are left in no doubt about the goals of their study. All these goals, we have seen, involve understanding and application, surface approaches being explicitly penalised. To complete the user's guide successfully, for example, students are told that they must identify the information necessary to translate designs into reality, establish an accessible format, evaluate the information, and present it concisely so that the information forms part of a coherent argument. These objectives imply the exercise of diverse skills, including understanding the limitations and advantages of a material and being able to communicate effectively with tradespeople.

For the assessment of their ability to provide their peers with feedback, the main criterion is the quality and constructiveness of the information presented in relation to criteria for a successful case study, which are established cooperatively in class. Note in this instance how students are involved in assessing their own work indirectly—that is, through the device of assessing their ability to assess their colleagues.

As an additional aid to students, the teacher provides them with a model answer to a sample question similar to those presented in the take-home examination. This model answer is handed out after students have attempted the sample question in order to encourage them to learn from their mistakes and assess their own performance.

Aligned assessment in an animal science course

The key to assessment for learning in Hyde and Taylor's animal science course is continuous improvement of the coherence between assessment tasks, feedback, teaching strategies and course objectives. They have expressly applied research on students' approaches to learning. The outcomes of the course, as we have already seen, are related to developing students' understanding of realistic problems in structure and function in the context of agricultural animals. The objectives include the development of professional responsibility and independence in learning as well as other generic attributes such as communication skills and self-assessment skills.

Gradually, over a period of several years, the assessment has been more closely aligned to these desired learning objectives (Table 10.1), The old course had been assessed purely through a true/false final examination, which took minimum staff time but which many students failed. Small assignments were introduced which enabled students to obtain timely

Table 10.1 Examples of assessment aligned to learning in animal science

Core theme	Assessment tasks	Criteria and feedback
How do production animals maintain homeostasis?	Students choose three questions, access library resources, and apply information from key articles to address the problem in a report.	Extent of critical reading and interpretation and application of ideas in relation to content. Detailed individual, group and peer feedback.
How do animals cope with external stresses?	Students produce 'agfacts' style information sheet.	Clarity of explanation, accuracy of content, presentation. Individual, group and peer feedback in tutorial.
How do animals grow, develop and reproduce?	Groups of 3–5 work on topics, answering specific questions, reviewing a current research paper, and making an oral presentation.	Accuracy of response to specific questions and quality of presentation. Peer and staff marking at the time of presentation.

feedback through peer and staff assessment in tutorials. Clear assessment guidelines for students, linking objectives to tasks and including grade descriptors were then introduced, explicitly linking core themes to required knowledge—both generic and specific. Assignment questions were set which required reasoning and application to solve realistic problems. Students responded with significant improvements in the quality of their assessed work:

> We gave them a lot to do. We aimed to give them lots of early feedback, with an emphasis on the positive. We aimed to give them experience in different styles of writing: fact sheets, scientific reports, essays. We expected them to be working continuously. We saw a dramatic improvement in quality of work and they told us they did more work for this course than they did for any others. The students came to realise that they could be active in the process of changing the assessment alongside us…

Assessing the content of a humanities course

The revised course in Fifteenth-Century Italian Art for second year undergraduates, constructed by Hazel Lybeck and Barbara Yencken,

abandoned one of the traditional methods of assessment in their department—the Visual test', in which students were required to identify works of art presented under examination conditions (slides shown once for a few seconds). These teachers were aware that students disliked this type of assessment: the students had argued that it emphasised recall of trivial details and they found it very threatening. The teachers reached the conclusion that the test would, in addition to encouraging activities that were not aims of the amended course—memorising the names of the creators of visual images, for instance—discourage the achievement of several of its main objectives. These included learning how to look at diverse works of art with confidence and independence; relating reading and personal experience to the examination of works of art; understanding the assumptions underlying particular concepts (such as Michael Baxandall's concept of the 'period eye' (Baxandall 1972)); encouraging a questioning and critical approach to art history authorities and texts in general; involvement, cooperation and responsible criticism in class; and capacity to give a mature response to critical comment. The staff also reasoned that if students acquired these skills and understandings, they would be able to recognise the works of art on which they were based.

The new assessment regime incorporated tasks connected to the aims:

1   One paper based on the joint class presentation (see p. 163), in which students were required to discuss the processes whereby they arrived at their conclusions and to include material that arose from the class discussions (worth 35 per cent). These sessions, we will remember, involved learning about the material through having to explain it to other students.
2   One long essay, designed to test students' ability to research a topic independently and present an argument clearly and convincingly (worth 40 per cent).
3   A take-home exam designed to provide an opportunity to engage freely with a work of art in a limited time, but without the necessity of lengthy research or bibliographic apparatus (worth 25 per cent).

Observe how this course uses student assessment in a quite simple way to realise the principle of encouraging student independence and choice, and advocates in its methods the view that the programme will be both an enjoyable and a challenging experience for students. The students are treated as responsible participants in a search for understanding, answerable to each other and to their teachers for the quality of their learning.

Assessment for learning in a statistics course

Assessment in Dunn's statistics course (see pp. 140 and 170–1) is connected to learning and teaching by means of diagnostic exercises of different kinds. For example, students are required to carry out a small social survey and present its results; they then receive feedback on this exercise before submitting a report on a major survey that counts towards their final grade. Tests on statistical methods, whose marks do not count towards the student's final grade, are used to make clear both the teacher's requirements for understanding and to provide extensive feedback on performance.

There are deliberate attempts in this assessment regime to encourage and reward deep approaches. Note how, in the example shown (Table 10.2), students are required to explain the meaning of a concept, and interpret an equation, as well as perform calculations. They cannot answer such questions fully without a thorough understanding of the material. At the same time, they provide the lecturer with valuable information about typical misunderstandings, which he can then use to modify teaching, and work with individual students who continue to have trouble. In order to reinforce the application of statistical methods to professional practice, students are told that extra marks (as many as 10 out of a problem marked out of 20) can only be gained if they show how the principles involved can be related to practice.

Table 10.2 A question designed to test understanding of some concepts in statistics

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Last year a paper was published which reported a study of pedestrian behaviour in Sydney. The author looked at the relationship between pedestrian walking speed and shopping centre size (the latter being measured by number of shops). He got the following result:

Speed = 1.27 + 0.05 log *Size*
r = +0.60
(r is statistically significant at "the 1% probability of error")

(a) Briefly explain this result in non-technical words (7 marks)
(b) Explain clearly the *meaning* of the phrase "Statistically . . . error" (10 marks)
(c) What is the null hypothesis in this case? (4 marks)
(d) What is the *standard error* under the assumption of the null hypothesis? (4 marks)

Passing end-of-semester tests is made compulsory to ensure that students cannot pass the whole course without achieving a minimum level of competence in statistical technique. To encourage students to cooperate with each other and work responsibly together, Dunn often requires students to learn from each other in problem classes. They have to explain their answers and how they arrive at them to each other, prior to the teacher going around the class, checking and correcting answers.

Assessment methods in a problem-based literature course

In his literary studies course, Bill Hutchings has tried, as far as possible within his institutional context, to ensure that the ways in which students are assessed reflect the processes in which academics engage as part of their professional activity.

He awards 20 per cent of the course marks for students' presentations of their responses to problems of the type represented by examples 1 to 3 (page 167). Having set their own learning objectives and method of inquiry to solve the problem, students are assessed on several criteria:

- The content of their presentation in terms of its relevance to the course;
- Evidence of the research they undertake to investigate the problem;
- Their understanding of the background to the problem;
- The evidence of the research they undertake to investigate the problem;
- The quality of the argument that they develop;
- The originality of their insights into the problem.

They are also assessed on the quality of their presentations—in terms of the extent to which they engage the audience, the quality of their handouts and the clarity with which they give thoughtful answers to the questions of the audience at their presentation.

Students' written responses to problems of the type represented by example problems 4 to 6 (see p. 167) count for 40 per cent of the course marks. In responding to these problems, students are expected to engage in processes similar to those of the professional literary scholar. In this case, assessment covers the clarity and accuracy of the expression of their written work; the range and depth of their references to the literature; their ability to select and marshal material relevant to the topic; and the originality, creativity and freshness of their ideas.

At the end of these assessed problems, students must evaluate the way in which their group has worked together in terms of their communication, organisation, sharing of ideas, time management and target setting. They also assess their own contribution to the group and reflect on what they have learned from the process. This assessment does not contribute towards students' final marks but is instead designed to encourage them to think about their experiences of how the group worked together.

Finally, there is a seen examination paper, which contributes the remaining 40 per cent of the marks. The examination assessment is included as part of the assessment of these course units because university regulations stipulate that 40 per cent of the assessment process must take place under controlled examination conditions. Hutchings decided to allow the students to see the examination paper so that they were still able to engage in activities similar to those they had used in tackling the course units. In the last PBL session of each unit, students are given the examination paper that they will take for this course unit. The paper contains a problem that students can work on individually in preparation for the examination. Although students are not allowed to take any notes or written materials into the examination, having access to the paper prior to it allows them to employ the same investigative processes they had used throughout the module in relation to other examination questions. In each of these elements of the assessments, students are assessed as individuals rather than as a group.

Assessment as learning from students about their understanding

The lecturer who would teach from a conception of assessment as understanding the process and outcome of his or her students' learning was at one time faced with the problem that a view of learning as the passive absorption of quantities of knowledge was implicit in most accepted theories of educational measurement. The theory of learning underlying traditional testing regarded the acquisition of facts, skills and techniques as an additive process, rather like progressively building a wall by adding extra bricks. Competence became defined as the ability to reproduce these facts, skills and techniques.

This effect remains noticeable in disciplines such as the physical sciences where the achievement of quantitative skills and understanding of mathematical models needs to be tested. In this kind of assessment, students' answers are typically compared with a single right answer—or

narrowly circumscribed set of right answers—in order to establish whether a particular piece of knowledge is present. Diagnosis of errors is seen as the identification of gaps in the student's knowledge. The idea that variation in the kinds of wrong answer given by students might be pedagogically valuable information, or that studying the process of learning these wrong answers from the learner's own perspective could be a useful part of teaching, has been absent in conventional test methodologies (Masters 1989:153).

The last fifteen years have seen the development of different ways of looking at measurement in education. They have grown from an increased awareness of the importance of the active nature of most human learning and from an understanding of the way in which students' conceptions of subject matter and approaches to learning are related to achievement. This perspective draws on the ideas presented in earlier chapters and is perfectly harmonious with the conception of teaching advocated throughout the book. It accepts that students are engaged in a search for meaning and that even novice learners begin from a point where they display some understanding of the phenomenon being assessed. Understanding is not either 'right' or 'wrong': 'wrong' answers usually reveal partial competence and students apply the problem-solving methods from which they are derived rationally and consistently. Moreover, insights into the nature of these wrong conceptions can be gained from the qualities of the answers provided. These insights can then be used systematically to help students appreciate the differences between the desired conceptions and the ones they currently display (examples of this process may be found in Ramsden 1988b).

Assessment considered from this perspective becomes the servant of good teaching as I have defined it. It helps lecturers intervene to change students' conceptions through a greater awareness of their place in a hierarchy of understanding, and at the same time representing to students a conception of learning as being about moving from one way of seeing the world to another. This approach to measurement also helps teachers to use the diagnostic information to provide summative reports on students' progress that more truly represent whether a student understands the subject matter.

This form of assessment can describe, in a more human and individual way than any grade or mark (especially if it includes some narrative comment), the complexity of a particular student's achievement (see also Rowntree 1981:237). It can encourage a more responsible and self-critical view of one's own achievement: rather than assessment being 'something that is done to you' by a band of external experts, it becomes

'something that you have to make sense of. The results are relativistic rather than dualistic: they require interpretation to fit the particular requirement they are to be used for. Assessment of this type provides a highly informative record of a person's or a group's achievement, and is less likely to fragment and trivialise learning than methods based on long checklists of skills to be mastered or facts to be remembered.

The two examples of this kind of work summarised below employ sophisticated statistical models to describe progress and to help teachers understand their students better. The details of this methodology do not need to be presented here. It is enough to recognise that if a lecturer understands assessment in the way that I have proposed, he or she will neither fight shy of quantitative techniques nor believe that they will in themselves solve the problems of assessing students.

Using SOLO to assess medical students' understandings of key concepts

John Balla has used the SOLO taxonomy (see Chapter 4, especially Table 4.4) to assess medical students' performance in elementary statistics and behavioural science (Balla *et al.* 1992). SOLO, you will remember, places students' responses into predetermined, hierarchical categories according to the *quality* of their answers. The categories range from simple unstructured responses, which use irrelevant information, through to high level abstractions that use available information to form hypotheses based on general principles.

Balla and his colleagues begin from the propositions that medical education should aim to produce graduates who understand the scientific basis of their discipline and that assessment should help teachers towards knowledge of their students' developing conceptualisations so that they can develop appropriate teaching strategies. But most tests of students' knowledge in medical science either lack reliability or fail to measure understanding: thus, their results are of limited use both for formative and summative purposes. He then goes on to show how SOLO items can be written which assess increasingly complex understandings of a key concept (see Table 10.3 for an example from clinical decision analysis). The responses to the questions are graded pass/fail, and it is assumed that success at each higher level implies success at all those beneath it. (The validity of this assumption is tested using the probabilistic Rasch Partial Credit Model, which is also used to combine scores on the different questions. The technical details of the model are described in Masters 1988 and Wright 1988.)

Table 10.3 Example of an item used to test understanding of clinical decision analysis concepts in Balla's study

In a population of 100 in a village, 20 people have TB. All of them have a chest X-ray.
Nineteen X-rays show abnormalities that look like TB.
Further tests reveal that 18 of these abnormal X-rays are in people with TB.

(1)   What is the TPR (true positive rate) of X-ray chest for TB?
                                                               (Level: Unistructural)
(2)   What is the FPR (false positive rate) of X-ray chest for TB?
                                                               (Level: Unistructural)
(3)   What is the prevalence of TB in that population?
                                                               (Level: Unistructural)
(4)   What is the PV+ (predictive value positive) of X-ray chest for TB?
                                                               (Level: Multistructural)
(5)   Give a formula to work out PV+
                                                                  (Level: Relational)

(Note: students were provided with definitions of the technical terms TPR, Prevalence, Predictive Value, etc., on the question sheet)

Balla states that the computer software that allows the Partial Credit Model analysis to be run is easy to operate and produces almost instantaneous results. A lecturer can thus obtain much-needed insights into the conceptual development of his or students. The Partial Credit Model analysis additionally shows how difficult students find each step from one interval of conceptual development to the next, and which aspects of a topic are hardest for students. This information from students helps teachers to devise a curriculum that focuses on students' difficulties in learning this particular content; and the methodology allows the effects of changes to the curriculum to be evaluated in the same way.

Using knowledge of students' conceptions to assess understanding in physics

The second example is from our work some years ago in Melbourne on identifying the essential principles and concepts that underlie, and are necessary for a complete understanding of, important principles in mechanics such as Newton's laws, relative speed, frames of reference and independent components of motion. Traditional physics tests require students to recall appropriate formulae and apply them to particular examples; we were concerned to explore what these concepts meant to

students, and then to describe the hierarchical nature of the different ways of understanding in a way that would be useful to teachers. The different conceptions were organised into a limited number of ordered outcome categories for a particular problem. While in the first example above, the SOLO categories were used to write items, the categories in this study were derived from the responses to the questions. The research team included subject specialists who were able to verify the hierarchies produced from the point of view of teaching the subject matter.

Some of the tasks we used involved algebraic and/or numerical manipulations; others involved drawing graphs or pictures. In each case, students were asked to discuss their answers at length and to justify their conclusions to an interviewer. The discussions were then transcribed and analysed using the approach developed in Gothenburg by Ference Marton to explore students' qualitatively different understandings of a wide variety of phenomena, from elementary number facts to concepts in economics and chemistry. We also asked students to complete written versions of the questions, since that would be the form used by teachers when they used the questions to diagnose their students' understandings.

One example of this type of question, and the associated categories, is given in Table 10.4. This study led to a collection of different response categories for each question, which was then presented to teachers to assist them in examining misunderstandings in their first year physics classes. (The record of inferred levels of conceptual understanding was analysed using the Rasch Partial Credit Model mentioned above.) We also made suggestions, based on the practices of experienced lecturers, for teaching strategies which might be used to help students to change their conceptions, as well as for ways of combining the responses to produce an estimate of a student's progress for summative purposes.

Readers with a background in this subject might note how, in the example given in Table 10.4, a particularly difficult step in physics teaching seems to be typified in the problem of helping students to change their understanding from seeing relative speed in terms of two separate motions (conceptions 1 and 2) and the more elegant view of conception 3, where the independent motions are subsumed under a general system (see also Ramsden *et al.* 1991).

Table 10.4 A test of understanding in physics, showing assessment categories derived from qualitative analysis of first year students' responses

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Problem:
Martha and Arthur are running along a straight road at a constant speed. Arthur is ahead of Martha. Arthur's speed is less than Martha's speed. How far must Martha run before she catches up to Arthur, and how long will this take her?

Response category 3
Students who take this approach solve the problem by focusing on relative speed and relative distance. They focus on the 'gap' as the distance that Martha must run. She closes this gap at the 'catching speed'. The ground is automatically conditioned out of consideration in this approach. This suggests a sophisticated understanding of speed as a relative quantity. Most students in this category will solve the problem using:

$$\text{time to close gap} = \frac{\text{size of gap}}{\text{catching speed}}$$

Response category 2
Students who take this approach consider the motion of each runner separately with respect to the ground. Typically, they set up two separate equations simultaneously; or they may attempt to solve the problem graphically. Almost all students taking this approach understand that Martha and Arthur run for the same time, t, and use this fact in the answer. Some arrive at a solution:

distance Martha runs = distance Arthur runs + gap
$Vm \times t = Va \times t + gap$

Others fail to solve the problem because they do not incorporate the initial distance between Martha and Arthur.

Response category 1
Students who take the third approach focus on the motions of Martha and Arthur separately and, rather than trying to derive a general algebraic or graphical solution, adopt a 'trial-and-error' approach. Typically, they divide the continuous motion into discrete pieces and consider the relative locations of the two runners after a fixed interval of time or after one of them has run a particular distance (Zeno's paradox). This may or may not lead to a solution to the problem; usually, it does not.

Response category 0
Some students display a very unsophisticated understanding of the problem. They may produce one or more equations of motion and attempt to substitute into these equations. They may confuse acceleration and speed, believing that Martha must be accelerating if she is to catch Arthur. They always become lost and are unable to arrive at a solution.

Fourteen rules for better assessment in higher education

1 Link assessment to learning: focus first on learning, second on encouraging effort, and third on grading; assess during the experience of learning as well as at the end of it; set tasks that mimic realistic problems whenever possible; reward integration and application.

2 Never assess without giving comments to students about how they might improve.

3 Learn from your students' mistakes. Use assessment to discover their misunderstandings, then modify teaching to address them.

4 Deploy a variety of assessment methods.

5 Try to get students participating in the assessment process, through:
   - discussions of appropriate methods and how the methods relate to the course goals;
   - joint staff-student design of assessment questions and negotiation of criteria for success and failure;
   - self and peer assessment activities;
   - offering students responsible choice among different methods.

6 Give lucid and frequent messages, both in the assessment questions you set and in your course goals, that memorisation, reproduction and imitation will be penalised and that success in your courses will only be achieved through decisive demonstrations of understanding.

7 Think about the relation between reporting and feedback. Justify on educational grounds either the separation or the combination of the diagnostic and summative functions of a particular test, rather than blindly applying an algorithm such as 'No assessment for feedback should count for a mark' or 'Every assessment should count or students won't bother with it'.

8 Use multiple choice and other 'objective' tests cautiously, preferably in combination with other methods. When numbers of students and time permit alternative techniques (see 6 above), use these.

9 In subjects involving quantitative manipulations, always include questions requiring explanations in prose (such as 'What does it mean in this case to say that the standard deviation is 1.8?') as well as numerical examples.

10 Focus on validity (is what you are measuring important?) before reliability (is your test consistent?). Try to avoid the temptation to test trifling aspects because they are easier to measure than important ones.

11 Do everything in your power to lessen the anxiety raised by assessments.

12 'Examinations are formidable even to the best prepared, for the greatest fool may ask more than the wisest man can answer' (Colton). Never set an assignment or examination question you are not ready to answer yourself. Practise the habit of writing model answers to your questions and using them to help students appreciate what you want.

13 Reduce the between-student competitive aspects of assessment while simultaneously providing inducements to succeed against a standard (through using assessments of group products and deriving standards from several cohorts of students, for example).

14 Be suspicious of the objectivity and accuracy of all measures of student ability and conscious that human judgement is the most important element in every indicator of achievement.

Conclusions on assessment

I hope that you will be able to appreciate more fully the benefits as well as the problems of the processes by which we assess our students in higher education. Assessment's educational value depends on our understanding of its multiple purposes and how they are related, on our willingness to accept that all judgements about people's performance must involve human error, and on how successfully we integrate the process of making judgements into the job of teaching.

No other aspect of university education reveals more starkly the essential conception of teaching inherent in a course or a lecturer's view of the educational process. Much assessment still proceeds from an ingenuous conception focused on methods of collecting information and comparing the relative worth of different students. The other extreme, much less common—but equally naive—is to think that there should be no attempt to combine the process of teaching with the process of making decisions about progress in an area of learning.

I have been arguing for a view of assessment as being (a) a means of helping students to learn, (b) a way of reporting on student progress and (c) a way of making decisions about teaching. Functions (a) and (b) are inextricably linked: the two separate worlds of assessment called 'formative' and 'summative' in the assessment manuals do not exist in reality. There is only one world: in that world, candid diagnosis implies valid judgements about student achievement and appropriate changes to teaching. The connection between diagnosis and judgement is like a one-way street. There can be no truthful reporting or effective changes to teaching in the absence of faithful diagnosis of students' understandings.

The belief that getting to know about our students' learning and sharing those findings with them must take priority is an inescapable consequence of a view of teaching as process whose cardinal aim is to change students' understandings of the world around them.

These reflections on assessment and teaching take us conveniently to the point where the final section of the book, whose concern is with how to evaluate and arrange for the improvement of teaching, can begin. Evaluation of teaching, like the assessment of students, is about learning; while improving teaching, like the improvement of students' learning, is about changes in understanding. Much of what we have learned about assessment is therefore applicable to evaluating teaching.

Further reading

There are some who believe that the critical stance on traditional assessment methods adopted in this chapter has been overtaken by a revolution in university assessment practices that occurred in the 1990s and early 2000s. For an excellent analysis showing how far this is from being true, and how far most current practices are from being good practice, see the outstanding review:

Elton, L. and Johnston, B. (2002) 'Assessment in universities: a critical review' (York: Learning and Teaching Support Network Generic Centre). Download from http://www.ltsn.ac.uk/genericcentre/docs/Critical%20review%20 of%20assessment %20research.rtf

For robust practical advice:
Biggs, J. (1999) 'Assessing for learning quality: I. Principles' and 'Assessing for learning quality: II. Practice'. Chapters 8 and 9 of *Teaching for Quality Learning at University,* Buckingham: SRHE and Open University Press.

For a review of techniques in self, peer and group assessment, the LTSN Generic Centre's Assessment Series Briefing Paper no. 9 is useful. Download from http://www.ltsn.ac.uk/genericcentre

Part 3

Evaluating and improving quality

Evaluating the quality of higher education

> The sole question is, What sort of conditions will produce the type of faculty which will run a successful university? The danger is that it is quite easy to produce a faculty entirely unfit—a faculty of very efficient pedants and dullards.
>
> (A.N.Whitehead)

In one sense, all this book is about evaluating the quality of university education. Evaluation is a way of understanding the effects of our teaching on students' learning. It implies collecting information about our work, interpreting the information and making judgements about which actions we should take to improve practice. To reflect on what helps students to understand a concept or argument, and to apply the results to teaching—that is to engage in evaluation. To experiment with a new way of assessing students, and to monitor its effects on the quality of their learning—that is to engage in evaluation. To listen to a student describing his or her approach to learning a topic—that is also to engage in evaluation. Evaluation is an analytical process that is intrinsic to good teaching.

The case studies of lecturers describing their experiences of teaching in Part 2 showed that good teachers are always evaluating themselves. Later in this chapter, we shall look in more detail at some of the evaluation methods that three of these teachers used. Their experiences demonstrate that evaluation is best conceptualised not as something that is done to teachers by experts wielding questionnaires and spreadsheets, but as something that is done by teachers for the benefit of their professional competence and their students' understanding.

Evaluating teaching concerns learning to teach better and exercising control over the process of learning to teach better. It is about

imaginatively testing out educational ideas in practice. To understand and practise these principles is to put into action our preferred theory of teaching as making student learning possible.

In the first part of the book, I tried to show how we might come to understand effective teaching through an exploration of students' experiences of learning. Good teaching helps students move towards the achievement of high-quality learning. This is learning that embraces changes in conceptions of subject content, confident facility with the subject's syntax and methods, stable knowledge of its specific details, and a sense of ownership and enjoyment in its practice. We saw how the students' perceptions served to highlight the properties of good teaching and how we might understand the quality of teaching in terms of different theories. The second part of the book sought to apply the idea of different conceptions of teaching to the improvement of our courses, teaching strategies and assessment of students. Both parts were addressed directly to practising individual lecturers and course teams. I hope that some of the practical examples given will encourage others to change their teaching methods so that they more nearly reflect the aim of promoting excellent student learning.

The remaining two chapters take us into a broader, more sensitive arena. When the first edition of this book appeared the 'quality movement' in higher education was a small cloud on the horizon. Now, it is impossible to address the issue of evaluating university teaching without being aware of its overarching presence. However, the three main issues to consider in evaluation and development of university teaching have not changed: the nature of good teaching; its measurement; and its promotion. From the evidence-based perspective I have used, it is ironic that most discussions of university quality continue to address these issues at a superficial level.

We will readily agree that teaching should be better, that students should enjoy the finest possible experience, that opportunities for those able to benefit from higher education should be widened, and that universities should be accountable for public monies they spend. But matters related to the measurement of performance in universities rather quickly lead to disagreement and defensiveness. The solution is not for us to hide away from the issues, but to try to understand them in order to take charge of them. We need to know about evaluation both in order to improve our teaching and in order to deal with politics of being evaluated. Accountability and the assurance of quality are topics inseparable from learning to teach.

What I want to try and establish in the last part of the book is simply

that the lessons learned about good teaching from an examination of how students perceive it should be applied to the process of evaluating and improving it. This means that we should focus evaluation on the student's experience of learning and base it on the best available evidence of what makes that experience better.

Evaluation and the nature of good teaching

Evaluation for accountability has become an essential part of today's university and the system of higher education of which it forms a part. The days when students' experiences and comparability of standards were in the background and unprofessional teaching behaviour was quietly tolerated have gone.

Unfortunately, the old order has not been replaced by a regime based on evidence of what makes student learning effective. The methods of accountability are evidence-based, but the experience they draw on is vested in a belief that a culture of lack of trust in academics can inexorably achieve the purposes of control. The concept of good teaching and scholarly analysis of the mechanisms by which it might improve student learning is left quite unexamined. Much more space and effort is devoted to measures and exhortations to measure than to what is being measured. We have to guess the goals of improvement from the tests that purport to indicate their achievement.

There is an exact parallel between this approach to measuring teaching quality and unsatisfactory ways of assessing students. Methods of student assessment should always be secondary to the vital preliminary question: What do we want our students to know (about the subject)? The equivalent question in the case of academic staff is: What do we want our teachers to know (about teaching their subjects)? Evaluation that will really improve teaching quality must follow similar principles to assessment that will genuinely help students to learn. The potential of some current approaches to encourage mediocrity, foster brooding resentment and dampen the desire to excel will be apparent to readers who have followed my arguments about the relation between educational goals, assessment and learning.

It is important, though, to avoid an over-reaction to external quality assurance. Doing so is bad politics and ironically one of the reasons why its power has become so pervasive. As we saw in Chapter 6, there is still a myth that teaching quality is a many-sided, elusive and ultimately indefinable phenomenon. The dogma runs along the lines that teaching varies too much across different subject areas to be tied down, is too

dependent on fallible human judgement, is too quirky for meaningful quality comparisons, alters in standard depending on the ability of the students, is too subjective and is ambiguous in its definition (is helping students good or is it 'spoon-feeding' and therefore bad?).

The myth that university teaching is so idiosyncratic a matter that we cannot define its nature may be mistaken one, but it serves a useful purpose. If you cannot specify a function, it is easier to resist pressures to determine whether it is being adequately performed. Stripped down, this argument against measuring teaching is based on little more than the idea that you cannot hit a moving target. It is about as reasonable. In the light of what I said in previous chapters, we can see that it rests on a convenient misunderstanding. We know what good university teaching is. We know that staff and students agree on what it is (see Chapter 6). We know how it helps students to learn, in many different subject areas. It is certain that good teaching is complicated and that it is a very individual, content-related and delicately balanced matter. It would be improper to inflict on academic staff a narrow definition, based on certain standard criteria, which left no room for the many different ways in which teachers can teach well. We nevertheless know enough to distinguish the existence of good teaching within these individual styles and subject variations. This means that it is possible for us to evaluate the extent to which effective teaching is going on, and to use the results to help improve its quality.

In summary, there are degrees of freedom in good teaching; but it exists, nevertheless. To reach the goal of useful evaluation—evaluation that actually helps teachers to do their jobs better—involves some careful steering.

Ways of understanding evaluation in higher education

Every recommendation about teaching evaluation and performance measurement made in this chapter can be derived from the propositions about successful course aims, teaching strategies and student assessment contained in previous parts of the book.

A developed understanding of evaluation corresponds to what I have previously called a theory 3 way of understanding teaching. It maintains that changes in our approaches to teaching are fundamental, and that the achievement of high standards requires a self-critical, professional attitude—an attitude that regards constant improvement as both natural and necessary. Wise teaching involves the application of understanding

in real situations, and its evaluation embraces a variety of carefully chosen and constantly updated techniques that focus on how effectively it affords student learning. The ultimate guardians of excellence in achieving these aims are not external forces, but expert responsibilities for enabling students to learn. This is an optimistic and relativistic theory of evaluation.

Simpler theories, in contrast, are based on ideas of absolute standards, knowledge as a quantity, and a more pessimistic view of the human potential for change. They start from the premise that teachers and courses are deficient. Academic staff and universities lack some essential components of effectiveness; they should be placed under close supervision until they have acquired these missing parts. Hierarchy, competition and league tables of customer satisfaction are the motivators that will induce them to add the skills and the knowledge to their repertoires.

The central issue to be faced now can be seen to be similar to those considered in Part 2: How can we apply a student-focused theory of evaluation to the process of measuring performance, for diagnostic and for judgement purposes? Can such a theory demonstrate that we are accountable to the public, to students and to funding bodies while at the same time improving the quality of teaching?

Figure 11.1 summarises some of the important theoretical distinctions that we need to understand in order to grasp the rather complicated arguments surrounding evaluation and quality assurance. Evaluation may be conceptualised along two dimensions. The first concerns levels of aggregation, shading from the evaluation of an individual lecturer's teaching through to the evaluation of courses, departments, programmes of study and institutions. The second dimension is to do with the major purpose and the originator of the evaluation. It ranges from the idea of evaluation as driven by the teacher who wants to improve his or her teaching to the idea of evaluation as the external assessment of teaching performance—with or without the underlying intention of improvement. We can illustrate this scheme by four examples: the evaluation of teaching by teachers; the evaluation of courses by teachers; the performance appraisal of individual staff; and the measurement of a department's teaching performance.

These distinctions should be useful in following the discussion, even though the lines between them are not rigid. Observe that a theory 3 conception of evaluation does not exclude the central importance of accountability and rewards, although its primary emphasis is on diagnosis, learning and improvement. A less developed conception, like a surface approach to learning, focuses on the extrinsic aspects, and stops at those; a more developed conception embraces both aspects.

Level of aggregation

Individual/small team

Accountability and rewards

Recognition of teachers, including promotion, qualifications and awards

Quality assurance of subjects, degrees and institutions

Purposeful reflection on teaching, including scholarship of teaching

Collegial review of modules, courses, departments and faculties

Group/university

Main focus

Improvement and learning

Figure 11.1 Two dimensions of evaluation in higher education

I now wish to look in turn at the process of recognising and rewarding good teaching, the processes of quality and subject review, and the process of evaluation by teachers themselves. The first two areas correspond to the top and bottom halves of Figure 11.1 respectively, while the third embraces the whole from an academic perspective.

Recognising, assessing and rewarding good teaching

It goes without saying that good university teaching should be recognised and rewarded in proportion to its contribution to student learning. A focus on learning rather than teaching has become a mantra of academic staff development. But universities less commonly follow through the most important implication of this view is in practice. There remains a tendency to focus more attention on the teacher's technique and the teacher's values—what the teacher does and thinks—than on his or her scholarly capacity to interpret and use evidence to improve student learning. Both aspects should of course inform each other. However, application and appreciation of research evidence about student learning is fundamental to good teaching and its evaluation. Try evaluating your own university's approach to recognising and assessing good teaching against the standards outlined below.

Among the plethora of schemes and definitions that now exist for describing and measuring effective university teaching—including criteria established by the Institute for Learning and Teaching, the Learning and Teaching Support Networks, and the Staff and Educational Development Association—the basics outlined in Chapter 6 remain the same. In operational terms, such as promotion and selection decisions, answers to a series of questions are required:

- **Planning and purpose:** What do you do to promote student learning of your subject? How do make clear to students what they have to learn? What learning experiences for your students have you arranged? Why are they appropriate?
- **Process:** What teaching strategies have you used and how closely are they focused on student learning?
- **Assessment of students:** Why are these the best assessment methods for achieving the objectives? How do you use assessment information to improve teaching?
- **Outcomes:** What are the effects of your teaching on the quality of student learning? How do you know?

- **Reflective self-evaluation:** What steps have you taken critically to evaluate your own work? What is the range and depth of evidence that you use? What have been the effects on improving your students' learning?
- **Communication and scholarship:** What have you done to learn from other teachers and to share your insights with other teachers? What steps have you taken to apply the best available evidence to improve your practice?

Above and beyond these criteria is a sort of derivative: the coherence or 'alignment' (Biggs 1999) that a person can demonstrate between each of them, between them and the six principles outlined in Chapter 6, and between the process of learning how to teach better and the criteria. The last-mentioned aspect is partly reflected in the final criterion above, but more fully captured in the idea of the 'scholarship of teaching'. This is the lecturer's expertise in applying rules and knowledge about good teaching to make decisions about student learning in particular contexts, their ability to connect their teaching strategies to research in their discipline, and their capacity to give due weight to all valid, relevant information about learning to make teaching better. These skills may extend into actively discovering and publishing new evidence about effective teaching and enabling other teachers to learn from it, although this is far from essential. I return to this idea of scholarship of teaching in the last chapter.

Certainly a formidable array of requirements—but if the measures used in your university do not include them, and especially the higher-order relations between them, then it may not be evaluating and recognising teaching effectively. A multistructural approach, focusing on the parts alone (see p. 55) is not enough: the relational aspect is crucial. From an institutional point of view, coherence is also necessary between criteria for selection, promotion, confirmation of appointment and teaching awards.

If we are looking for a simpler model in selection and appointment, then it is far better to focus on a person's commitment to teaching and students rather than on a list of skills. The three most important generic areas to evaluate are then:

- Positive attitude towards students;
- Ability to communicate well with other people;
- Lively interest in improving teaching through reflection and action (see Ramsden 1998:179).

We can go further, and assess our university's or our professional association's competence in recognising teaching by comparing their methods and criteria with recommendations derived from the basic ideas of good teaching and assessment that we have already explored. In brief, a proficient system will:

- Articulate explicit criteria and, critically, the relations between these criteria and student learning;
- Reward the reflective application of knowledge to improve teaching;
- Specify minimum standards for professional teaching, including basic skills development;
- Align the methods of evaluating and rewarding teaching with the university's particular strategic goals; for example, a research-intensive university might give special emphasis to the recognition of teaching-research links; a new university might give greater stress to teaching skills associated with wider participation;
- Provide formal rewards through promotion. In one study, nearly eight out of ten academics said that taking account of teaching in promotion was likely to have a considerable or great effect on improving it (Ramsden and Martin 1996);
- Minimise differences in the processes for evaluating and rewarding research performance and teaching performance (and ideally, reward success in linking research and teaching as complementary parts of academic work);
- Use valid methods of assessing teaching, with more weight being given to peer review, research-based approaches and portfolios of evidence than to student ratings;
- Emphasise intrinsic as well as intrinsic rewards, including commendation and support from heads of departments and other academic managers;
- Monitor the system's own effectiveness as a means of recognising teaching, including the perceptions of the academic staff.

I shall have more to say about the issue of academic leadership and institutional support for good teaching—and its evaluation—in the next chapter.

Quality and review

It is hard not to be censorious of the 'quality movement' and its contribution to quality assurance in higher education. In its journey from

industry to universities, QA has metamorphosed from a practical way of achieving a better bottom line into a tool of control. Quality assurance in universities has more of the characteristics of administrative burden than an exciting intellectual journey. It seems to attract more than its fair share of supporters who are not in the top rank of scholars. It is more remarkable for vapid pronouncements than inspiring discourse. It badgers teachers instead of working alongside them. It also tends to constitutional dishonesty: it declares it is about one thing but it does another.

All these characteristics seem to be present whether an intensive subject inspection system or a 'lighter touch' of periodic institutional audit is employed. The variation is in degree rather than character.

Most external QA systems begin with lofty notions of improvement rather than audit, minimum bureaucracy, small opportunity costs for academics, minimum emphasis on inter-institutional comparison, and maximum support for sharing good practice. They soon enter the slippery slope. The narrative of regression from cooperation to inspection is simply told. Extra paperwork becomes needed; administrative procedures are found to be too simple; the time of an audit is gradually lengthened; support for improvement is limited to lists of recommendations and demands; judgement starts to crowd out collaboration; and league tables are mysteriously crafted from non-comparative information. Agencies will typically argue that they view quality as 'fitness for purpose' and will judge a university against its own goals. This is a misleading view of quality in teaching and learning, since it sidesteps the basic idea that quality is about excellence, and excellence requires some understanding of the standards against which something will be measured. Standards imply external reference. It is one thing to be good at what you want to be good at; quite another to be good at what you need to be good at. Being splendid at building a house of cards is just not the same as being brilliant at designing and teaching a problem-based medical programme.

Perhaps it does not matter. In practice, quality audit systems tend quietly to overlook the idea of fitness for purpose and prefer a one-size-fits-all view of university performance that harmonises with a culture of increased government control. All universities then, it appears, should have the same high completion rates, should have the same high participation rates, should provide the same support to their students, and should provide the same research that enhances teaching. The impossibility of achieving contradictory goals has the advantage of keeping universities and academic staff on their toes and unsure about what will happen next. But does it enhance the quality of student learning?

The effectiveness of teaching quality assessment, quality assurance and quality audit as a method of enhancing the quality of higher education has rarely been presented as a hypothesis to be tested. It has simply been asserted as a self-evident truth—a fiat of quality. The validity of the proposition is by no means incontestable. Evidence that external QA in higher education has enhanced innovation and the quality of student learning is notably lacking. The desired primary change, greater political control and accountability, has led to a reverberation through the system which has made the achievement of the goal of improved quality harder rather than easier.

Why has this happened? The main reason concerns perceptions of reward and support systems. Quality assurance tends to make university people into falsifiers. They comply but do not commit. The mechanism in question corresponds to the effect of certain teaching and assessment methods on student learning. We find ourselves returning full circle to Sawyer's idea of imitation subjects, which we met earlier in the book. This time, though, it applies to us as lecturers and to the improvement of our teaching. In other words, academic staff and universities are likely to act as their students do when they perceive an assessment system to be inappropriate: they will learn to perform certain tricks in order to pass examinations in subjects they do not understand. They will not become qualified to teach and assess better, but to hide their inefficiencies better. If scoring well is important in either quality review or the assessment of learning, both staff and students understandably shift their attention towards activities that tend to maximise their scores. We soon reach the peculiar situation where 'success' may be bought at the cost of doing without the very thing that success is supposed to measure.

In the first edition of the book, I had some sharp things to say about the inappropriate use of student ratings as a means of appraising university teachers. That criticism applies more cogently now to the use of the apparatus of quality assurance to evaluate university courses, and in particular the fascination of ranking and league tables. Exotic manipulations of research indicators and subject ratings serve to remind us that there is nothing intrinsically valid about something that has numbers attached to it. An apple with a price tag on it is not necessarily a better apple, nor does it provide a less subjective eating experience. The league table advocates could do worse than to read and digest Peter Medawar's eloquently expressed views on the contrast between the natural sciences and the 'unnatural sciences':

It will at once be recognized as a distinguishing mark of the latter that their practitioners try most painstakingly to imitate what they

believe—quite wrongly, alas for them—to be the distinctive manners and observances of the natural sciences. Among these are:

(a) the belief that measurement and numeration are intrinsically praiseworthy activities (the worship, indeed, of what Ernst Gombrich calls *idola quantitatis*);

(b) the whole discredited farrago of inductivism—especially the belief that facts are prior to ideas and that a sufficiently voluminous compilation of facts can be processed by a calculus of discovery in such a way as to yield general principles and natural-seeming laws;

(c) another distinguishing mark of unnatural scientists is their faith in the efficacy of statistical formulas, particularly when processed by a computer—the use of which is in itself interpreted as a mark of scientific manhood. There is no need to cause offense by specifying the unnatural sciences, for their practitioners will recognize themselves easily; the shoe belongs where it fits.

(Medawar 1977)

We need to question the validity of external quality assurance processes not because we do not want to be accountable, but because they generally display a flawed understanding of the essentials of teaching and learning. Improving teaching, as I have asserted several times, implies that lecturers—and by implication, departments, faculties and universities—must learn. To help people learn, we must try to arouse their imagination. Does quality assurance by government agencies arouse the imagination? Does it inspire in us a vision of the future? Does it set us free to soar to the stars? The theory of learning underlying it is precisely the one that informs so much bad teaching: that motivational sticks and carrots should be employed to force people to learn things which appear to them as a series of meaningless signs and rules. The logical outcome of imitation university learning, entirely predictable from the studies of student learning we have met in earlier chapters, is to reinforce unsophisticated theories of teaching.

Taking charge of quality assurance

How can we improve quality assurance processes and use them to our advantage? The simple conclusion is that we must evaluate in a way that coheres with the principles of good teaching, learning and assessment. Coherent or aligned evaluation—evaluation that points in the same direction as the other aspects of good teaching—will:

- Focus on the student experience of learning;
- Be intellectually challenging;
- Challenge the often-spurious discourse of quality 'experts';
- Provide autonomy for those who are evaluated;
- Use the power of self-review;
- Treat areas for improvement as research problems, not congenital weaknesses;
- Be focused on feedback, improvement and peer judgement;
- Display confidence in the professionalism of university teachers;
- Ensure rigour and precision, using the best available techniques;
- Be evidence-based;
- Monitor its own effectiveness and adapt to new evidence.

Underlying these standards is an important value. An approach to ensuring and enhancing the quality of higher education should be collaborative and scholarly. Quality then becomes an academic issue, subject to scrutiny based on evidence and capable of being tested through peer review. Academics combine research, teamwork and intellectual ability to improve student learning and the student experience. A model of this kind keeps academic quality in the hands of academics and acknowledges institutional diversity (see Massy 2001). To be effective, it must combine the 'collegial' and 'managerial' as well as the improvement and accountability aspects. If it does these things properly, then its products can be assessed externally and its effectiveness measured against common criteria. It thus integrates the two lower boxes of Figure 11.1. I will explore further aspects of this integration in Chapter 12.

Student experiences and performance indicators

We have seen how for students the quality of teaching is not simply about 'satisfaction'. It is fundamentally about how effectively teaching engages them with learning so that the result is avoidance of surface approaches and an urging towards deep approaches.

An example of an evidence-based approach to evaluation is the course experience questionnaire (CEQ), to which I have already referred to several times (see especially Chapter 6). It is intended to fulfil the function of a performance indicator of teaching quality from the students' perspective. It also provides information that universities and faculties use to make improvements. Since the feedback and the audit functions are aligned, the CEQ functions like an effective assessment instrument,

simultaneously encouraging and rewarding the desirable outcome of teaching that enables student learning.

Unlike surveys based wholly on empirical studies of student satisfaction (see Harvey 1997) the CEQ is derived from the evidence that we have examined about student learning. The outcomes of learning are associated with approaches to learning which are in turn associated with the experience of appropriate assessment and good teaching. Note also that, consistent with our theory of teaching, the CEQ and the format of its questions is focused on student experiences, not on characteristics of teachers or curricula: the point is that what matters in determining the quality of learning is whether students experience clear goals, effective feedback, appropriate assessment and so on. It is not whether the lecturer makes the objectives clear; it is whether the students feel that the objectives are clear. This is far from being an abstruse distinction: it represents the difference between a teacher-focused and a student-focused view of evaluation.

In the last ten years the CEQ has been used in many British and Australian universities as an evaluation instrument and as a graduate survey. Ten years of time-series data from Australian graduates now provide a fascinating history of changes in the student experience and by implication the quality of learning (Long and Hillman 2000; Wilson *et al.* 1997).

The CEQ may be combined with other measures of teaching at aggregate (course, faculty and institution) level to provide an evaluation system for QA purposes that follows the model I have outlined. Since its results are collected cheaply and at national level, its value for accountability purposes is clear. But it is accountability based on academic evidence and facts about the quality of learning, not on quality assurance decrees. At the University of Sydney, a system of evidence-based teaching QA uses CEQ data as part of a management system for enhancing teaching quality in a research-intensive environment (see Table 11.1). I shall refer again to this system as an example of an institution-wide approach to improving teaching in Chapter 12.

Performance indicators may also be devised to evaluate particular aspects of the student experience at a university level, such as the quality of student assessment. They may be articulated in the form of a series of questions, based of course on evidence about the relations between the quality of student learning and assessment. You can then check the list against actual practice in order to identify areas for improvement and to monitor progress. I presented one such scheme, based on the principles we have been exploring, at the Australian Universities Teaching

Table 11.1 Performance indicators as part of a coherent approach to evaluating and recognising teaching quality

Performance criteria	Description of indicators
Student progress	Module pass rate
First to second year retention	Percentage of students still enrolled after one year
Graduate experiences	Scores on three measures: good teaching, generic skills, overall satisfaction
Student experiences	Scores on three measures: good teaching, generic skills, overall satisfaction
Employability	First destinations survey employment rate
Further study	First destinations survey rate of further study

- Scores on PIs are referenced to research-intensive university averages and compensated for field of study effects.
- Weighting is used to emphasise importance of the student experience in influencing the quality of learning outcomes.
- PIs are published at faculty level and used in academic development activity (see Chapter 12).
- Weighted averages influence resource allocation (c. $3.5M annually).

Committee annual conference in 2000 (http://www.autc.gov.au/forum/papers/AUTCnn.ppt). You will see how the list incorporates a check on its own quality and freshness by including a series of items about quality management for student assessment (Table 11.2).

Complementary to the use of PIs like these are self-review systems for departmental and faculty teaching quality such as those at University College London and at Sydney, which provide rigorous, collegial QA that is tailored to the special characteristics of the institutions concerned. Academics drive the processes. They are focused on improvement and sharing good practice, and provide coherence between student experiences and the structure of curriculum and teaching.

Self-evaluation of teaching and courses

> Evaluation is often viewed as a test of effectiveness—of materials, teaching methods, or whatnot—but this is the least important aspect of it. The most important is to provide intelligence on how to improve these things.
>
> (Bruner1966:165)

Table 11.2 Performance indicators for the alignment of assessment and learning

Performance criteria	Performance indicators
Goals (the clarity of the connection between learning outcomes and the method of assessment)	Statement about how assessment and learning are linked? Students consulted on criteria and process? Statement of what is required to succeed, rather than objectives and content? Attention to relative workload? Justification for use of particular method?
Feedback (the quality of the assessment methods as diagnostic tools)	Every task's requirements clear? Descriptors of levels of performance? Expression of feedback links individual performance to precise criteria? Aspects of poor performance linked to specific remedial actions?
Lifelong learning (the potential effect of assessment as a means of developing the skills of inquiry and independent learning)	Value ascribed to self-identification of goals? Value ascribed to self-identification of what is meritorious? Value ascribed to self-identification of implications of performance for action? Use of meta-assessment, i.e. students comment on achievement as part of the assessment? Assessment represents understanding, not simply tests it?
Quality assurance (the existence of methods for linking assessment to learning, continuously improving it, and subjecting it to peer review)	Statement about good practice? Mechanism for using assessment results to improve focus of teaching? Mechanism for monitoring/applying findings from student perceptions? Specific intervention when students not likely to succeed? Mechanism for benchmarking with other universities?

It is now appropriate to move our attention to what we might do as university teachers to evaluate the quality of our own work, with the overriding aim of improving the quality of student learning. The fact that a theory 3 way of understanding teaching defines evaluation as being about the process of making teaching better cannot be overemphasised. Evaluation is not at heart about collecting evidence to justify oneself, or about measuring the relative worth of courses or teachers. It is about coming to understand teaching in order to improve student learning.

From this point of view, then, the comparative and classifying aspects of evaluation represented by the various forms of quality assurance ought to be secondary to its major purpose of helping lecturers to learn how to teach better. The following premises, whose educational basis will be familiar from previous chapters, should apply:

1 Evaluation implies finding out how students and others—including yourself—experience your teaching and your courses.
2 It requires the collection of evidence from several sources. These sources must always include the students, who are in a unique position to comment on teaching and whose experiences of it determine the quality of their learning.
3 It involves the interpretation of this evidence before acting. The quality of this interpretive process is critically important to the success of the subsequent measures.
4 Evaluation processes should be coherent. The methods we use should be formally linked to the central idea of improving student learning.
5 Although it is always satisfying to observe positive results, the primary focus of evaluation should be on identifying areas for improvement rather than proving that something works. It is best if we see it as a kind of intellectually curious activity, almost a form of research, seeking to disprove hypotheses about the effects of teaching on students' learning and to establish fresh ones.
6 Evaluation is part of our responsibility as teachers towards our students. We should take the major role. We might ask for assistance from external experts, but we should never let ourselves be dominated by them.
7 Evaluation is a continuous and continuing process. It should occur before a course, during it, and after it. Evaluation on the first two occasions is generally more important than on the third. Certainly, evaluation at the end of a course cannot replace evaluation during it.

8 Evaluation is better if it is a cooperative but rigorous activity that permits teachers to learn from each other in a spirit of peer review and continuous inquiry.
9 All evaluation methods, if they are to help teachers to learn, should seek to minimise the threat occasioned by a display of their strengths and weaknesses.
10 The techniques of collecting evidence are less important than the motivation for evaluative activity and one's understanding of these principles.

All these ideas follow naturally from our understanding of effective teaching and assessment. They embody a professional approach to evaluation in higher education—one that emphasises cooperation, self-monitoring, intrinsic rewards and collegiality. It will be clear that these standards do not consort well with a process of quality assurance that is determined externally, linked to league tables, and bureaucratically controlled.

One way of concluding this chapter would be to examine the various techniques that can be used to apply these ideas. But the variety of evaluation procedures, ranging from student questionnaires to cooperative peer evaluation of lecturing performance, and from external experts' comments on the curriculum to the analysis of the results of student assessments, is now easily available from many sources (see Further Reading on p. 232 for one example). As I have been at pains to stress the interpretive understanding of principles as the road to better teaching, I shall look at how some of the lecturers whose teaching we observed in Chapters 8–10 went about applying the ideas.

In Chapters 9 and 10, I spoke of effective teaching and assessment as a kind of conversation between lecturers and students. The same reasoning applies to evaluation—although the 'conversation' in this case is widened to include other teachers and reflection on one's own experiences as well as the students, as the examples will show. Another important thing we can learn from these teachers' experiences is that evaluation does not finish when they have collected the information. Evaluation is not about handing out questionnaires. The most significant and challenging aspects of evaluation comprise interpretation of results and the action that follows to improve teaching.

Evaluating a materials technology course

We saw in Chapters 8–10 how Elaine Atkinson's new materials technology course was based on her evaluation of the previous version.

The revised course abandoned the 'information dispensing' view of the subject and sought to introduce methods that would lead students actively to link their knowledge of materials to professional practice. Atkinson described the improvements as 'a continuous process of development' (p. 164). Notice how a good teacher, who cares for students, always conceptualises evaluation as a continuing endeavour, never a one-off activity. We also noted in Chapter 10 how Atkinson, like Eizenberg and Dunn, used the results of student assessments as part of the process of evaluation. This enabled her to learn about students' misunderstandings and to structure the course around the problems that students experienced in grasping the essential concepts in the subject. Listening to and learning from your students is an essential component of all teaching and of any evaluation.

It is not necessary to use questionnaires to evaluate courses. Other techniques of obtaining student feedback may be as good or better, depending on what you want to find out. During the first year that the revised course ran, Atkinson organised a session based on Graham Gibbs's 'Structured Group Feedback' method (see Gibbs *et al.* 1988b; the simple method is also described in Ramsden and Dodds 1989:18–20). She asked each member of the class to write down their answers to each of the following questions:

1   What was the BEST feature of the course for you?
2   What was the WORST feature of the course for you?
3   In what ways do you think the course could be IMPROVED?

She then asked students to discuss their responses in groups of four, and to record the points on which they could reach agreement. The teacher then collated the comments in front of the whole class. She asked each group in turn to report a 'best feature' and checked that the rest of the class agreed with it before writing it up on an overhead transparency, and then went on to questions 2 and 3.

After a break, she reported to the class what she intended to do with the information. During the break, she compared the comments with her own perceptions of the strengths and weaknesses of the course. This is the most critical part of evaluation—the careful collation and interpretation of the data. Acting on student feedback does not necessarily mean doing what students say they want. The teacher should remain in control. This does not imply, however, any dismissal of students' comments. It means understanding their meaning in relation to the whole course.

For example, Atkinson's students told her that they felt insecure at the start of the course. They said they didn't get enough factual material in what they thought was a 'fact-based' subject. The teacher concluded from her own observations of students' work, and her course aims, that students were unclear about what was expected of them and the standard they should reach. She explained her interpretation to the class, and obtained their agreement that it was a reasonable one. She then described what she proposed to do about the problem. This mainly involved providing more individual support at the beginning of the course so that students were helped to become aware of her requirements, and moving one of the assignments to the beginning of the course to provide early feedback on progress.

Evaluating an animal science course

Like Atkinson's design course, the inquiry-based animal science course illustrates the seemingly paradoxical fact that evaluation should often be done *before* a course starts. As we saw in Chapter 8, changes in the course were a response to problems in student learning (high failure rates; poor understanding of the relationship between scientific knowledge and its application; inferior communication and independent learning skills; approaches to studying concentrated on reproduction). The new aims and objectives were written with these issues in mind, and the teaching and assessment strategies, including a significant decrease in the amount of content covered, were re-engineered to address them.

Evaluation continued throughout the new course's implementation, using a variety of methods over six years. The focuses were the student experience—including approaches to learning—and the quality of learning outcomes. Thus the evaluation represented the 'scholarship of teaching' in action: it was congruent with the underlying principles of research into student learning, deliberately seeking evidence of whether changes predicted by the theory were taking place.

Analysis of student surveys involved careful examination of students' written comments and the preparation of reflective reports on the results, which were then made available to academics in the faculty. As the results began to show incremental improvement, other staff were motivated to find out more about what made the course successful. Taylor and Hyde also realised that they needed to know more about the background and experience of students beginning the course, and methodically began to collect information that they could use to tailor the content and teaching to student needs:

Students give you amazing insights into how to improve things. We got many horrendous comments to start with. The students were telling us early on that although they were interested in animal science they just couldn't see how the basic information was in any way relevant to, say, managing a sheep in a paddock. This helped to make the argument for moving away from a discipline-based approach to a more integrated approach. We also got feedback that they didn't understand how the detailed objectives related to what they had to do for assessment and how generic attributes fitted in. As a result we focused on broader themes, explicitly combined disciplinary and generic skills, and gave assessment assignment feedback sheets so that students understood what we were looking for and how they were being judged. The comments of the previous year's students were fed back to the current years; we told them what had changed and how we wanted their feedback to continue the process.

The effects of the changes on students' experiences as measured by the course experience questionnaire over six years tell their own story (Figure 11.2).

The impact of the new course was also examined through systematic analysis of attendance, students' approaches to studying and the quality
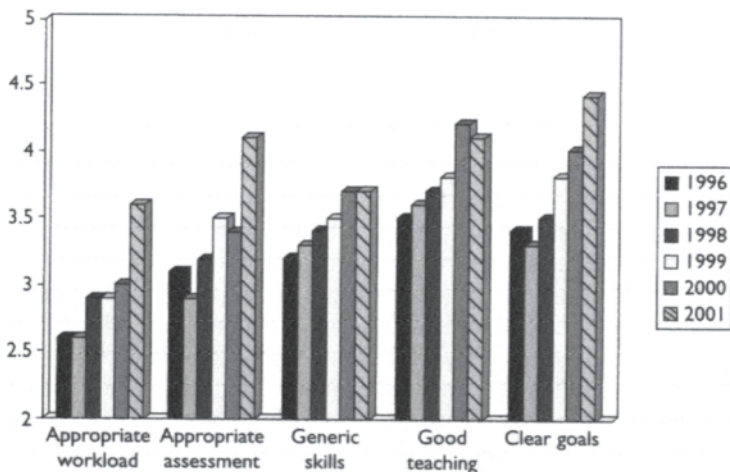
Figure 11.2 Improvements in the student experience of animal science, 1996–2001

of student work. Students were more likely to attend classes, more likely to use deep approaches and more likely to succeed. A dramatic improvement took place in the quality of student assignments. In 2001, when the curriculum even more strongly emphasised conceptual change and the application of knowledge to problem solving, every student was successful in passing the course. Taylor and Hyde also noted the generally favourable effects of the new course on the attitudes and background knowledge of students beginning the third year course. However, it emerged that in two areas, students were not well enough prepared for third year study, and the second year course was appropriately amended in 2002.

Evaluating a humanities course

The idea that an external team of experts can 'evaluate' a course is alien to a theory 3 approach to teaching. However, this does not mean that professional advice and support is unnecessary or unhelpful, particularly if it comes from a source that has been involved in the development of the programme. Lybeck and Yencken's course is an example. Devised in cooperation with members of an educational development unit, its evaluation was carried out as a cooperative process. A sample of students was interviewed at the beginning and the end of the course in order to gauge their reactions to the group work and assessment procedures, and in order to examine changes in students' conceptions of art history and the Renaissance. The educational methods staff also collected data on attendance and withdrawal. The findings provided a comprehensive picture of students' approaches and learning outcomes. They were discussed several times with teachers and students. When interpreted in relation to the teachers' own experiences, the staff were able to form a clear picture of the strengths and weaknesses of the course.

The high attendance and low dropout rate; the positive comments of students on their experiences of working cooperatively in the groups, and their own descriptions of developments in their critical thinking and writing skills; the evidence of changes in students' understanding of important concepts; the information derived by the teachers about the quality of students' work from their assessments: these different sources pointed to the fact that the course was achieving many of the goals it set out to achieve. On the other hand, it was clear that some students found the early experiences of the groups unsettling, that the lecture programme (based on visiting lecturers and organised well before the decision to restructure the group work) was not properly related to the seminars,

and that the some of the essay questions, based on a narrow set of readings, were not in line with the course aims. As a result, the teachers decided to build more direction into the course, to require students to read more widely and imaginatively, to spend more time on developing student confidence and expertise in the groups, and to reorganise the lecture series.

Notice once again in this example how effective evaluation involves collecting and interpreting evidence from a variety of origins (students' comments on their experiences are only one part—though an essential part—of the information needed to evaluate teaching) and how the identification of problems is not ignored despite evidence of the course's success.

Conclusions on evaluation and quality

This chapter has ranged widely over numerous issues of accountability and evaluation of the quality of higher education. Its most important con' clusion is that the potential of any method of evaluation or performance measurement to improve university quality depends on professional activity undertaken by lecturers. However elaborate the system of quality review or performance evaluation, its effectiveness stands or falls by the way in which academic staff interpret it. No one can buy excellence in university teaching by the threats and promises of subject benchmarks, impose it by the fiat of funding bodies, or assure it through the mysteries of quality agencies. It can only be realised by creating the conditions in which universities and the teachers who work in them can excel.

As students' perceptions of our teaching determine the quality of their learning, so lecturers' perceptions of evaluation policies determine the effects of these policies on the quality of their teaching. Ignoring these realities can only result in pressures for accountability having the opposite effects to their intentions. Methods for quality assurance all too easily become ends in themselves, redirecting resources from the substance of academic work into bureaucratic hoop-jumping.

Nevertheless, the substance of academic work includes evaluation and accountability; these are integral to good teaching. It remains our responsibility to influence the 'quality movement' so that it puts aside the insidious culture of control, escapes the shackles of intellectual vapidity, and recognises the significance of evidence derived from fundamental research into learning and teaching. Our aim should be the development of a self-critical, reflective academic community which

constantly seeks internal and external comment on the quality of its teaching, and has the knowledge base and the sense of inner security to act wisely and temperately in the light of the judgements it makes of itself.

Further reading

Light, G. and Cox, R. (2001) Chapter 11, 'Evaluating: teaching and course evaluation', in *Learning and Teaching in Higher Education: The Reflective Professional,* London: Paul Chapman Publishing.

What does it take to improve university teaching?

> If there is no place for pleasure in teaching, surely our learning has failed us altogether.
>
> (Kenneth Eble)

In the preceding chapters, I have maintained that the way to improve teaching is to analyse our students' experiences of learning. In justifying this approach, I have been stating formally what good teachers know and do naturally.

Lecturers who teach well think carefully about their students' understanding of the subject matter and their students' reactions to how it is taught. They are able to apply this knowledge through a variety of strategies. They put student learning first and their teaching and assessment methods second. The methods that good teachers use depend on the problems of learning that they have to solve.

In the ten years since this book was first published, and especially in the post-Dearing period, we have seen a great expansion in the numbers of educational development specialists, courses in higher education teaching, national learning and teaching support units and associations, and university centres for academic staff development. These developments reflect a government agenda of quality, value for money and enhanced participation. That agenda is in turn a means for controlling the system in response to two converging forces: the expanding importance of higher education in an economy based on knowledge; and the fact that knowledge growth throughout the world steadily exceeds the capacity to service it (Clark 1998). No academic

island is free from these pressures. Anyone trying to improve learning and teaching is constantly aware of them.

Is the central message of this book relevant in this environment? In this chapter, I want to show how the basic ideas about good teaching that follow from an understanding of our students' learning can be applied to the task of helping ourselves and our colleagues to teach better. What does a theory of teaching as 'making student learning possible' tell us about how to improve its quality? How might we provide the means for lecturers to teach better? What do we need to do to create an environment where university students and their teachers learn well? I hope to demonstrate the enduring relevance to these questions of the underlying principles of university learning and teaching.

The context of teaching

If we accept the implications of the book's theory of learning and teaching, then changes to the context of university teaching, as well as interventions designed to encourage teachers to learn, should be carried out in a variety of ways, and at multiple levels. There can be no single right answer to the problem of improving the quality of university teaching.

It is as important to focus on good teaching as on good teachers. We ought to be able to reach this conclusion from our knowledge of effective learning. Cooperation and peer feedback within a team is motivating and helps people to learn. Changing how we think about teaching is more than changing individual lecturers—although it must imply variation in how they experience teaching. Recall that theories of teaching are 'relational': they describe ways of experiencing and conceptualising the activities of teaching rather than phenomena inside teachers' heads. It makes sense to speak of changes in theories of teaching in the context of a course or department. An institutional context that represents in its academic policies and reward systems a theory 3 understanding of teaching—'teaching as making learning possible'—will tend to shift individual lecturers towards a similar understanding. Improving learning and teaching involves efforts to stimulate debate about a university's policies for promoting and supporting good teaching and the implementation strategies that accompany them.

You can, however, carry the argument for changing the institutional context and working at the structural level too far. That would lead to a too-simple, and pessimistic, conclusion. While such changes are desirable because they alter the context of teaching—and therefore make it easier

to teach well—it is not necessary for every lecturer who is interested in improving on the limitations of conventional small groups and lectures (for example) to wait for an institutional revolution. It is feasible for individual lecturers and small teams to work within the constraints, apply existing knowledge, and have positive effects on the quality of learning. Although it may seem at first sight a perplexing conclusion, study of the context of learning and teaching demonstrates how much of the process of higher education is the responsibility of individual teachers and students.

We saw some illustrations of this educationally optimistic view in the case studies reported in Chapters 8 to 10, as well as in the example of Ms Ramsey's teaching in Chapter 6. Hazel Lybeck and Barbara Yencken's art history course was similarly designed within a department whose teaching was otherwise quite conventional.

A study of secondary school science teachers (Tobin and Fraser 1988) provides further support for the view that good teaching in adverse settings is achievable. Tobin and Fraser document the existence and effectiveness of 'exemplary teachers' in unfavourable environments—environments constrained much more than is usual in higher education by external examinations. The exemplary teachers used, in the terms of our model of different ways of understanding teaching, a theory 3 approach to their work. They all understood teaching as providing the means for students to learn. They were receptive to change; they thought and talked about what they did. They acted in accordance with the principles of good teaching laid down in Chapter 6: although the exact methods they employed varied, each created a setting where students could engage productively with learning tasks. They interacted in a friendly and respectful way with their students, who acknowledged this approach, rarely disrupting their classes. Unlike their less effective counterparts, these exemplary teachers did not focus on transmitting information in order to 'cover' the curriculum. Instead, they ensured that students understood the content fully by giving them opportunities to comprehend it. They set consistently high expectations for students, and the students responded by doing well.

The critical point is that the successful teachers were subject to the same forces as the less successful:

> These exemplary teachers operated in the same schools as the contrast teachers and their implemented curricula were exposed to the same powerful driving forces as those teachers. For example, the influence of external factors such as tests and examinations were [sic] about the

same as those that operated on the classes of the contrast teachers, and factors such as student motivation to learn, student expectations, peer influence, and support of parents were probably similar within a school. Yet these exemplary teachers were able to create a positive learning environment and the comparison teachers generally could not.

(Tobin and Fraser 1988:91–2)

Now all this is equally true in universities. There is room for manoeuvre in improving teaching and learning. No university teacher may hide behind the belief that real improvement is impossible without complete support from the institution. Every practising lecturer who is reading this book can start changing his or her teaching tomorrow; and they can expect those changes, if conscientiously performed and compatible with what we know about effective teaching, to have a favourable effect on the quality of their students' learning. Their activity may also influence their colleagues to attempt something different in teaching. Relatively modest innovations—especially those undertaken in adverse contexts—are often enough to encourage others to try similar ideas. The argument is not that we should discourage either individual initiatives or wholesale changes, but that we should operate at several levels of the system, remembering always that good educational development should follow the same rules as good teaching. There is no one right teaching method. There is no one correct place to intervene.

How can we encourage more academics to improve their teaching—to teach in the way that our case study lecturers have done? The answers lie in applying the findings of research into academic leadership at the local level; coherent, multi-level policies on recognition and reward; and carefully crafted programmes of academic development that are aligned with fundamental scholarly values.

A climate for good teaching

Perhaps the most significant research on student learning to have emerged in the last ten years is not about learning at all, but about teaching. The idea that lecturers' approaches to teaching could be conceptualised in a similar way to students' approaches to learning was just an idea when this book was first written. The logic went as follows. If there was variation in students' approaches to learning, and if approaches were context-dependent, then a reasonable next step would be to imagine equivalent phenomena related to lecturers. A student might focus on merely

reproducing facts in one context, but on thoroughly comprehending the material in another. Might then a lecturer experience teaching as solely transmitting information in one context, but as helping students to develop their understanding in another?

Thus teaching in higher education could also be conceptualised as context-dependent, and lecturers could be expected to adopt different approaches in differently perceived circumstances. The qualitatively different ways of conceiving of and approaching teaching in higher education were empirically identified in the 1990s. It has turned out to be true that approaches to teaching are related to lecturers' perceptions of the context of teaching (Martin and Balla 1991; Trigwell *et al.* 1994; Prosser and Trigwell 1999). Crucially, associations have also been found between teachers' approaches to teaching and students' approaches to learning (Trigwell *et al.* 1999), linking the two previously separate research areas. This research shows that an information-transmission, teacher-focused approach to teaching on the part of a teacher is associated with a surface approach to learning on the part of their students, while a conceptual change and development, student-focused approach to teaching is associated with a deep approach to learning. These results are of great significance for programmes of university teacher training.

An important part of the context of teaching is lecturers' experiences of leadership. If we look at lecturers' perceptions of heads of departments' and course coordinators' ways of supporting teaching, we find that there are variations in how their leadership is experienced. Moreover, there are also variations in these academic leaders' own conceptions of how they support teaching. A consistent pattern emerges: a focus on collaborative, supportive and purposeful leadership for teaching is associated with a culture of strong teamwork and student-focused approaches. Where these characteristics are not experienced, information-transmission and teacher-focused approaches are more prevalent (Martin *et al.* 2002; Ramsden et al. 2003).

Figure 12.1 summarises some elements of the results of this recent research in relation to findings about the links between approaches to teaching, observed practice, and approaches to learning. Interested readers should consult the original sources for more details.

There are piquant correspondences between good leadership for teaching and good teaching. The first four problems of university teaching are goals and structure; teaching strategies; assessment; and evaluation (Chapter 8). The first four problems of leadership for teaching are vision, strategy and planning; enabling people; recognising and developing performance; and self-development as a leader through reflective evaluation (Ramsden

Figure 12.1 Recent research on university teaching and its context

1998:132). Academic managers, in short, should learn to manage in the same way that a good teacher teaches (see Eble 1988:192).

The desirable environment for theory 3 ways of teaching is one where most lecturers experiment with new ideas and want to share their experiences with their colleagues. Like Tobin and Fraser's exemplary teachers and our case study lecturers, they think and talk a lot about their teaching and their students' learning. They make mistakes and they learn from them. There are evident parallels between the effects of independence and freedom in learning on student approaches to studying and the effects of collegial academic management on lecturers' approaches to teaching. Competent academic managers make it possible for their staff to adopt deep approaches to their teaching. They provide good feedback. They inspire excellence. They recognise achievement. They see beyond themselves. They lead by vision and hope, not admonishment and fear. Each of their staff knows, without having to be told, exactly what they have to do to achieve high-quality learning.

The significance of leadership for university teaching is perhaps not a great surprise. It is well known that successful schools are more likely to enjoy sensitive and strong leadership combined with a shared management culture (Mortimore *et al.* 1988; Leithwood 1992; Ramsden *et al.* 1989; Reynolds *et al.* 1996). It does, however, have immensely important implications for the quality of student learning. It is now possible to see that effective leadership—at all levels—is a key to improved learning. Since effective leadership in higher education can itself be learned, it is a crucial lever for change. Specific practical guidance for heads and deans may be found in my *Learning to Lead in Higher Education* (Routledge, 1998), particularly Chapter 8.

The importance of academic leadership in influencing the quality of university education has at last begun to be recognised at national level. We need to educate all academic managers about the qualities of good teaching, help them develop an understanding of how to recognise and reward it productively, and support them in acquiring a feel for how to create the trusting environment where teachers believe in what they are doing—so that they find it both challenging and possible to improve their teaching. Perhaps deans and heads of departments could start with A.N.Whitehead's splendid *Aims of Education and other Essays,* whose wisdom has been referred to several times in the present volume. There he tells, wonderfully well, the stories of the essential tension between

discipline and freedom in education, and the excitement of imaginative university teaching unfettered by trivial regulation.

Coherent policies

A critical factor in the context of good teaching is the quality of a university's policies for recognising and rewarding it. Specifically, this means that policies and processes should be coherent. Strategies for recognising teaching should reflect important processes related to student learning and academic scholarship, and be consistent across the various levels of the institution—including the level of the individual lecturer.

While this may sound commonplace, all too often there is evidence that the principle is not applied. In that case, contrary messages are sent to staff about what matters. The results are similar to those of a poorly aligned student assessment system. For example, a university may have inconsistent criteria for teaching awards and for promotion; it may emphasise academic-led approaches to quality assurance of learning and teaching at departmental level, but apply bureaucratic appraisal and performance management techniques for individual staff; it may stress the importance of the nexus between teaching and research as a key aspect of good teaching, but not reward its demonstration or use it as a criterion for staff selection. It may sanction parallel academic and managerial processes for course development and resource allocation, without linking the two explicitly. Or it may simply articulate a policy on the importance of good teaching without implementing the processes that make good teaching achievable.

In a harmonised system, a university will ensure that:

- Planning processes (such as learning and teaching plans) are associated with reporting against measurable objectives, and are preferably linked to resources;
- There is a direct link between resource allocation and good teaching. This may mean allocating a component of funding to departmental or faculty performance as measured by agreed indicators, including student experiences, teaching qualifications and awards;
- The work of its academic development unit is closely linked to university QA and teaching policies. Does the unit convene faculty reference groups on strategic issues such as quality and evaluation of teaching and courses? Does it carry out quality-related surveys of students? Does it organise events that celebrate the university's

commitment to good teaching? Is it executively involved in achieving goals in teaching and learning plans?

- Its activities in support of teaching and learning, and their impact, are evaluated against external examples of good practice ('benchmarked');
- Its promotion and selection criteria for lecturers are consistent with criteria for teaching awards and performance management processes; and that each set of criteria is itself aligned with the university's mission and goals;
- Its collegial processes in support of good teaching (such as academic quality assurance reviews) are complementary to, but do not duplicate any part of, managerial processes such as resource allocation.

Just as an inappropriate context of learning encourages surface approaches to learning, so an inappropriate context of teaching will push staff towards superficial strategies, harden any tendency to teacher-centred approaches, and discourage change. Unless our aim is to produce the corps of efficient pedants and dullards that Whitehead dreaded, we must build coherence into programmes for improving the quality of learning and teaching. Poor alignment leads to academics' suspicion of administrative and senior management processes for rewarding teaching.

Probably a university's biggest challenge in providing a context for good teaching is to ensure that managerial and collegial mechanisms work comfortably together in an atmosphere of shared values. As in successful research management, funding drivers should align with peer review processes. One example of an attempt at harmonisation is illustrated in Figure 12.2. In this model, mandated academic policies are complemented by voluntary recognition and reward processes, while resource-related management strategies are combined with review and policy processes underpinned by collegial imperatives. The university's teaching and learning unit provides support for implementing policies in key areas (quality assurance, first year experience, ICT and generic attributes).

The goals of educational development

The first problem to address in programmes to improve university teaching is the same one as in planning for any learning: What do we want the learners to know? In other words, what changes in understanding do we wish to see occurring? Evidently our desire is to help to change people's understanding and experiences of teaching, away from a conception of

Mandated

Management-led

Student and graduate surveys
Teaching performance indicators (and performance funding)
External benchmarks
Required training in teaching
Teaching & Learning Plans
QA reports

Academic Board reviews (self-evaluation, visit, report)
Policies on teaching: evaluation, assessment, quality of ICT, promotions, generic attributes

Academic-led

Teaching awards
Research supervision awards
Teaching Improvement Fund
Scholarship Index
Policy on research-led teaching

'Guidelines for Good Practice'
Institute for Teaching & Learning courses and support groups: quality, skills, 1st year
Faculty initiatives: benchmarking, teaching retreats, A/Deans T&L, teaching awards

Recognised and encouraged

Figure 12.2 Varieties of management-led and academic-led policies and processes for good teaching: University of Sydney, 1999–2003

teaching as transmitting knowledge or making students active and towards one as making learning possible. Excellence in teaching demands unremitting attention to how the subject is comprehended by one's students, and the ability to use the results of assessment to change the curriculum so that it more accurately addresses students' errors and misunderstandings. It means devising strategies which will increase the likelihood that students will use deep approaches to learning. It means being on the alert for discrepancies between students' perceptions of our requirements and our own expectations.

Effective academic development will encourage lecturers to enjoy finding out more about the nature of good teaching in their subject area and to delight in its practice. Needless to say, it will not be enough for them to learn about the theoretical aspects of good learning and teaching: lecturers should be able to apply their knowledge in a range of contexts, and must recognise and understand the reasons for inconsistencies between the predictions of the theory and what happens in their classes. And, if they are responsible for running a course taught by several teachers, or for leading an academic department, we shall expect them to manage their staff in a way that is consistent with the principles of effective teaching.

Like conceptual development in students, these processes of changing understanding will be gradual and hesitant. Lecturers will pass through cycles of experiment, error and progress towards more complete understanding. As we noted in the cases of several teachers whose experiences were described in Chapters 8 to 11, the processes are also continuing ones. No one can ever know enough about how to teach. We shall hope that lecturers come to realise how little they know about teaching, and how their authority rests not on dogmatic assurance, but rather on their knowledge of how little they know.

The context and process of educational development

These goals of development in teaching may be summarised in terms of a shift from a simple way of understanding teaching to a complex, relativistic and dynamic one. In the latter, the application of theoretical knowledge is integrated with its practice. This model implies recognition that learning how to teach is a process that never ends.

These changes emulate those that university lecturers, especially those in professional fields, desire to see in their undergraduate students, and it may be helpful to conceptualise the process of learning how to teach in

similar terms. The level of difficulty of this process, for lecturers with an average understanding of teaching, is probably about the same as an undergraduate programme of study. We are not talking about a few survival tips on lecturing and assessment presented in a one-day staff development workshop, or outlined in a web-based guide to basic teaching skills—useful as these may be for beginners—but about a lengthy and demanding progression towards professional competence.

From our knowledge of the theory of teaching and learning described repeatedly in this book, we are able to see the outlines of how we should proceed to help academic staff to attain these goals. What is the best way to encourage changes in conceptions of teaching—away from a primary focus on teaching and towards a focus on learning and students?

Changing understanding, changing teaching

Many years ago, I helped a lecturer who was having difficulty in managing a class of medical students. She 'could not control them' when lecturing on aspects of psychology; they 'didn't find it relevant'. We planned a strategy around clearly expressing the lecture's objectives and linking its ideas to examples from the students' experience. Much use was made of techniques of class control, learning-by-doing and questioning (fortunately, PowerPoint had not yet been invented). A few weeks later my lecturer invited me to observe the effects. The class was industrious and full of attention. The students assiduously took notes. They did the exercises. You could hear a pin drop. Success! But in a debriefing session shortly afterwards the lecturer said, 'You know, it worked. But I don't know why it worked'.

Although I did not realise it at the time, this was the authentic early warning sign of defeat. And sure enough, within three weeks the class was back to its previous confusion. Something was missing from the equation. The lecturer had not built on a foundation of understanding but had simply applied some 'practical' strategies. I had failed far more than she had. I had conspired to encourage a surface approach to lecturing.

One of the first reviews of *Learning to Teach in Higher Education* found fault with its emphasis on research-based approaches to improving university teaching. The reviewer contended that an understanding of theoretical ideas about teaching did not imply that the teacher would use effective practical strategies (Bligh 1993). This was ironic, since the whole purpose of the book was to propose an alternative to that proposition. Research has subsequently uncovered a sequence of links between the teacher's understanding of teaching and the quality of student

learning. A significant part of the chain is the finding that lecturers' approaches to teaching predict their observed classroom practice (Martin *et al.* 2002).

The reason for the impact of ideas about student approaches to learning is that their implications for teaching reflect how accomplished teachers actually operate. These teachers do not segregate practice and theory; on the contrary, they seek productive relations between them to establish better ways of helping their students to learn. They know that the right teaching techniques are important. They also know that if they are to be effective in the long term, techniques must be blended with an understanding of learning and enthusiastic concern for students. The key to professionalism is learning how to fuse theory and practice. These are the essential principles that we must apply to the task of improving university teaching.

Yet many of the published texts and electronic resources on university teaching persist in ignoring these conclusions, repeating my errors with the psychology lecturer. They focus on method detached from the reasons for it and the human being who applies it. They embody the naive conception that approaches to teaching are unrelated to practical action. The result is 'the passive reception of disconnected ideas, not illumined with any spark of vitality' (Whitehead 1929). You can of course go a long way without theory. Without it, however, you will command a circumscribed capacity for improving the quality of student learning.

Scholarship of teaching and courses for lecturers

If academic development is about changing lecturers' understanding of teaching, then the strategies used to help them to change should reflect the imperatives of a theory 3 approach to teaching. In other words, we ought to help lecturers to learn how to teach in a way compatible with our understanding of teaching as making learning possible. For most lecturers, this will mean working with people who are active in research and whose approach to staff development is driven by a spirit of stimulating inquiry. Undergraduates prefer to be taught in an active research environment. Why should lecturers be any different? Good academic development engages us in the excitement of discovery and makes learning about teaching as exhilarating as doing research. Arousing interest in the process of improving learning through applying evidence will be a high priority in an effective programme.

In the past few years, commitment to an evidence-based approach to improving student learning has become known as the 'scholarship of teaching', following the work of Boyer (1990) and Glassick *et al.* (1997). If the aim of teaching is to make student learning possible, then the aim of scholarly teaching

> is to make transparent how we have made learning possible. For this to happen, university teachers must be informed of the theoretical perspectives and literature of teaching and learning in their discipline, and be able to collect and present rigorous evidence of their effectiveness, from these perspectives, as teachers. In turn, this involves reflection, inquiry, evaluation, documentation and communication.
>
> (Trigwell *et al.* 2000)

Essentially, the scholarship of teaching is no more than an inquiry mode of enhancing the quality of student learning. It implies the use of activities that improve learning within and across disciplines and involves academics in collecting and communicating the results of their work in a manner analogous to research; indeed, it may involve formal publication of advances in teaching and learning. However, is most important to understand that it is not a substitute for research in the disciplines—a kind of second-rate research for non-researchers who can manage to dabble a bit in education. On the contrary, the scholarship of teaching cannot exist separately from Boyer's other three scholarships of discovery, integration and application. The foundation stone of the scholarship of teaching is strength in research.

It is interesting in the light of our previous discussion that Trigwell and his colleagues found that simple understandings of the concept of the scholarship of teaching implied separation of theory from action and a focus on teacher activity. A mature conception involved a theory 3, learner-focused understanding of teaching in combination with research-like communication of findings about how student learning had been improved. Institutional support for a research-led approach to improving university teaching would seem to be essential if the scholarship of teaching is to be an effective strategy for enhancing student learning.

The first recommendations for the compulsory training of university teachers date back at least to the Warnock Report (1990). The last few years have seen a prodigious expansion of induction programmes and formal courses, driven in part by national policies and enacted through the Institute for Learning and Teaching and the Staff and Educational Development Association.

Do such courses work? There is evidence that courses which incorporate the principles of effective learning and teaching do indeed have a positive impact on lecturers' approaches to teaching, students' perceptions of the context of learning, and students' approaches to learning (Coffey and Gibbs 2000; Ho *et al.* 2001). Exactly as our theory would suggest, the least effective courses isolate practical advice from conceptual knowledge, while the most potent outcomes occur where there is strong linkage between principles and practice, and where teaching techniques such as large class management and online interaction are developed against a background of knowledge about student learning (Martin and Ramsden 1994). The more scholarly the programme, the more likely it is to engage academics' interest and help them to make long-term changes in their approaches to teaching.

Instead of considering such courses in the abstract, I want to follow a procedure used earlier and describe two examples of successful programmes for university teachers that practise the principles advocated throughout the book. Both stand in contrast to the courses that operate from what I have called a theory 2 approach to teaching. These assume that training in skills, in particular getting teachers and students to do things, will in itself lead to higher-quality student learning. These courses would seem determined to try and practise the old Chinese proverb: 'I hear, I forget; I see, I remember; I do, I understand.' They would do well to realise that this advice is at best a half-truth, as I have previously argued. In any case, it is now outmoded. A distinguished Hong Kong gynaecologist has suggested a better version for his students, which certain academic developers might perhaps take to heart: 'I hear, I forget; I see, I remember; *I make a mistake*, I understand'.

University of Oxford: Diploma in Learning and Teaching in Higher Education

Oxford's Diploma in Learning and Teaching in Higher Education, taught in the Institute for the Advancement of University Learning, is designed on the principle that the best university teaching emerges from academics' own understandings of how students learn in their discipline. That understanding—and not just awareness of how to use PowerPoint or how to be heard at the back of a lecture theatre—is what its designers regard as fundamental to constructive relationships with students, well-designed courses and productive learning environments. The focus of the course is therefore student learning, and how it may be conceptualised, fostered and assessed. Teachers' learning is also a part of the concern, so the course

emphasises what and how academics can learn from their teaching relationships with students.

The course makes use of four primary sources of participants' learning. It introduces them to the literature on learning and teaching, both the primary research literature and the secondary literature written for university teachers. It models at every level the educational practices under discussion, so that participants self-consciously experience and evaluate as 'students' different approaches to lecturing, small group work, programme design, assessment, and learning and teaching evaluation. The course takes advantage of the varying levels of experience and knowledge brought by different participants by promoting cooperative working, collaboration and the exchange of expertise. And participants each have a 'mentor' or professional supervisor who encourages them to draw together and reflect upon their experiences of learning and teaching.

The criteria for assessment of the portfolio ensure that participants take advantage of the course to think through changes in their approach to teaching. They are encouraged to undertake projects of value to their departments or colleges, so that their time, knowledge and expertise are productively used and their contribution recognised by colleagues. Many participants graduate from the course to return as professional supervisors, creating a community of academics continuing to engage in reflection and professional development.

University of Sydney: Graduate Diploma in Educational Studies (Higher Education)

Sydney's Graduate Certificate in Educational Studies (Higher Education) is taught by the university's Institute for Teaching and Learning (ITL). The aim of the course is to bring about a shift in the way academics think about teaching, with the emphasis on student learning. The university is the most research-intensive in Australia and places a strong emphasis on encouraging scholarly, research-led approaches to teaching. The course's focus on linking theory and research in higher education to good practice in teaching harmonises with this strategic direction. For staff who hope simply to pick up some new classroom techniques, the course often turns out to be more intellectually challenging and more satisfying than they expected.

The course takes the idea of student approaches to learning as its starting point. After being introduced to the concept, participants are helped to see that what they do (or fail to do) as teachers can influence

the approach students are likely to take, which in turn affects the quality of their learning outcomes.

For their first 1,000-word project, participants interview three of their students, then categorise their responses according to the surface/deep distinction. They are usually surprised to find how many of their students report adopting surface approaches, and similarly surprised that individual students vary their approach from task to task. In subsequent projects participants engage in turn with the importance of clear aims and learning outcomes; interactive classroom methods which allow students to be engaged in their own learning (even in large classes of diverse students); re-thinking assumptions about assessment; and how to apply the concept of constructive alignment (Biggs 1999) to their own curriculum. In each task, they are asked to apply the principles encountered in class, and in their reading, to their own teaching practice. At the same time the facilitators are careful to model teaching and learning activities which participants can adopt or adapt for themselves. One participant noted that the most worthwhile aspect of the course was 'the actual implementation of a learner-centred environment'.

Collaborative learning is integral to the course, as is the idea of formative peer review and mentoring. At the beginning of every meeting in the first half of the course, participants report on what they learned from the project just completed, sharing their reflections and receiving feedback from peers and facilitators. Some written work receives individual comments; other work is posted to online discussion groups where the feedback comes from peers.

The second half of the course focuses on the scholarship of teaching. Participants work in groups, engaging in scholarly inquiry into their own teaching with reference to the published literature. Past graduates of the course act as mentors, and the course ends with each participant writing up a research proposal. Appropriately for a research-intensive university, many later build on their project work to develop new research agendas in the scholarship of teaching.

How teachers experience academic development

As we approach the end of a book that has stressed so much the student's perspective on learning and teaching, it would seem appropriate to hear from lecturers who have experienced these courses. Their comments will make my point about the value of applying the principles of good teaching

to the education of members of academic staff more forcefully than any further description I could give:

> My work this week has been an eye opener to my teaching style. I have reassessed the way I teach, and redeveloped my lesson structure to include more student interaction and to get feedback and check understanding of what has been taught. My assumption of what I thought was important, and could only be taught one way, was incorrect. The students learned it another way and interacted with each other in ways I didn't think were possible.

> The course turned my thinking around from 'what do I want the students to know' to 'how will the students perceive this information that I want them to know'. It made me much more student-focused in my teaching.

> On the whole I thought of myself as a pretty good teacher. I even received a major university-level teaching award at Southern Illinois University where I was a professor before coming to Oxford. Sure, some of my students never seemed to understand the subject, but most did, and surely the others failed because they were lazy, thick or both. But I decided to take the course because I realised that during my entire professional career, I'd always concentrated on the research side of my duties, and never given the same degree of critical thought toward my teaching duties.
>   Throughout, our colleagues would occasionally ask us how the course was going and whether or not we thought it was useful. I would routinely answer that I liked it a lot and that it was very useful, but it most definitely was not a course in the practical aspects of teaching. We were not discussing lecturing techniques like the key to successful visual aids, or the production of good lecture handouts. Rather, we were asking ourselves why students learn in some situations, but not in others.
>   For me, the portfolio itself was the most important and useful part of the course, because it really forced me to think about how students learn ecology and why they fail to learn it. It didn't give me the answers, but it gave me the tools to assist me in finding out the answers. I feel that my teaching has improved and will continue to do so in the years to come, not because they showed me how to produce better lectures, but because I am less likely to immediately conclude that a student's inability to learn is an indication of sloth

and indolence. I am now better equipped to assess the student's approach to learning, and to adapt my approach to better help the student to learn.

Some of us were so pleased with the course that we have become professional supervisors, responsible for helping a colleague who is a current participant on the course. This has forced us to continue to think about our own teaching and not to lose sight of its importance. I've just had an object (probably closer to abject) lesson in what we've been studying. I set a piece of formative assessment for my undergraduate class. I thought that the directions were clear, but enough of the groups got it wrong that I'm pretty sure that what I thought I said and what they interpreted were two different things. One of the students came to see me about it not long ago, and the first thing I did was to ask her what it was what she thought the instructions said. I wouldn't have done that two months ago.

Your feedback made me reflect a little more about the distance that I have travelled since beginning the course. I have come to accept the 'scholarship of teaching' idea. Learning new teaching techniques is OK—but only when you think seriously about the issue of teaching and learning do these techniques make sense. When I think about it conceptually, all sorts of new approaches to teaching and learning emerge.

I was particularly keen to find ways to make students more excited to know more and to see how their learning was going to help them become capable graduates. The key that unlocked these mysteries for me was this course. It provided some solid foundations that have enabled me to ask, 'What effect will this sort of teaching practice have on my students?' and then to have confidence that I can collect, evaluate, reflect and act on the evidence I gather…It has been empowering because I have developed the courage of my convictions. This only became possible when I really felt I knew the evidence (from the scholarly literature in education)…All new staff should do the course early in their career to provide them with this sort of confidence. All established staff should do the course to help them reflect on how they might do the key aspect of their academic work better.

Concluding summary

Throughout the previous chapters we have regularly experienced a

contrast between two ways of looking at academic subject matter and the process of learning. Roger Säljö described development from purely quantitative views of learning subject matter (adding quanta of facts and procedures to one's store of knowledge) towards a qualitative conception of learning as understanding, relating theory to practice, and abstracting meaning. Similarly, William Perry looked at the process of students' intellectual development, from dualistic to relativistic views of subject matter; while Marton described a distinction between deep and surface approaches and outcomes in studying which can be seen to parallel the contrast between 'imitation' and 'real' subjects drawn so eloquently by Sawyer. In the area of assessing student learning, Biggs's SOLO scheme and the categories derived from analysis of the physics interviews in Chapter 10 embody the same theme.

The line of progress is from simple to complex, from black-and-white to shades of grey, from simply accepting what authorities say to questioning and making personal sense, from separate parts to the articulation of parts within a system. In SOLO, for example, relational responses differ from multistructural ones in that they imply a bringing together of isolated parts under an overarching system, while extended abstract responses go even further to question the system itself. And in fact the general trend of the movement in all these examples is away from the search for right and wrong answers towards an understanding and acceptance of the necessary tension of opposites, and a recognition that today's knowledge, however valuable, represents a partial and transitory perspective on reality. It must, like its progenitors, be superseded.

These differences correspond to lecturers' own descriptions of their aims for student learning. You will surely see by now what it means to say that good teaching in higher education may be defined by the quality of learning it encourages. The development of good teaching involves an equivalent process of change from simple to complex, from absolute to relative, from the unquestioning acceptance of authority to a search for personal meaning, from discrete techniques and right answers to the expression of skills within an ordered but provisional system. Good university teaching is focused on the relation between students' experiences and the content to be learned. Good university teaching is based on trying to understand student learning.

Education in university teaching and the management of teaching should follow the same axioms. Encouraging students to learn and helping lecturers to teach involve identical principles. If we understand how to help students, we understand how to improve teaching. Bad teaching makes the subject matter seem monotonous and difficult, and makes the

students frightened and insecure. It leads inexorably to the learning of imitation subjects. As with bad teaching, so with bad evaluation, bad educational development and bad educational management. They neither touch the imagination nor enhance the ability to reason. They nurture our fear of change and sap our energy. They focus on a procession of signs and meaningless rules rather than on the things those rules and signs are supposed to signify.

If you are able to accept this general line of reasoning, you will find it as disturbing as I do to observe the continuing endorsement and use of methods for improving university teaching which we know are most unlikely to improve student learning. These include training in techniques of 'causing students to learn during lectures', the sillier varieties of quality assurance and accountability, and the propensity of irresolute academic managers to encroach on scholarly judgement.

The least comfortable aspect of the present climate of suspicion and 'something-for-something' meddling is not its depressing effect on university teachers, painful though that is. It is rather that these conditions retard the application of our understanding of university learning to its improvement. This book has shown that we have enough knowledge of the essence and substance of good teaching in higher education to improve the quality of our students' learning. What we need in the long run is the political will and leadership to implement evidence-based progress.

But we do not have to wait for the whole system to change. Despite the rather discouraging picture that surrounds them, many university teachers are teaching excellently and many teachers are learning to teach excellently. I hope it will be clear from the experiences reported in this book that many of the improvements can begin straight away. There is no need to delay until the millennium of educational development, or to wait for more enlightened approaches to quality and standards, to use what each of us knows. It is up to us as teachers to take control of improving university teaching, especially by listening respectfully to our students about how we can help them to learn. In the process of improvement, I hope we shall realise a conception of teaching and learning as an imaginative, arduous, but pleasurable process. There can be no excellent teaching or learning unless teachers and learners delight in what they are doing.

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