2

Teaching according to how students learn

How effectively we teach depends, first, on what we think teaching is. Three levels of thinking about teaching are distinguished. The first two are 'blame' models, the first blaming the learner, the second the teacher. The third model integrates learning and teaching, seeing effective teaching as encouraging students to use the learning activities most likely to achieve the outcomes intended. To do this requires some knowledge of how students learn. Students may use learning activities that are of lower cognitive level than are needed to achieve the outcomes, resulting in a *surface* approach to learning; or they can use high level activities appropriate to achieving the intended outcomes, resulting in a *deep* approach to learning. Good teaching is that which supports the appropriate learning activities and discourages inappropriate ones.

Levels of thinking about teaching

All teachers have some theory of what teaching is, even if they are not explicitly aware of that theory. Teachers' theories deeply affect the kind of learning environment they create in their classrooms (Trigwell and Prosser 1991; Gow and Kember 1993). Three common theories of teaching exist, which teachers tend to hold at different points in their teaching career. In fact, these levels describe a sequence in the development of teachers' thinking and practice: a route map towards reflective teaching, if you like. The level at which a teacher operates depends on what is the focus of teaching.

But before discussing different theories of teaching and learning, what are your theories (Task 2.1)?

Task 2.1 What are your theories of teaching and learning?

Learning is _____
_____
_____
_____
_____

Teaching is _____
_____
_____
_____
_____

When you have finished this chapter, you will revisit these statements.

Now let's see what others think.

Level 1. Focus: what the student is

Teachers at Level 1 focus on the differences between students, as most beginning teachers do: there are good students, like Susan, and poor students, like Robert. Level 1 teachers see their responsibility as knowing their content well, and expounding it clearly. Thereafter, it's up to the student to attend lectures, to listen carefully, to take notes, to read the recommended readings, and to make sure it's taken on board and unloaded on cue. Susan does – good student; Robert doesn't – poor student.

At Level 1, teaching is in effect held constant – it is transmitting information, usually by lecturing – so differences in learning are attributed to differences between students in ability, motivation, what sort of school they went to, A level results, cultural background and so on. Ability is usually believed to be the most important factor in determining students' performance, assessment being the instrument for sorting the more able from the less able students after teaching is over. Many common but counterproductive practices spring from this belief, one being that teaching is not an educative activity so much as a *selective* one, the purpose being to separate the good learners from the poor learners. This belief bedevils much common assessment practice, as we discuss in Chapter 10. The curriculum in Level 1 teaching becomes a list of items of content that, once expounded from the podium, has been 'covered'.

How the students receive and deal with that content, and what their depth of understanding of it might be, are not specifically addressed.

Level 1 is founded on a *quantitative* way of thinking about learning and teaching (Cole 1990), which manifests itself most obviously in assessment practices, such as 'marking', that is, counting the number of correct points, or rating aspects of students' performances on arbitrary scales. We examine this model, its manifestations and its consequences, in Chapter 10.

The view of university teaching as transmitting information is so widely accepted that teaching and assessment the world over are based on it. Teaching rooms and media are specifically designed for one-way delivery. A teacher is the knowledgeable expert, the sage on the stage, who expounds the information the students are to absorb and to report back accurately. How well students do these things depends, in this view, on their ability, on their motivation, and even on their ethnicity, as Asian students are frequently but unfairly and inaccurately stereotyped as 'rote-learners' (Biggs 1996a).

Explaining the variability in student learning on students' characteristics is a *blame-the-student* theory of teaching. When students don't learn (that is, when teaching breaks down), it is due to something the students are lacking, as exemplified in the following comments:

How can I be expected to teach that lot with those A level results? They wouldn't even have been admitted 10 years ago.

They lack any motivation at all.

These students lack suitable study skills. But that's not my problem, they'll have to go to the counselling service.

In themselves, these statements may well be true: school leaving results might be poor, students nowadays may be less academically oriented. As we saw in Chapter 1, that is precisely the *challenge* for teachers to teach well, not their excuse for poor teaching.

Blame-the-student is a comfortable theory of teaching. If students don't learn, it's not because there is anything wrong with the teaching, it's because they are incapable, unmotivated, foreign or the possessors of some other nonacademic defect which is not the teacher's responsibility to correct. Level 1 teaching is totally unreflective. It doesn't occur to the teacher to ask the key generative question: 'What else could I be doing that might make them learn more effectively?' And until they do ask that, their teaching is unlikely to change.

Level 2. Focus: what the teacher does

Teachers at Level 2 focus on what teachers do. This view of teaching is still based on transmission, but transmitting concepts and understandings, not just information (Prosser and Trigwell 1999). The responsibility for 'getting it across' now rests to a significant extent on what the teacher does. The

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possibility is entertained that there may be more effective ways of teaching than what one is currently doing, which is a major advance. Learning is seen as more a function of what the teacher is doing than a function of what sort of student one has to deal with.

The teacher who operates at Level 2 works at obtaining an armoury of teaching skills. The material to be 'got across' includes complex understandings, which requires much more than chalk and talk. Consider the following:

I'll settle them down with some music, then an introductory spiel: where we were last week, what we're going to do today. Then a video clip followed by a buzz session. The questions they're to address will be on the OH. I'll then fire six questions at them to be answered individually. Yes, four at the back row, finger pointing, that'll stir that lot up. Then I speak to the answers for about seven minutes, working in those two jokes I looked up. Wrap up, warning them there's an exam question hidden in today's session (moans of 'Now he tells us!' yuk, yuk). Mention what's coming up for next week, and meantime they're to read Chapter 10 of Bronowski.

Plenty of variation in technique here, probably – almost certainly – a good student response, but the focus of this description is entirely teacher-centred. It's about what *I* the teacher am doing, not on what *they* the students are learning.

Traditional approaches to staff development for teachers often work on what the teacher does, as do 'how to' courses and books that provide tips for teachers and prescriptive advice on getting it across more effectively, advice such as:

• Establish clear procedural rules at the outset, such as signals for silence.
• Ensure clarity. Project the voice, use clear visual aids.
• Eye contact with students while talking.
• Don't interrupt a large lecture with handouts as chaos is likely.

This is certainly useful advice, but it is concerned with *management*, not with facilitating learning. Good management is important, but it is a means of setting the stage on which good learning may occur; it is not as an end in itself.

Level 2 is also a deficit model, the 'blame' this time being on the teacher. It is a view of teaching often held by university administrators, because it provides a rationale for making personnel decisions. Good teachers are those who have lots of teaching competencies. Does Dr Jones 'have' the appropriate competencies for tertiary level teaching? If not, he had better show evidence that he has by the time his contract comes up for renewal. However, teaching competencies may have little to do with teaching effectiveness. A competency, such as constructing a reliable multiple-choice test, is useful only if it is appropriate to one's teaching purposes to *use* a multiple-choice test. Likewise, managing educational technology, or questioning skills, or any of the other competencies tertiary teachers should 'have', should not be isolated from the context in which they are being used. Knowing what to do is important only if you know why, when and how you should do it. The focus

should not be on the skill itself, but on whether its deployment has the desired effect on student learning.

Which brings us to the third level of teaching.

Level 3. Focus: what the student does

Teachers at Level 3 focus on what the student does and how that relates to teaching. Level 3 is a student-centred model of teaching; the purpose of teaching is to support learning. No longer is it possible to say: 'I taught them, but they didn't learn.' Expert teaching includes mastery over a variety of teaching techniques, but unless learning takes place, they are irrelevant. The focus in Level 3 is on what the student does and on how well the intended outcomes are achieved.

This implies a view of teaching that is not just about facts, concepts and principles to be covered and understood, but which also requires us to be clear about:

1 what it is the students are to learn and what are the intended or desirable outcomes of their learning;
2 what it means for students to 'understand' content in the way that is stipulated in the intended learning outcomes;
3 what kind of teaching/learning activities are required to achieve those stipulated levels of understanding.

Levels 1 and 2 did not address these questions. The first question requires that we specify what we intend students to be able to do after we have taught a topic. It's just not good enough for us to talk about it or teach with an impressive array of visual aids: the whole point, how well the students have learned, has been ignored. The second question requires that the level of understanding that students are to achieve is stipulated, and the third that the teaching/learning activities are specifically attuned to helping students achieve those levels of understanding. Then follow the key questions:

• How do you define those levels of understanding as outcome statements?
• What do students have to do to reach the level specified?
• What do you have to do to find out if the outcomes have been reached at the appropriate level or not?

Defining levels of understanding is basic to clarifying our intended outcomes, the subject of Chapters 5 and 7, and examples are given in Chapter 6. Getting students to understand at the level required is a matter of getting them to undertake the appropriate learning activities, which is a matter dealt with in Chapters 8 and 9. This is where a Level 3 student-centred theory of teaching departs from the other models. It's not what *we* do but what *students* do that's the important thing. Finally, we need to check that their levels of understanding and of performance are what we intended. This is dealt with in Chapters 10, 11 and 12, on the theory and practice of assessment.

How do students learn?

Learning has been the subject of research by psychologists for well over a century, but remarkably little has *directly* resulted in improved teaching. The reason is that until recently psychologists were more concerned with developing the One Grand Theory of Learning that covered all learning, rather than with studying the contexts in which people learned, such as schools and universities (Biggs 1993a). Over a century ago, William James warned:

> I say moreover that you make a great, a very great, mistake if you think that psychology, being the science of the mind's laws, is something from which you can deduce definite programmes and schemes and methods of instruction. . . . Teaching must *agree* with the psychology but need not necessarily be the only kind of teaching that would so agree . . .
>
> (James 1899/1962: 3)

B.F. Skinner tried to introduce a whole technology of teaching from behaviourism (Skinner 1968), his apparently successful teaching machines being one celebrated example. Teaching machines were however not so much an application of psychology but an analogy based on pigeons pecking targets, and, not surprisingly, worked best for low level rote learning. The notion of the One Grand Theory that explains all is now dead, but the belief that psychology can improve educational practice is still very much alive. However, the nature of that relationship between psychology and education has been interpreted differently in North America and in Europe. In North America, the tendency is to apply psychological theory, derived in controlled laboratory research, to education top-down, as seen particularly in theories of intelligence (e.g. Sternberg 1988; Gardner 1999) and motivation (Pintrich and Schunk 2002; see also Chapter 3 below). In Europe and Australia, on the other hand, the focus has been to study learning bottom-up by observing students learning in context. These studies gave rise to the field of study designated as 'student learning' research.

Both perspectives have their uses and address different issues. As a generalization, the psychological foundation to American research on teaching and learning tends to put the focus on the person and 'within-the-skin' factors, such as intelligence, learning styles (see below) and motivation, while the European focus is on contextual factors, of which teaching is clearly the most important in our context.

Student learning research originated in Sweden, with Marton and Säljö's (1976a, 1976b) studies of surface and deep approaches to learning. They gave students a text to read and told them they would be asked questions afterwards. Students responded in two different ways. The first group learned in anticipation of the questions, concentrating anxiously on the facts and details that might be asked. They 'skated along the surface of the text', as Marton and Säljö put it, using a *surface* approach to learning. These students remembered a list of disjointed facts; they did not comprehend the underlying theme

the author was addressing. The second group on the other hand set out to understand the meaning of what the author was trying to say. They went below the surface of the text to interpret that meaning, using a *deep* approach. They saw the big picture and how the facts and details made the author's case.

Note that the terms 'deep' and 'surface' as used here describe ways of learning a particular task, they do *not* describe characteristics of students. We can say that Robert might typically use a surface approach, but the issue – and the point of this book – is to set up ways of getting him to go deep.

The Marton and Säljö studies struck a chord with ongoing work in other countries; in particular that of Entwistle in the United Kingdom (e.g. Entwistle and Ramsden 1983) and of Biggs in Australia (e.g. 1979, 1987a). Entwistle was working from the psychology of individual differences, Biggs from cognitive psychology, and Marton and Säljö from what they later called phenomenography. However, all had a common focus: studying learning in an institutional context.

This work generates strong implications for teaching, as we explore in this chapter.

Constructivism and phenomenography

In reflecting on our teaching and interpreting our teaching decisions, we need a theory. Level 3 theories of teaching, which we looked at earlier in this chapter, are based on two main theories: constructivism and phenomenography. Which one you use may not matter too much, as long as your theory is consistent, understandable and works for you. We prefer constructivism as our framework for thinking about teaching because it emphasizes what students have to do to construct knowledge, which in turn suggests the sorts of learning activities that teachers need to encourage in order to lead students to achieve the desired outcomes.

Constructivism has a long history in cognitive psychology, going back at least to Piaget (1950). Today, it takes on several forms: individual, social, cognitive, postmodern (Steffe and Gale 1995). All forms emphasize that the learners construct knowledge with their own activities, and that they interpret concepts and principles in terms of the 'schemata' that they have already developed. Teaching is not a matter of transmitting but of engaging students in active learning, building their knowledge in terms of what they already understand: 'Constructivism does not claim to have made earth-shaking inventions in the area of education; it merely claims to provide a solid conceptual basis for some of the things that, until now, inspired teachers had to do without theoretical foundation' (von Glasersfeld 1995: 4).

'Phenomenography' was a term resurrected by Marton (1981) to refer to the theory that grew out of his studies with Säljö on approaches to learning and has developed since then (Marton and Booth 1997). Originally used by Sonnemann (1954) in clinical psychology, phenomenography in the student

learning context refers to the idea that the learner's perspective determines what is learned, not necessarily what the teacher intends should be learned. Thus, in outcomes-based teaching and learning, it is important that students clearly understand the learning outcomes they are meant to achieve, and accordingly they are written from the student's perspective. The learning outcomes say what they, the students, have to do in order to achieve them, not what the teachers have to do. In the phenomenographic approach itself, however, the emphasis is not on defining learning outcomes, but on changing the learner's perspective, or the way the learner sees the world and on how learners represent knowledge (Prosser and Trigwell 1999). Teaching here starts from the student's experience. Phenomenographic studies have shown how students' ideas of a particular concept or principle develop from simple to complex and that teachers need to see the object of instruction from the student's perspective and lead them to higher order levels of understanding. One way of doing this is by using variation in presenting information and perspectives (Marton and Booth 1997; Prosser and Trigwell 1999).

Both constructivism and phenomenography agree that effective learning changes the way we see the world. The acquisition of information in itself does not bring about such a change, but the way we *structure* that information and think with it does. Thus, education is about *conceptual change*, not just the acquisition of information.

Such conceptual change takes place when:

1 it is clear to both teachers and students what the intended outcomes of learning are, where all can see where they are supposed to be going. Outcomes-based teaching and learning requires this of teachers, whereas teaching in the form of 'covering a topic' does not. This is not to say that there will not be unintended but desirable outcomes, such outcomes are of course very welcome. How we handle these is discussed in Chapter 10.

2 students experience a felt need to achieve the outcome. The art of good teaching is to communicate that need where it is initially lacking. 'Motivation' is not something that students must first possess; motivation is as much a product of good teaching as its prerequisite. This question is addressed in the next chapter.

3 students feel free to focus on the task, not on watching their backs. Attempts to create a felt need to learn by the use of ill-conceived and urgent assessments create anxiety and are counterproductive. The game changes, becoming a matter of dealing with the test, not with engaging with the task deeply.

4 students work collaboratively and in dialogue with others, both peers and teachers. Good dialogue elicits those activities that shape, elaborate and deepen understanding.

These four points contain a wealth of implication for the design of teaching and for personal reflection about what one is really trying to do, as we examine in the following chapter.

Surface and deep approaches to learning

The surface and deep approaches usefully describe how Robert and Susan typically go about their learning and studying – up to the point when teaching begins. Our aim is to teach so that Robert learns more in the manner of Susan.

Surface approach

The surface approach arises from an intention to get the task out of the way with minimum trouble, while appearing to meet course requirements. Low cognitive level activities are therefore used, when higher level activities are required to do the task properly. The concept of the surface approach may be applied to any area, not only to learning. The terms 'cutting corners' and 'sweeping under the carpet' convey the idea: the job appears to have been done properly when it hasn't.

Applied to academic learning, examples include rote learning selected content instead of understanding it, padding an essay, listing points instead of addressing an argument, quoting secondary references as if they were primary ones; the list is endless. A common misconception is that memorization in itself indicates a surface approach (Webb 1997). However, verbatim recall is sometimes entirely appropriate, such as learning lines for a play, acquiring vocabulary or learning formulae. An example of memorizing playing a part in a deep approach occurs in the examination context, in what Tang (1991) called 'deep memorizing'. The student intends to understand in depth but also needs to be able to recall details on cue, but those details are interconnected so that correct recall of the part can give access the whole. Entwistle and Entwistle (2003) report an interesting development of this in their concept of a 'knowledge object'. After a period of intensive revision, some students experience a holistic visual image of the content they are learning. They feel 'outside' the object and almost like an artist painting a picture, adding a detail here, altering something there. They can then use the object to guide their exam answers. Here rote memorizing and understanding play off each other, so that understanding is fixed and supported with relevant detail that can be remembered on cue, as is needed in exams.

Memorization becomes a surface approach when it is used to *replace* understanding, to give the impression that an appropriate level of understanding has occurred when it has not. When Robert takes notes, and selectively quotes them back, he is under-engaging in terms of what is properly required. That is a surface approach. The problem is that it works when teaching, and particularly assessment, allow it to.

> I hate to say it, but what you have got to do is to have a list of 'facts'; you write down ten important points and memorize those, then you'll do all right in the test. . . . If you can give a bit of factual information – so and

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so did that, and concluded that – for two sides of writing, then you'll get a good mark.

<div align="right">(a psychology undergraduate, quoted in Ramsden 1984: 144)</div>

If the teacher of this student thought that an adequate understanding of psychology could be manifested by selectively memorizing, there would be no problem. But it is unlikely that the teacher did think that – we should hope not, anyway. Rather, an inappropriate assessment task *allowed* the students to get a good mark on the basis of memorizing facts. As it happened, this particular student later graduated with first class honours. The problem lies therefore not in the student, but in the assessment task. This teacher was not being reflective while the student was highly reflective: he'd outconned the teacher.

Thus, do not think that Robert is irredeemably cursed with a surface approach if he only lists unrelated bullet points as his understanding of an article. Teaching and assessment methods often encourage a surface approach, because they are not aligned to the aims of teaching the subject, as in the case of the psychology teacher we just saw. The presence of a surface approach is thus a signal that something is out of kilter in our teaching or in our assessment methods. It is therefore something we can hope to address.

In using the surface approach, students focus on what Marton calls the 'signs' of learning; the words used, isolated facts, items treated independently of each other. This prevents students from seeing what the signs signify, the meaning and structure of what is taught. Simply, they cannot see the wood for the trees. Emotionally, learning becomes a drag, a task to be got out of the way. Hence the presence of negative feelings about the learning task: anxiety, cynicism, boredom. Exhilaration or enjoyment of the task is not part of the surface approach.

Factors that encourage students to adopt such an approach include:

1 *From the student's side*:

- an intention only to achieve a minimal pass. Such may arise from a 'meal ticket' view of university or from a requirement to take a subject irrelevant to the student's programme;
- non-academic priorities exceeding academic ones;
- insufficient time; too high a workload;
- misunderstanding requirements, such as thinking that factual recall is adequate;
- a cynical view of the subject topic and/or of the teaching context itself;
- high anxiety;
- a genuine inability to understand particular content at a deep level.

2 *From the teacher's side*:

- teaching piecemeal by bullet lists, not bringing out the intrinsic structure of the topic or subject. (We hasten to add that some bullet lists, like these two here, for instance, are OK: see Chapter 4);

- assessing for independent facts, which is almost inevitably the case when using short answer and multiple-choice tests;
- teaching, and especially assessing, in a way that encourages cynicism: for example, 'I hate teaching this section, and you're going to hate learning it, but we've got to cover it';
- providing insufficient time to engage the tasks; emphasizing coverage at the expense of depth;
- creating undue anxiety or low expectations of success: 'Anyone who can't understand this isn't fit to be at university'.

The student factors (1) are not entirely separate from the teacher factors (2). Most of the student factors are affected by teaching. Is insufficient time to engage properly a matter of poor student planning or of poor teacher judgement? Much student cynicism is a reaction to teaching busy-work and of assessing trivia. Even the last student factor, inability to understand at a deep level, refers to the task at hand and that may be a matter of poor teacher judgement concerning curriculum content as much as the student's abilities. But there are limits. Even under the best teaching some students will still maintain a surface approach. Unfortunately, it is easier to create a surface approach than it is to support a deep approach (Trigwell and Prosser 1991).

An important step in improving teaching, then, is to avoid those factors that encourage a surface approach.

Deep approach

The deep approach arises from a felt need to engage the task appropriately and meaningfully, so the student tries to use the most appropriate cognitive activities for handling it. To Susan, who is interested in mathematics and wants to master the subject, cutting corners is pointless.

When students feel this need-to-know, they automatically try to focus on underlying meanings, on main ideas, themes, principles or successful applications. This requires a sound foundation of relevant prior knowledge, so students needing to know will naturally try to learn the details, as well as making sure they understand the big picture. In fact, the big picture is not understandable without the details. When using the deep approach in handling a task, students have positive feelings: interest, a sense of importance, challenge, exhilaration. Learning is a pleasure. Students come with questions they want answered, and when the answers are unexpected, that is even better.

Factors that encourage students to adopt such an approach include:

1 *From the student's side*:

- an intention to engage the task meaningfully and appropriately. Such an intention may arise from an intrinsic curiosity or from a determination to do well;
- appropriate background knowledge and a well-structured knowledge base;

- the ability to focus at a high conceptual level, working from first principles;
- a genuine preference for working conceptually rather than with unrelated detail.

2 *From the teacher's side*:

- teaching in such a way as to explicitly bring out the structure of the topic or subject;
- teaching to elicit an active response from students, e.g. by questioning, presenting problems for them to solve, rather than teaching to expound information;
- teaching by building on what students already know;
- confronting and eradicating students' misconceptions;
- assessing for structure rather than for independent facts;
- teaching and assessing in a way that encourages a positive learning atmosphere, so students can make mistakes and learn from them;
- emphasizing depth of learning, rather than breadth of coverage;
- in general, and most importantly, using teaching and assessment methods that support the explicit aims and intended outcomes of the course.

Again, the student factors (1) are not independent of the teacher factors (2). Encouraging the need-to-know, instilling curiosity, building on students' prior knowledge are all things that teachers can attempt to do; and, conversely, are things that poor teaching can too easily discourage. There are many things the teacher can do to encourage deep learning, as will be a lot clearer by the end of this book.

Desirable student learning depends both on student-based factors – ability, appropriate prior knowledge, clearly accessible new knowledge – and on the teaching context, which includes teacher responsibility, informed decision making and good management. But the bottom line is that teachers have to work with what material they have. Whereas lectures and tutorials might have worked in the good old days when highly selected students tended to bring their deep approaches with them, they may not work so well today. We need to create a teaching context where the Roberts of this world can go deep too.

Another and more important step in improving teaching is to focus on those factors that encourage a deep approach.

What is the difference between learning approaches and learning styles?

Some people speak of students' approaches to learning as if they were learning styles that students use consistently, whatever the task or the teaching (Schmeck 1988; Sternberg and Zhang 2001). Others speak of approaches as

entirely determined by context, as if students walk into a learning situation without any preference for their way of going about learning (Marton and Säljö 1976a). These interpretations reflect the American and the European perspectives (p. 21).

We take a middle position. Students do have predilections or preferences for this or that approach, but those predilections may or may not be realized in practice, depending on the teaching context. We are dealing with an *interaction* between personal and contextual factors, not unlike the interaction between heredity and environment. Both factors apply, but which predominates depends on particular situations. Have another look at Figure 1.1 (p. 6). At point A, under passive teaching, student factors make the difference, but at point B, under active teaching, the differences between students lessen. Practically speaking, however, it is more helpful to see approaches to learning as something we as teachers can hope to change, rather than as styles about which we can do little. For an analysis of the differences between learning styles and learning approaches see Sternberg and Zhang (2001).

Scores on such questionnaires as the *Approaches and Study Skills Inventory for Students* (ASSIST) (Tait et al. 1998) or the *Study Process Questionnaire* (SPQ) (Biggs et al. 2001), are most usefully seen as outcomes of teaching rather than as measuring differences between students. Responses to these questionnaires tell us something about the quality of the teaching environment, precisely because students' predilections tend to adapt to the expected requirements of different teaching environments.

Teaching and approaches to learning

To achieve most intended learning outcomes a range of verbs, from high to low cognitive level, needs to be activated. The highest would refer to such activities as reflecting and theorizing, the lowest to memorizing and recalling, while in between are various levels of activity. When using a deep approach, students use the full range of desired learning activities; they learn terminology, they memorize formulae, but move from there to applying these formulae to new examples. When using a surface approach, there is a shortfall; students handle all tasks, low and high, with low level verbs ('two pages of writing, etc.'). The teaching challenge is to prevent this shortfall from occurring, or to correct it where it has occurred (see Figure 2.1).

The conclusion to be drawn is simple but powerful: the surface approach is to be discouraged, the deep approach to be encouraged, which is a good working definition of good teaching. Preventing students from using a surface approach by discouraging the use of low level and inappropriate learning activities is the main thrust of the following chapter, while supporting the full range of appropriate learning activities, thus encouraging a deep approach, is what the remainder of the book is about.

Now try Task 2.2 (p. 30) to see how your teaching has helped shape your students' approaches to learning.

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Cognitive level of learning activities

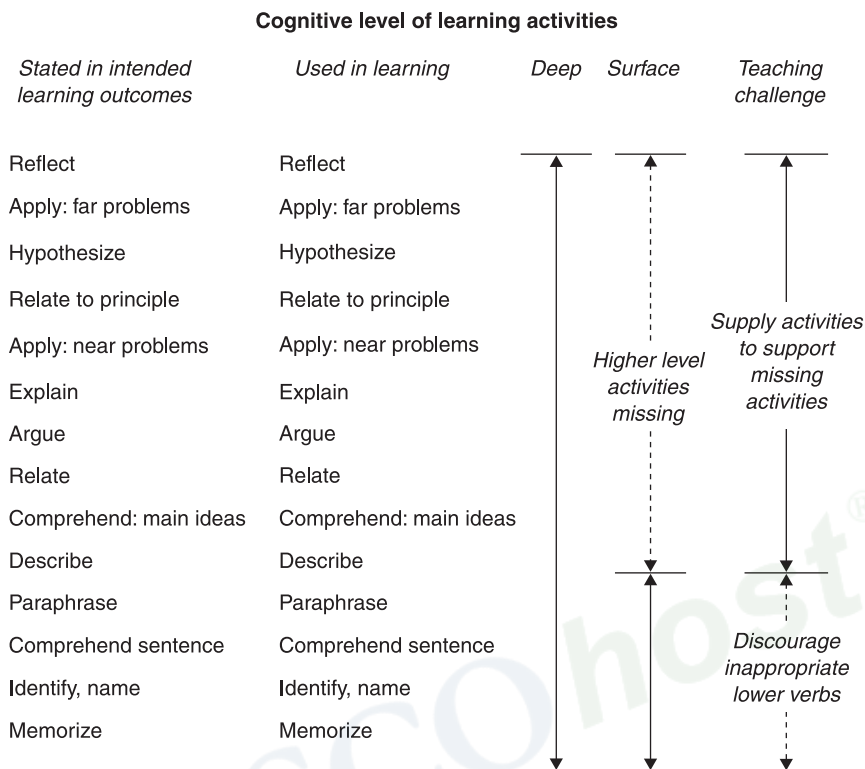| Stated in intended learning outcomes	Used in learning	Deep	Surface	Teaching challenge
Reflect	Reflect			
Apply: far problems	Apply: far problems			
Hypothesize	Hypothesize			
Relate to principle	Relate to principle			Supply activities to support missing activities
Apply: near problems	Apply: near problems			
Explain	Explain		Higher level activities missing	
Argue	Argue			
Relate	Relate			
Comprehend: main ideas	Comprehend: main ideas			
Describe	Describe			
Paraphrase	Paraphrase			
Comprehend sentence	Comprehend sentence			Discourage inappropriate lower verbs
Identify, name	Identify, name			
Memorize	Memorize			

Figure 2.1 Desired and actual level of engagement, approaches to learning and enhancing teaching

Summary and conclusions

Levels of thinking about teaching

We distinguish three common theories of teaching, depending on what is seen as the main determinant of learning: (1) what students are, (2) what teachers do and (3) what students do. These define 'levels' of thinking about teaching. At Level 1, the teacher's role is to display information, the students' to absorb it. If students don't have the ability or motivation to do that correctly, that is their problem. At Level 2, the teacher's role is to explain concepts and principles, as well as to present information. For this they need various skills, techniques, and competencies. Here the focus is on what the teacher does, rather than on what the student is, and to that extent is more reflective and sophisticated. At Level 3, the focus is on what the students do: are they engaging those learning activities most likely to lead to the intended outcomes?

Task 2.2 Does your teaching encourage surface or deep approaches to learning?

Good teaching *encourages* a deep approach, and *discourages* a surface approach, to learning.

Reflect on your teaching so far. Identify aspects of your teaching that have (maybe unintentionally)

a encouraged a surface approach to learning:

_____
_____
_____

b encouraged a deep approach to learning:

_____
_____
_____

What future actions would you take to encourage a deep approach to learning in your students?

_____
_____
_____

Before we end this chapter, please complete Task 2.3.

Task 2.3 Follow-up to Task 2.1

In Task 2.1, you stated your theories of teaching and learning. Now that you have finished this chapter, we ask you to review those theories and answer the following question.

Have your theories of teaching and learning changed now that you have seen others' views? If yes, what is(are) the change(s) and why?

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_____
_____

If not, what sort of teaching/learning context would best help them? How can I know that they have achieved the intended outcomes satisfactorily?

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How do students learn?

It is only in comparatively recent years that researchers into learning have studied learning as it takes place in institutions, by students. There is now a body of theory called 'student learning research' which directly relates to practice, constructivism and phenomenography being the two most influential. Both emphasize that meaning is created by the learner, but constructivism focuses particularly on the nature of the learning activities the student uses and on this account in our view leads more readily to designing contexts for enhancing learning.

Surface and deep approaches to learning

Learning activities that are too low a level to achieve the intended learning outcomes are referred to as comprising a 'surface' approach to learning, for example memorizing to give the impression of understanding. Activities that are appropriate to achieving the outcomes are referred to as a 'deep' approach. At university, intended outcomes would be high level, requiring students to reflect, hypothesize, apply and so on. Surface and deep approaches to learning are not personality traits, as is sometimes thought, but are most usefully thought of as reactions to the teaching environment.

Teaching and approaches to learning

Good teaching supports those activities that lead to a deep approach to learning and to the attainment of the intended learning outcomes. How to design such teaching, and how to assess in order to see how well the outcomes have been achieved, are what the rest of this book is about. That is to accentuate the positive. But we also need to eliminate the negative. There is much in what the teacher does or says that can encourage inappropriate, surface approaches to learning. These are of course to be discouraged. To do that is to set the stage for effective teaching; and that is the subject of the following chapter.

Further reading

Between levels 2 and 3?

Bain, K. (2004) *What the Best College Teachers Do.* Cambridge, MA: Harvard University Press.
Biggs, J.B. (1993b) From theory to practice: a cognitive systems approach, *Higher Education Research and Development*, 12: 73–86.

Bain and Biggs offer two contrasting but complementary views on teaching. Bain's book is based on a study of the philosophies of exceptional teachers and what they did in the classroom, an exceptional teacher being one who 'transforms lives, changes everything, and messes with . . . student's heads' (p. 10). Biggs takes the view that the plot is about what students do, not what teachers do, and that to enhance student learning across the board it is the responsibility of the institution to support student learning with appropriate policies and infrastructure. That is, the issue is teach*ing*, not teach*ers*. Exceptional individual teachers have always transformed lives and will continue to do so, but ordinary teachers, the large majority, will affect more lives, especially if they teach badly: this is where the systems approach can help in supporting all teachers not just exceptional ones. Bain and Biggs are talking about different aspects of teaching – but ordinary teachers may well be inspired by reading about what their gifted colleagues do so effectively.

Constructivism and phenomenography

Marton, F. and Booth, S.A. (1997) *Learning and Awareness.* Hillsdale, NJ: Lawrence Erlbaum.
Perkins, D. (1999) The many faces of constructivism, *Educational Leadership*, 57, 3: 6–11.
Steffe, L. and Gale, J. (eds) (1995) *Constructivism in Education.* Hillsdale, NJ: Lawrence Erlbaum.
von Glasersfeld, E. (1995) *Radical Constructivism: A Way of Knowing and Learning.* Washington, DC: The Falmer Press.

These books present the major theories behind current student learning research and applications to teaching. Marton and Booth discuss learning from the phenomenographic standpoint; while much of the discussion is philosophical, the title of the last chapter, which outlines the phenomenographic approach to teaching, is 'A pedagogy of awareness'. Steffe and Gale and von Glasersfeld examine the constructivist position generally and how it applies to education. Perkins gives an excellent overview for teachers. The constructivist approach is that which guides the rest of the present book.

On applying student learning research to teaching

Dart, B. and Boulton-Lewis, G. (eds) (1998) *Teaching and Learning in Higher Education.* Camberwell, Victoria: Australian Council for Educational Research.
Entwistle, N. (2009) *Teaching for Understanding at University: Deep Approaches and Distinctive Ways of Thinking.* Basingstoke: Palgrave Macmillan.

Prosser, M. and Trigwell, K. (1999) *Understanding Learning and Teaching: The Experience in Higher Education.* Buckingham: Open University Press.
Ramsden, P. (2003) *Learning to Teach in Higher Education.* London: Routledge.
Sternberg, R.J. and Zhang L.F. (eds) (2001) *Perspectives on Thinking, Learning, and Cognitive Styles.* Mahwah, NJ: Lawrence Erlbaum.

Dart and Boulton-Lewis contains a collection of papers that address a range of teaching issues within the general student learning paradigm, including teachers' beliefs, creative writing, handling individual differences, collaborative learning and educational measurement. Entwistle reviews the recent student learning research comprehensively, with particular emphasis on the nature of knowledge and understanding (and to which we return in Chapter 5). Prosser and Trigwell demonstrate the implications for teaching arising from the phenomenographic framework and is in a sense a parallel to the present book, which operates from constructivism. Ramsden's approach is his own, but derives much from phenomenography, Chapters 1 to 7 giving rather more detail on the history and development of the student learning paradigm than is given here and how it may be applied to teaching. In Sternberg and Zhang most contributors argue that learning/cognitive styles are relevant to teaching, except Biggs, who argues that accommodating teaching to different learning styles is too complex to be practicable, and that surface and deep learning approaches are not styles to which teaching should accommodate, but are outcomes of teaching.

3

Setting the stage for effective teaching

Effective teaching requires that we eliminate those aspects of our teaching that encourage surface approaches to learning; and that we set the stage properly so that students will more readily use deep approaches to learning. This involves getting students to realize that appropriate task engagement is a good and impelling idea (otherwise known as 'motivation'), and that we establish the kind of climate that will optimize appropriate interactions with our students. An important aspect to effective teaching is reflective practice, using transformative reflection, which involves teachers reflecting on their current teaching through the lens of a sound theory of teaching and learning in order to create an improved teaching environment that adapts to changing conditions.

Getting students involved in learning: motivation

There is no such thing as an unmotivated student: all students not in a coma want to do *something*. Our task is to maximize the chances that what they want to do is to achieve the intended learning outcomes, and any unintended but desirable outcomes. Unfortunately, there are many aspects of teaching that actually discourage students from doing that: we need to identify and minimize these as far as we can.

The best sort of motivation arises from intrinsic interest, fascination, call it what you will, but, unfortunately, that occurs well down the track, when the student already knows a lot about the topic and, like Susan, is already involved in it. Our problem as teachers is getting students to engage in learning before they have reached that stage. Unfortunately, students like Robert resort to surface learning strategies to avoid becoming involved. It doesn't help to say that Robert is 'unmotivated'. Of course he is: that's the problem.

Teachers who have a Level 1 theory of teaching see motivation as a substance that students possess in varying quantities, the Susans having lots, the Roberts having little or none – and that's the way it is. But surely we can

do *something* to encourage Robert to engage? Yes, we can. Two factors make students (or anyone, come to that) want to learn something:

1 It has to be important; it must have some *value* to the learner.
2 The learner needs to *expect success* when engaging the learning task.

Nobody wants to do something they see as worthless. Neither do they want to do something, however valued, if they believe they have no chance of succeeding. In both cases, doing the task will be seen as a waste of time.

This commonsense theory of why students do or do not want to learn is called the *expectancy-value* theory of motivation, which says that if anyone is to engage in an activity, he or she needs both to value the outcome and to expect success in achieving it (Feather 1982). Both the high value and the expectancy of success need to be present; if either one is zero, then no motivated activity occurs.

What makes a task worth doing?

Let us look first at the value term in the expectancy-value formula. How can we enhance the value of the task to the students? The general answer is clear enough: make their work important to them. Work can be important in various ways, each one producing a familiar category of motivation:

- what the outcome produces (*extrinsic* motivation);
- what other people value (*social* motivation);
- the opportunity for ego enhancement (*achievement* motivation);
- the process of doing it (*intrinsic* motivation).

Extrinsic motivation occurs when students perform the task because of the value or importance they attach to what the outcome brings, either something positive following success, such as a material reward, or something negative, such as a punishment, that would follow failure or non-engagement.

The quality of learning is usually low under extrinsic conditions. The student's attention is not so much on the task as on its consequences. Extrinsic motivation is a standing invitation to students to adopt a surface approach: indeed, the motive component of a surface approach is extrinsic, including a fear of failure (Biggs 1987a). Negative reinforcement is worse than positive, because if the learning is not successful, punishment is implicated, which introduces a range of side issues such as anxiety, anger, shame, desire for revenge, none of which is very helpful in getting the job done.

Social motivation occurs when students learn in order to please people whose opinions are important to them. If the processes of studying, or the fruits of a good education, are valued by other people important to the student, education may take on an intrinsic importance to the student. This is evident in some families, particularly Asian families, who have a high regard for education. Children with this family background are likely to accept that education is a good thing, to be pursued without question.

We can usually trace the beginning of our interest in something to someone who exhibited that interest to us. We want to be like them. This process is called 'modelling', where the models are admired and readily identified with. University teachers are in a good position to be seen as models, especially in the one-to-one situation of dissertation supervision. At the undergraduate level, in today's crowded universities, students are rather less likely to have the opportunity to engage closely with an academic but it can happen, especially if the academic publicly displays great enthusiasm for the subject.

Achievement motivation is about achieving in order to enhance the ego, such as competing against other students and beating them. They feel good about themselves. This can often lead to high achievement, and tends even to be associated with deep learning (Biggs 1987a), but the aims of deep learning and of achievement motivation ultimately diverge. The deep approach is concerned with handling the task as appropriately as possible, the achieving approach with handling it in order to obtain the highest grades possible. High grades and appropriate learning should mean the same, but in poorly designed assessment tasks the strategic student can obtain high grades using inappropriate, low level learning, as did Ramsden's student (pp. 24–5).

Achievement motivation in the raw is not a pretty sight. It kills collaborative learning. Other students become competitors, not colleagues, and so steps are taken to disadvantage others: key references are hidden or mutilated, hints are not shared, misleading advice is given. Achievement motivation needs competitive conditions in which to work, and while that suits the minority of students who are positively motivated by competition, it actually damages the learning of those who perceive competition as threatening. Achievement motivation, like anxiety, changes the priorities of students, because content mastery plays second fiddle either to winning or to avoiding the appearance of losing, for example by doing only very easy tasks or, paradoxically, too hard tasks that the student can fail with honour. More students are turned off and work less well under competitive conditions than those who are turned on and work better. Although competition is often touted as the way the 'real' world works, it does not follow that universities should make learning competitive for the general run of students, as happens when using norm-referenced assessments such as 'grading on the curve'.

Intrinsic motivation is the academic ideal but is the rarer for that. Students like Susan learn because they are interested in the task or activity itself. They do mathematics for the intellectual pleasure of problem solving and exercising their skill, independently of any rewards that might be involved. The point is to travel rather than to arrive. Intrinsic motivation drives deep learning and the best academic work.

Intrinsic motivation increases with continuing successful engagement with a specific task. Susan does not turn up at university to study mathematics without having experienced previous success in mathematics. The fact that many students may not have had much previous formal engagement in a subject does not, however, mean they will not develop intrinsic interest in it. Interest in subjects such as psychology or sociology, which may not have been

studied previously, arises from curiosity and informal experience or from career plans. If the student sees the area as personally important, intrinsic interest will follow.

The question is, how do we motivate the Roberts, who have no definite career plans, no perception yet of personal importance of the area or even curiosity about related topics?

Involving students who are not yet intrinsically motivated

Rephrase the question: if a student doesn't yet see the task as important, how can we help make it so?

Let us look first at extrinsic motivation, as when the teacher sees assessment as the answer. A common cry is that students will not spend time learning a topic if they think it is not going to be assessed. Very well, some say, see that the topic *is* assessed. But this is an excellent way of devaluing it. The subtext says: 'The only value of this topic is that I have decided to test you on it!'

In an aligned system of teaching, this does not happen. The reason that the topic is being assessed is because it was important enough to be overtly included in the intended outcomes. The fact that it is there establishes its value. Assessing outside the curriculum, or at a lower cognitive level than the curriculum demands, results in irrelevant or counterproductive tasks that students will resent or turn to their advantage, as did the student who wrote 'who said what on two sides of paper'.

The effects of assessment also depend on the kind of climate that has been created. One teacher informed his senior undergraduate class: 'You're going to hate the next couple of weeks; I know I am. I see absolutely no point in this form of linguistic analysis, but there it is, it's in the syllabus and we've got to cover it.' Amazingly, one student reported she had found the topic to be the most interesting part of the course, and was designing a dissertation proposal around it! Susan can cope with this kind of thing; she has her own reasons for valuing the topic. But Robert, who has nothing but the teacher's word for it, will indeed see the topic as valueless, hence not worth learning, except for the most cynical of reasons.

Using social motivation is a good strategy. Teachers who love their subject, and show it, can be inspirational. The fact that here is someone who does perceive great value in it will cause students to be curious, to seek some of that value.

The key to motivation, then, is to ensure that academic activities are meaningful and worthwhile. This is made very clear in problem-based learning, where real-life problems become the context in which students learn academic content and professional skills. When faced with a patient with a suspected broken leg and whom the students have to help, learning all the necessary knowledge leading to the diagnosis and treatment of the patient is manifestly a worthwhile activity for a medical student. Problem-based learning is usually undertaken enthusiastically: we explore this teaching strategy further in Chapter 9.

What makes students expect to succeed or to fail?

Let us examine the following true incident:

> When we got to the Psych I lectures, the Stats lecturer said 'Anyone who can't follow this isn't fit to be at University.' That was the first message I got. I *was* having difficulty with Stats and so I thought, maybe he's right, maybe university isn't for me. I liked the rest of Psych but couldn't handle the Stats and had to withdraw.
>
> Next year, funny thing, I did Maths I and we came to probability theory, much the same stuff that I'd bombed out in last year. But the lecturer there said 'Probability is quite hard really. You'll need to work at it. You're welcome to come to me for help if you really need it . . .'
>
> It was like a blinding light. It wasn't *me* after all! This stuff really was *hard*, but if I tried it might just work. That year I got a Credit in that part of the subject.
>
> (a mature student, quoted in Biggs and Moore 1993: 272)

This student had initially been led to believe she had no chance of success. Her first teacher attributed lack of success to lack of ability, she perceived she was not succeeding, so she naturally concluded she didn't have the ability needed. As this was something beyond her control, she concluded she had no chance of ever succeeding. Her second teacher attributed success instead to effort, which is something the student could control. With that came the liberating realization that what was initially certain failure could now be possible success. So she persevered and succeeded. The reasons for that transformation are very instructive in the matter of motivating students.

A history of successful engagement with content that is personally meaningful allows the student both to build up the knowledge base needed for deep learning and, motivationally, to develop the expectations that give confidence in future success. These expectations create feelings of what psychologists call 'self-efficacy', or more simply, of 'ownership': 'I can do this; this is my thing.'

Expectations of success are instilled on the basis of previous success, but only if the conditions that are believed to lead to success remain unchanged. If a student believes that a particular success was due to factors that might change and that are uncontrollable, such as luck or dependence on a particular teacher, belief in future success is diminished.

Westerners differ significantly from the Chinese in their attributions for success and failure. Westerners tend to see success as being attributable more to ability than to effort, while ethnic Chinese see effort as more important. This is possibly one reason why Chinese students do so well in international comparisons of attainment (Watkins and Biggs 1996).

Take methods of assessing students. Norm-referenced assessment is based on grading students against each other, for example by ranking, or 'following the curve'. Students see this sort of assessment as competitive; to get a high grade you have to beat other students. This puts a premium on the importance of relative ability as determining the outcome. In criterion-referenced

assessment, where students are assessed on how well they meet preset criteria, they see that to get a high grade they have to know the intended outcomes and learn how to get there, with a premium on attributions involving effort, study skill and know-how. In norm-referenced assessment success depends on the abilities of other students, over which there is no control, while in criterion-referenced assessment, the ball is in the student's court.

Teacher feedback has powerful effects on students' expectations of success, as the story on learning statistics makes very clear. The psychology teacher's comment pre-empted student control, while the mathematics teacher made students see that success was up to them. Feedback as to progress also encourages beliefs in future success, which again is easier with criterion-referenced assessment: 'This is what you did, the criteria tell you what you might have done, so that this is how to get a better result.'

But how can norm-referenced feedback, such as 'You are below average on this', help students to learn? What does Robert do with *that* information? This is not to say that some students don't want to be told where they stand in relation to their peers, but that information has little to do with teaching and learning. It is nice to be told that you're cleverer than most other students, but not very helpful for learning how to improve your performance. To be told, directly or indirectly, that you're dumber than most of the others is simply destructive.

To instil expectations of failure, as did our psychology lecturer with consummate skill, is easy to do. This is classic blame-the-student stuff: attributing failure to lack of ability or to some other trait that lies fixed within the student. A valuable act of self-reflection as a teacher is to monitor what you say, how you say it, and what comments you write in students' assignments. What does the subtext of your comments say about future success or failure?

Task 3.1 asks you to think of the messages you send your students that might leave them feeling hopeful or hopeless about future success.

Teachers might worry less about motivating students and more about teaching better. That, in a nutshell, is the message of this section. 'Motivation' is dealt with in two ways. The first is to avoid doing those things that devalue academic tasks by encouraging cynicism and debilitating anxiety or sending messages to students that they have no chance of success. The second is to teach in such a way that students build up a good knowledge base, achieve success in problems that are significant and build up a feeling of 'ownership' of their learning; motivation follows good learning as night follows day. It is a matter of getting the causes and the effects right.

The next step in setting the stage for effective teaching is establishing a productive classroom climate.

The teaching/learning climate

Teachers create a certain learning climate through formal and informal interactions with students, which establishes how we and our students feel about learning. This naturally has strong effects on students' learning.