

## Teaching for Quality Learning at University

John B. Biggs (2nd edn. 2003)

Chapter 2, pp. 11-25

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### Constructing learning by aligning teaching: constructive alignment

The key to reflecting on the way we teach is to base our thinking on what we know about how students learn. Learning is constructed as a result of the learner's activities. Activities that are appropriate to achieving the curriculum objectives result in a deep approach to learning. Good teaching supports those appropriate activities, thereby encouraging students to adopt a deep approach. Poor teaching and assessment result in a surface approach, where students use inappropriate and low-order learning activities. A good teaching system aligns teaching method and assessment to the learning activities stated in the objectives, so that all aspects of this system act in accord to support appropriate learning. This system is called *constructive alignment*, based as it is on the twin principles of constructivism in learning and alignment in teaching.

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### Research into student learning

Learning has been the subject of research by psychologists for the whole of the last 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 than in studying the contexts in which people learned, such as schools and universities (Biggs 1993a). This focus has been rectified in the past 20 years or so, and there is now a great deal of research into the ways that students go about their learning. Appropriately, the field of study is now designated 'student learning' research.

Student learning research originated in Sweden, with Marton and Säljö's (1976a,b) 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. What these students remembered was a list of disjointed facts; they did not comprehend the point the author was making. 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 whole point of this book is to set up ways of getting him to go deep. We return to this important distinction shortly.

The Marton and Säljö studies struck a chord with ongoing work in other countries; in particular with that of Entwistle in the UK (e.g. Entwistle and Ramsden 1983), and that of Biggs in Australia (e.g. 1979, 1987a). The conceptual frameworks of these workers were originally quite different from that of the Swedish group, deriving in the first case largely from the psychology of individual differences, and in the second case from cognitive psychology, but the common focus was the study of learning in an institutional context. Some strong implications for teaching could be drawn.

### How do we learn?

Theories of teaching and learning focusing on student activity are based on two main theories: phenomenography and constructivism. 'Phenomenography' was a term coined by Marton (1981) to describe the theory that grew out of his original studies with Säljö, and has developed since then (Marton and Booth 1997). It is based on the idea that the learner's perspective defines what is learned, not what the teacher intends should be learned. Teaching is a matter of changing the learner's perspective, the way the learner sees the world.

Constructivism has a long history in cognitive psychology – Jean Piaget is a crucial figure (e.g. Ginsberg and Oppen 1987) – and today, it takes on several forms: individual, social, cognitive, postmodern (Steffe and Gale 1995). They have in common the idea that what the learner has to *do* to create knowledge is the important thing.

While there are differences between constructivist-driven and phenomenologically driven teaching (Trigwell and Prosser 1997; Prosser and Trigwell 1998), I assume that most teachers, including readers of this book, are not

particularly interested in theories of learning so much as in improving their teaching. For that we need a framework to aid reflection: a theory of learning that is broad-based and empirically sound, and that easily translates into practice. To my mind that means constructivism, with its emphasis on what students have to do, rather than on how they represent knowledge. Both emphasize that the student creates knowledge – call it 'constructing knowledge' or 'constituting knowledge' as you will – so that knowledge is not imposed or transmitted by direct instruction.

Knowledge, then, is created by the student's *learning activities*, their 'approaches to learning' (see below). The low cognitive level of engagement deriving from the surface approach yields fragmented outcomes that do not convey the meaning of the encounter, whereas the deep approach yields the meaning at least as the student construes it. The surface approach is therefore to be discouraged, the deep approach encouraged – and that is the working definition of good teaching used in this book.

What people construct from a learning encounter depends on their motives and intentions, on what they know already, and on how they use their prior knowledge. Meaning is therefore personal. What else can it be? The alternative is that meaning is 'transmitted' from teacher to student, like dubbing an audio-tape, which is a common but untenable view.

Learning is thus a way of interacting with the world. As we learn, our conceptions of phenomena change, and we see the world differently. 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 educative conceptual change takes place when:

- 1 it is clear to students (and teachers) what is 'appropriate', what the objectives are, where all can see where they are supposed to be going;
- 2 students experience the felt need to get there. The art of good teaching is to communicate that need where it is initially lacking. 'Motivation' is a product of good teaching, not its prerequisite;
- 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 are counterproductive. The game then becomes a matter of dealing with the test, not with engaging the task deeply;
- 4 students can 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. But first let us elaborate the fundamental concept of approach to learning.

## Surface and deep approaches to learning

The concepts of surface and deep approaches to learning are helpful in conceiving ways of improving teaching. Sometimes it is useful to refer to an 'achieving' approach (Biggs 1987a), or 'strategic approach' (Tait *et al.* 1998), which refer to how ambitious and how organized students are, whereas we are concerned here with how learning tasks are handled. The surface and deep approaches usefully describe how Robert and Susan typically go about their learning and studying – up to now. Remember that our aim is to teach so that Robert behaves more like Susan.

### The 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 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 phrases '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 very long. A common misconception is that memorization indicates a surface approach (e.g. Webb 1997). However, verbatim recall is sometimes entirely appropriate, such as learning lines for a play, acquiring vocabulary, learning formulae. Memorization becomes a surface approach when something more like understanding is required, and is used to give the impression of understanding. 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; and the problem is that it often works:

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

(Psychology undergraduate quoted in Ramsden 1984: 144)

Now, 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 I rather doubt that the teacher did think that. I see this as a case where an inappropriate assessment task *allowed* the student to get a good mark on the basis of memorizing

facts. As it happened, this particular student wrote essays in a highly appropriate way, and later graduated with first class honours. The problem is therefore not with the student but with the assessment task. This is an instance of unreflective practice by the teacher, highly reflective by the student.

Thus, do not think that Robert is irredeemably cursed with a surface approach. What we know is that *under current conditions of teaching*, he chooses to use a surface approach. 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 above psychology teacher. The presence of a surface approach is thus a signal that something is out of kilter in our teaching or in our assessment methods, and therefore is something we can hope to address. It might in the end turn out that Robert is a student who is hopelessly addicted to surface learning, but that conclusion is way down the track yet.

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 them from seeing what the signs signify, the meaning and structure of what is taught. 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:

#### *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 education.
- High anxiety.
- A genuine inability to understand particular content at a deep level.

#### *From the teacher's side*

- Teaching piecemeal by bullet lists, not bringing out the intrinsic structure of the topic or subject.
- Assessing for independent facts, 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 two sides should not be seen as entirely separate. Most of the student-based factors are affected by teaching. Is insufficient time to engage properly a matter of poor student planning or poor teacher judgement? Much student cynicism is a reaction to the manner of teaching and assessment. 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 maintain a surface approach.

It is probably less likely that under poor teaching students will maintain a deep approach. Even Susan. Unfortunately, it is easier to create a surface approach than it is to support a deep approach (Trigwell and Prosser 1991).

*The first step in improving teaching, then, is to avoid those factors that encourage a surface approach.*

### The 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. Susan is interested in mathematics, is intrigued by mathematical structures and wants to get to the bottom of the subject; cutting corners is pointless.

When students feel this need to know, they automatically try to focus on underlying meaning, 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 make 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, even of 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:

#### *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.

- The ability to focus at a high conceptual level, working from first principles, which in turn requires a well-structured knowledge base.
- A genuine preference, and ability, for working conceptually rather than with unrelated detail.

#### *In the teaching environment*

- 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, 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 working 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 objectives of the course. This is known as 'practising what you preach'.

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

To summarize, then, deep and surface approaches to learning describe the way students relate to a teaching/learning environment; they are not fixed characteristics of students, their 'academic personalities' so to speak.

### Learning approaches and learning styles

Some people speak of students' approaches to learning as if they were learning *styles* that apply whatever the task or the teaching (Schmeck 1988). At the other extreme, Marton and Säljö (1976a,b) 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.

The truth lies in the middle. 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 the personal and the contextual, not unlike the interaction between heredity and environment. Both factors apply, but which predominates depends on particular situations. Turn back to Figure 1.1. At point A, under passive teaching, student factors make the difference, but at point B, active teaching predominates, lessening the



differences between students. For an analysis of the differences between learning styles and learning approaches see Sternberg and Zhang (2001).

If you want to assess predilections for different approaches to learning, this can be done using questionnaires such as the Approaches and Study Skills Inventory for Students (ASSIST) (Tait *et al.* 1998), or the Study Process Questionnaire (SPQ) (Biggs 1987a). Responses to these questionnaires also tell us something about the quality of the teaching environment, because students' predilections tend to change when they are faced with a particular kind of teaching environment; they adapt to the expected requirements. Thus, questionnaires can be used to evaluate teaching environments (Biggs 1993a; Kember *et al.* 1998). For example, Eley (1992) found that students adapted their approaches to learning to their perception of what different units demanded; Meyer (1991) refers to this as 'study orchestration'. The practical details of using such questionnaires in research on teaching are given in Chapter 12.

### The 3P model of learning and teaching

Figure 2.1 puts all this together in the 3P model of teaching and learning, which elaborates Dunkin and Biddle's (1974) model of teaching to include approaches to learning.

The 3P model describes three points in time at which learning-related factors are placed:

- 1 presage, before learning takes place;
- 2 process, during learning;
- 3 product, the outcome of learning.

Presage factors are of two kinds:

- 1 *Student based* – the relevant prior knowledge the student has about the topic, interest in the topic, student ability, commitment to university, and so on.
- 2 *Teaching context based* – what is intended to be taught, how it will be taught and assessed, the expertise of the teacher, the 'climate' or ethos of the classroom and of the institution itself, and so on.

These factors interact at the process level to determine the student's immediate learning-related activities, as approaches to learning. Possible interactions here are manifold. A student with little prior knowledge of the topic will be unlikely to use a deep approach, even where the teaching is expert. Another student who already knows a great deal and is very interested in the topic is pre-set for a deep approach, but doesn't use it because of severe time pressures. Yet another, who typically picks out likely items for assessment and rote learns them, finds that approach won't work under portfolio assessment, so goes deep. You can

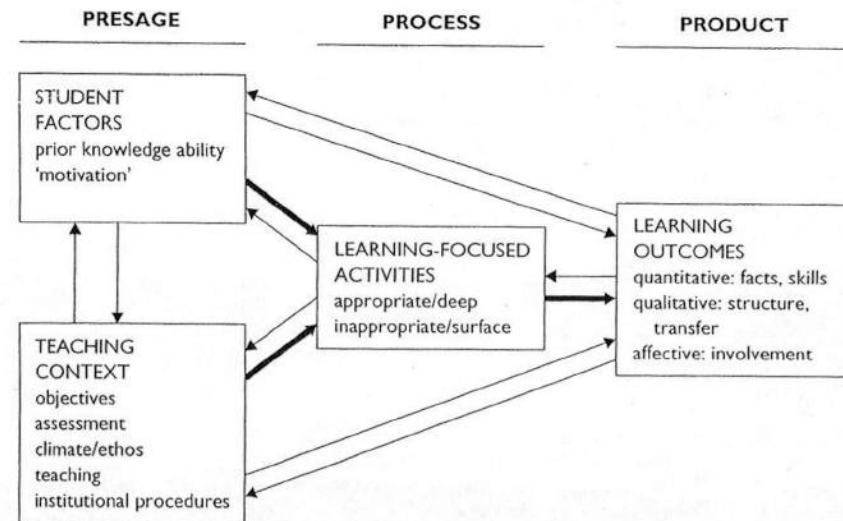


Figure 2.1: The 3P model of teaching and learning

see why it is inappropriate to write off particular students as surface learners.

The learning outcome is determined by many factors, acting in interaction with each other. The general direction of effects is marked by the heavy arrows: student and teaching presage factors jointly determine the approach a student uses for a given task, and that in turn determines the outcome. The light arrows connect everything to everything else, because all components form a *system* (Biggs 1993b).

A system is a set of components that interact to produce a common outcome, in service to a common goal (Romizowski 1981). Here the common goal is learning, and the immediate system comprises all things in and out of the classroom that might affect each other and thus the outcome. Systems are interactive, not linear, so that, for example, it is difficult to pin down the cause of good or poor learning. Students bring in their abilities, personalities and motives; teachers bring in theirs, and they make decisions about teaching and assessment. What works for one class does not work for another. Collectively, these background factors determine the cognitive processes the students are likely to use, which in turn determine the detail and structure inherent in the learning outcomes, and how the students feel about the outcome.

No two classes are ever the same. You may be the same, but the students are not, so you strike a different deal with each group of students each

time; in a functional sense, it is not even true that you are the same. Likewise, you and a colleague teaching the same class create a different system, because one of the components is different, the teacher, and accordingly each individual achieves different results. Then there is the larger institutional system, of which the classroom is one component; that too strikes its own balance. This is important in quality assurance, as we see in the final chapter.

The 3P model contains within it various theories of teaching. Before examining these, let us see where you currently stand on your theory of teaching by completing Task 2.1.

### **Levels of thinking about teaching**

The 3P model draws attention to three sources that might affect the learning outcome: a direct effect from the student-based factors, another direct effect from the teaching-based factors, and an interactive effect from the system as a whole. Each of these ways of determining learning forms a theory of how teaching works:

- 1 Learning is a function of individual differences between students.
- 2 Learning is a function of teaching.
- 3 Learning is the result of students' learning-focused activities which are engaged by students as a result both of their own perceptions and inputs, and of the total teaching context.

These different 'theories' of teaching are in order of complexity and sophistication, and so we refer to them as 'levels'. They include what others call intentions or conceptions (Trigwell and Prosser 1996).

Teachers tend to hold these theories at different points in their teaching career, some progressing to level 3, others staying at levels 1 or 2 (Biggs 1996c). They describe a sequence in the development of teaching skill: a route map towards reflective teaching, if you like, where the level at which you operate depends on what you focus on as most important.

#### **Level 1. Focus: what the student is**

Teachers at level 1 focus on the student presage factors. They are struck by student differences, as most beginning teachers are; there are good students, like Susan, and poor students, like Robert. As teachers, they see their responsibility to know the content well, and to expound 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 the material is taken on board and unloaded on cue.

#### **Task 2.1: What are your theories of teaching and learning?**

Learning is \_\_\_\_\_

Teaching is \_\_\_\_\_

When you have finished this chapter, come back to these statements and see how they check out against the transmission and student learning models, and the theories of teaching outlined in the chapter. Where do your own views lie? Now that you have seen these other views, have you changed your theory of teaching?

Comments \_\_\_\_\_

At level 1, teaching is, as it were, held constant – it is transmitting information, usually by lecturing – so differences in learning are due to differences between students in ability, motivation, what sort of school they went to, A-level results, and yes, their 'innate' approaches to learning. Ability is usually seen as the most important factor, an interesting consequence of which is that teaching becomes not so much an educative activity as a *selective* one, assessment the instrument for sorting the good

students from the bad after teaching is over. Many common practices (addressed in Chapters 8 and 9) spring from this belief.

The view of university teaching as transmitting information is so widely accepted that delivery and assessment systems the world over are based on it. Teaching rooms and media are specifically designed for one-way delivery. A teacher is the knowledgeable expert who expounds the information the students are to absorb and to report back accurately, according to their ability, their motivation, even their ethnicity (see Chapter 7). The curriculum is a list of items of content that, once expounded from the podium, have been 'covered'. How the students receive 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; Marton *et al.* 1993), which manifests itself most obviously in assessment practices. Learning outcomes are quantified into units of knowledge of equivalent value: a word, an idea, a point. The correct ones are counted and converted by a common currency, usually a percentage, to make them interchangeable. We examine this model, its manifestations and its consequences, in Chapter 8.

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

*How can I be expected to teach that lot with those A-level results? They wouldn't even have been admitted ten 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: A-level or HSC results might be poor, students nowadays may be less academically oriented. That is exactly the challenge outlined in Chapter 1.

Blame-the-student is a comfortable theory of teaching. If students don't learn, it's not that there is anything wrong with the teaching, but that they are incapable, unmotivated, foreign, or some other non-academic defect, which it is not the teacher's responsibility to correct. Blaming the student is very common in teaching international students, as we see in Chapter 7.

The level 1 theory of teaching is totally unreflective. It doesn't occur to the teacher to ask the key generative question: 'What else could I be doing?' 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 the teacher presage factors. This view of teaching is still based on transmission, but of concepts and understandings

not just of information (Prosser and Trigwell 1998). The responsibility for 'getting it across' now rests to a significant extent on what the teacher does. The possibility is entertained that there may be more effective ways of teaching than what one is currently doing. This is a major advance. Learning is seen as more a function of what the teacher is doing than 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 (screams 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 upon what *they* the students are learning.

Traditional approaches to teaching development often worked on what the teacher does, as do 'how to' courses and books that provide prescriptive advice on getting it across more effectively:

- Establish clear procedural rules at the outset, such as signals for silence.
- Ensure clarity: project the voice, clear visual aids.
- Make eye contact with students while talking.
- Don't interrupt a large lecture with handouts: chaos is likely.

This may be useful advice, as we endorse in Chapter 6, but it is concerned with *management*, not with facilitating learning. Good management is important, but as a means of setting the stage so that good learning may occur, not as an end in itself.

Level 2 is also a deficit model, the 'blame' this time is 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, 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 when and how you should do it. The focus should be not 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 all the components in the systems, in particular on what the student does at process and product, and how that relates to teaching. Level 3 sees teaching as supporting 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 is on what the student does, on what learning is or is not going on.

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

- 1 what it means to 'understand' content in the way we want it to be understood;
- 2 what kind of teaching/learning activities are required to reach those kinds of understandings.

The first two levels did not address these questions. The first question requires that we specify what levels of understanding we want when we teach a topic; the second what learning activities might best be appropriate for achieving those levels. Then follow the key questions:

- How do you define those levels of understanding?
- What do students have to do to reach the level specified?
- What do you have to do to find out if they have been reached or not?

Defining levels of understanding is basic to clarifying our curriculum objectives, the subject of the Chapter 3. Getting students to understand at the level required is a matter of getting them to undertake the appropriate learning activities, which is dealt with in Chapters 5, 6 and 10. This is where a level 3 student-centred theory of teaching departs from the other models. It's not what *we* do, it's what *students* do that is important. Finally, we need to check that their understandings and performances are what we wanted, which is dealt with in the chapters on assessment (Chapters 8, 9 and 10).

Level 3 teaching is systemic. Good 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.

Do the conceptions we hold affect the way we teach? Gow and Kember (1993) showed that teachers who saw teaching as knowledge transmission created classrooms where students scored very low on the deep approach, while teachers who saw teaching as facilitating student learning created classrooms where students scored very low on a surface approach. Teachers' beliefs had created teaching environments to which the students reacted by tuning their approaches to learning to suit the environment to which they were exposed.