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John Biggs

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Invited Contribution: Personal Perspective

John Biggs has worked as an educational researcher and theorist for almost 40 years. He is a world leader in the area of teaching and learning in educational institutions, particularly at the tertiary level. His work has influenced countless students and teachers as well as the current generation of educational researchers. John is also one of the very few scholars who has considered teaching and learning from a cross-cultural perspective.

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What the Student Does: teaching for enhanced learning

JOHN BIGGS
University of New South Wales

ABSTRACT *Many teachers see major difficulties in maintaining academic standards in today's larger and more diversified classes. The problem becomes more tractable if learning outcomes are seen as more a function of students' activities than of their fixed characteristics. The teacher's job is then to organise the teaching/learning context so that all students are more likely to use the higher order learning processes which "academic" students use spontaneously. This may be achieved when all components are aligned, so that objectives express the kinds of understanding that we want from students, the teaching context encourages students to undertake the learning activities likely to achieve those understandings, and the assessment tasks tell students what activities are required of them, and tell us how well the objectives have been met. Two examples of aligned teaching systems are described: problem-based learning and the learning portfolio.*

Student Ability and Teaching Method: the pay-off

In the days when university classes contained highly selected students, at university by choice, the traditional lecture followed by tutorial seemed to work well enough. Today, when the student population is quite diversified, many students seem not to be coping, while teachers feel they are being unfairly put upon. Some believe that these students should not be at university at all.

Let us take two students attending a lecture. Susan is academically committed; she is bright, interested in her studies, and wants to do well. She has clear academic and career plans, and what she learns is important to her. When she learns she goes about it in an "academic" way. She comes to the lecture with relevant background knowledge and a question she wants answered. In the lecture, she finds an answer to that question; it forms the keystone for a particular arch of knowledge she is constructing. She reflects on the personal significance of what she is learning. Students like Susan (continuous line in Figure 1) virtually teach themselves; they need little help from us. The way Susan learns fits Marton and Säljö's (1976) description of a *deep* approach to learning (see below), but in making this connection it is important to emphasise that "deep" describes how Susan usually goes about her learning, it does *not* describe a personality characteristic of Susan.

Now take Robert. He is at university not out of a driving curiosity about a

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particular subject, or a burning ambition to excel in a particular profession, but to obtain a qualification for a job. He is not even studying in the area of his first choice. He is less committed than Susan, and has a less developed background of relevant knowledge; he comes to the lecture with no questions to ask. He wants only to put in sufficient effort to pass. Robert hears the lecturer say the same words as Susan heard, but he doesn't see a keystone, just another brick to be recorded in his lecture notes. He believes that if he can record enough of these bricks, and can remember them on cue, he'll keep out of trouble come exam time. Robert (dotted line in Figure 1) appears to adopt a *surface* approach to learning (Marton & Säljö, 1976), but again it must be emphasised that this is not to describe Robert as a person, but to describe the way he currently learns. The teaching challenge is precisely to change his usual way of learning, not to see it as an impediment to teaching him.

Students like Robert probably are in higher proportions in today's classes than was the case 20 years ago. They will need help if they are to achieve the same levels of understanding that their more committed colleagues achieve spontaneously. To say that Robert is "unmotivated" may be true, but unhelpful. What that really means is that he is not responding to the methods that work for Susan. The challenge we face as teachers is to teach so that Robert learns more in the manner of Susan.

Figure 1, based on a number of studies and observations summarised in Biggs (1999), postulates a two-way interaction between the degree of learning-related activity that a teaching method is likely to stimulate, and the academic orientation of the students, as they jointly affect students' levels of engagement in the task. "Academic" students will adopt a deep approach to learning in their major subjects, often despite their teaching, while non-academic students are likely to adopt a deep approach only under the most favourable teaching conditions.

Thus, at Point A, the "passive" end of the teaching method continuum, there is a large gap between Susan and Robert in terms of the their level of engagement, as in the lecture example described above. If we look at the ordinate of Figure 1, the student's level of engagement, we see that Susan is relating, applying, possibly theorising, while Robert is taking notes and memorising. At point B, the "active" end of the teaching method continuum, the gap between Susan and Robert is lessened; both are now using the higher-level activities. Problem-based learning would be an example of an active method, because it *requires* Robert to question, to speculate, to generate solutions, to use the higher order cognitive activities that Susan uses spontaneously. The teaching has narrowed the gap between them, at least in terms of the kind of cognitive activity engaged.

There may well be endogenous limits to what students can do that are beyond any teacher's control, but there are learning-related aspects that *are* controllable. Capitalising on them is what good teaching is about. *Good teaching is getting most students to use the higher cognitive level processes that the more academic students use spontaneously.* Good teaching narrows the gap.

The problem is to describe a technology of teaching that maximises the chances of engaging students' learning processes in this way.

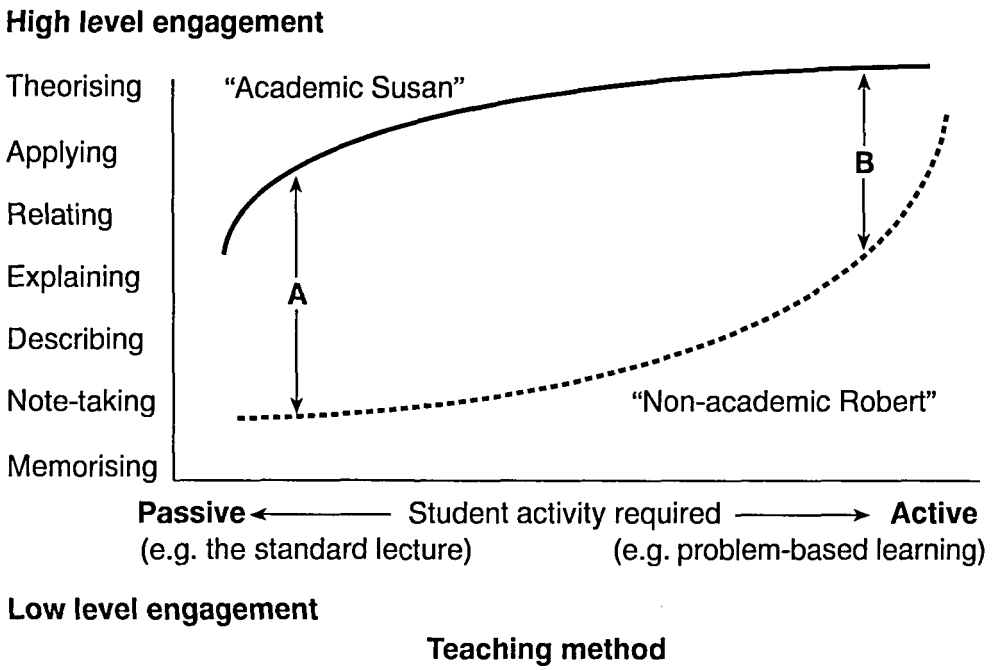

FIG. 1. Student orientation, teaching method, and level of engagement.

Constructivism and Phenomenography

How do we derive such a technology? It seems reasonable to turn to the psychology of learning to derive a technology of teaching, but the track record is not encouraging. Learning has been the subject of research by psychologists for the whole of this 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 learn, such as schools and universities (Biggs, 1993a). This focus has been rectified in the last 20 years or so, by focusing attention precisely on how students go about learning in formal, institutional contexts. Appropriately, this field of study is now designated as "student learning" research.

Student learning research originated in Sweden, with Marton and Säljö's (1976) study 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, not, as many subsequently used the terms, as describing characteristics of students.

This series of studies struck a chord with ongoing work in other countries; in particular with that of Entwistle in the UK (e.g., Entwistle & Ramsden, 1983), and that of Biggs in Australia (e.g., 1979, 1987). The conceptual frameworks of these workers were originally quite different from that of the Swedish group; the former from individual differences psychology and the latter from cognitive psychology. However, there was a common focus on students being active in a learning context, and some strong implications for teaching could be drawn.

There are two main theories of learning within the student learning paradigm: 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 considerably since then (Marton & Booth, 1997). Constructivism has a long history in cognitive psychology, Jean Piaget being a crucial figure, and today it takes on several forms: individual, social, cognitive, postmodern (Steffe & Gale, 1995).

While there are differences in flavour between constructivist-driven and phenomenologically driven teaching (Prosser & Trigwell, 1998; Trigwell & Prosser, 1997), my own assumption is that helping teachers improve their teaching is best done using a theory that helps teachers reflect on what they are doing. For that they need a framework to aid reflection: a theory of learning that is broad based and empirically sound, that easily translates into practice, and that is readily understandable. To my mind this means constructivism, although there is a lot in common between the constructivist and phenomenological positions.

The most basic commonality is that meaning is not imposed or transmitted by direct instruction, but is created by the student's *learning activities*, well summarised in the term "approaches to learning". A surface approach refers to activities of an inappropriately low cognitive level, which yields fragmented outcomes that do not convey the meaning of the encounter. The deep approach refers to activities that are appropriate to handling the task so that an appropriate outcome is achieved. The surface approach is therefore to be discouraged, the deep approach encouraged—and that is my working definition of good teaching.

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, and where these objectives are buried in the assessment tasks.

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. Often, attempts to create a felt need to learn, particularly through ill-conceived and urgent assessments, are counter-productive. 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.

What is Good Teaching? Levels of teaching competence

What one sees as good teaching, and how one teaches, depends on what conception of teaching one has. There has been a great deal of research on conceptions of teaching (e.g., Martin & Balla, 1991; Samuelowicz & Bain, 1992; Prosser & Trigwell, 1998), and there is some consensus on the broad picture. Prosser and Trigwell distinguish basically two conceptions, based on two strategies of teaching: teacher-focused and student-focused. Teacher-focused strategies are transmission theories of teaching; that is knowledge is conceived as being transmitted from expert teacher to inexpert learner, and the teacher's task it to "get it across". The lowest conceptions sees "it" as information, a higher conception sees transmission as being about important concepts needed to understand the discipline. But, in either event, the focus is on what the teacher does. Student-focused strategies see the focus as being on bringing about conceptual change in students' understanding of the world, and it is what students do to achieve understanding that is important, not what teachers do.

I would see such conceptions arising from assumptions about the nature of institutional learning. Learning outcomes are determined by a whole complex of factors: fixed student-related factors such as ability; teaching-related factors such as curriculum, and methods of teaching and assessing; and the approaches to learning that students use while engaging in any particular task to achieve an outcome. All these factors affect each other, forming an interactive *system* (Biggs, 1993b). Any system, such as an eco-system, has to be understood as a whole. Components have to be considered as they affect each other, not as acting separately or additively.

Using this systems model, it is possible to formulate the assumptions underlying three common theories of teaching (Biggs, 1999):

1. Learning is primarily a direct result of individual differences between students.
2. Learning is primarily the result of appropriate 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.

The first two are additive models, the third systemic. These different "theories" of teaching are parallel to the Prosser and Trigwell (1998) conceptions and are hierarchical or developmental as they seem to follow the growth of teacher competence. It is likely that teachers tend to hold them at different points in their teaching career.

Level 1. Focus: what the student is

Teachers at Level 1 focus on student differences. They are struck, as most beginning teachers are, with the fact that there are the good students and the poor students. Their own responsibility as teachers is 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 it's taken on board and unloaded on cue. At Level 1, the purpose of teaching is to transmit information, usually by lecturing, as in the lowest of the Prosser and Trigwell (1998) teacher-focused conception.

Basically, this conception holds teaching constant, so that variability in student learning is accounted for by individual differences between students, which makes this a *blame-the-student* theory of teaching. When students don't learn, it is due to a deficit: ability; attitude; study skills; motivation; even a student's ethnicity (Samuelowicz, 1987). It is not considered that the teaching might have been the problem.

Level 2. Focus: what the teacher does

The focus of teaching at the next level is more clearly on what the teacher does. It is still conceived as a transmission process, but of concepts and understandings, not just of information, as in Prosser and Trigwell's second teacher-focused strategy. Getting complex understandings across requires much more than chalk-and-talk, so the responsibility now rests to a significant extent on what the teacher does. The teacher who operates at Level 2 works at obtaining an armoury of teaching skills. Traditional approaches to staff development often worked on what the teacher does, as do "how to" courses, and books that provide prescriptive tips 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;
- eye-contact students while talking;
- don't interrupt a large lecture with handouts: chaos is likely.

This advice, useful as it is, is concerned with *management*, not with facilitating learning. Good management is important for setting the stage for good learning to take place—not as an end in itself.

Level 2 is also a deficit model, the "blame" this time on the teacher. It is a view of teaching often held by administrators because it provides a convenient rationale

for making personnel decisions. Teaching is seen as a bag of competencies; the more competencies you have, the better a teacher you are.

Level 3. Focus: what the student does

The focus of teaching at Level 3 is on whether student activities leading to appropriate learning are being supported. No longer is it possible to say: "I taught them, but they didn't learn." Expert teaching certainly includes mastery of a variety of teaching techniques, but unless learning takes place, they have not achieved their purpose. The Level 3 teacher focuses on what the student does; on what learning is or is not going on. Level 3 teaching is systemic, taking into account all components in the system.

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

1. What it means to *understand* those concepts and principles in the way we want them to be understood.
2. What kind of *TLAs* (teaching/learning activities) are required to reach those kinds of understandings.

The first two Levels did not address these questions. Even Level 2, with its concern for concepts and principles, does not address the question of what it might *mean* to understand something at the desired levels. Getting students so to understand requires that they undertake the appropriate learning activities. This is where a Level 3 student-centred theory of teaching departs from the other models. It's not what *teachers* do, it's what *students* do that is the important thing.

Shuell (1986) puts all this together thus:

> If students are to learn desired outcomes in a reasonably effective manner, then the teacher's fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes. ... It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does (p. 429).

The Design of Teaching

Shuell's statement may seem "motherhood", but it in fact contains a blueprint for the design of teaching and criterion-referenced assessment that is radically different from that which I would guess prevails in most institutions.

The fundamental assumption, that it is what the *student* does that is the important thing, may have entered the constructivist-type rhetoric of many teachers, but it remains aloof from practice. During teaching, a great majority of teachers focus their awareness on what they are doing, not on what they are teaching, or on what their students are learning (Marton & Booth, 1997).

When we take this fundamental assumption of the centrality of student activity on board, we face three steps:

1. Saying what the "desired outcomes" are. In so doing, we specify our objectives.
2. Deciding if the outcomes are learned in a "reasonably effective manner". In so doing, we use assessment tasks that are criterion-referenced to our objectives.
3. Getting students to "engage in (appropriate) learning activities". In so doing, we use TLAs that encourage students to go about learning in a way that is likely to achieve our objectives.

We have first to be clear about what we want students to learn, and then teach and assess accordingly in an *aligned* system of instruction (Biggs, 1996). It is a fully criterion-referenced system, where the objectives define what we should be teaching; how we should be teaching it; and how we could know how well students have learned it. In aligned teaching, there is maximum consistency throughout the system. The curriculum is stated in the form of clear objectives which state the level of understanding required rather than simply listing the topics to be covered. The teaching methods chosen are those that are likely to realise those objectives; you get students to do the things that the objectives nominate. Finally, the assessment tasks address the objectives, so that you can test to see if the students have learned what the objectives state they should be learning. All components in the system address the same agenda and support each other. The students are "entrapped" in this web of consistency, optimising the likelihood that they will engage the appropriate learning activities. I call this network *constructive alignment* (Biggs, 1999).

In practice, *verbs* are useful markers for operationalising alignment. Verbs are used in a similar way in Figure 1, where Susan is depicted as spontaneously using high level verbs such as theorise, reflect, generate, apply, and Robert lower level verbs such as recognise, memorise, and so on. The TLAs are then tuned to elicit those verbs, and they are also embedded in the assessment tasks. The content being taught, of course, determines the objects of the verbs. These points are illustrated in Figure 2.

The curriculum objectives are at the centre. Decisions as to how they are to be taught, and how they may be assessed, follow. We express the objectives in terms of what constructive activities are most likely to achieve the desired outcomes for the topic or unit in question. Practically speaking, we specify the verbs which describe the behaviours which we want students to enact in the context of the content discipline being taught, specifying levels of understanding that can be used for awarding grades. The level of understanding required for a Pass is obviously less than that required for a High Distinction. The first step is, therefore, to arrange these levels of understanding in a hierarchy that corresponds to the grading system used. This is explained further in a later section (pp. 68–70).

In Figure 2, taken from a teacher education unit, the objectives are expressed as a four-tier hierarchy corresponding to grade levels; here, "A" to "D" letter grades are used. As an aside, letter grades are preferable to grades such as "High Distinction", "Credit", and so on, because being "Highly Distinguished" is a norm-referenced concept that is out of place in a criterion-referenced system. Thus, "A" denotes a quality of learning and understanding that is the best one can reasonably expect for the unit and level of students in question. "B" is highly satisfactory, but "B"

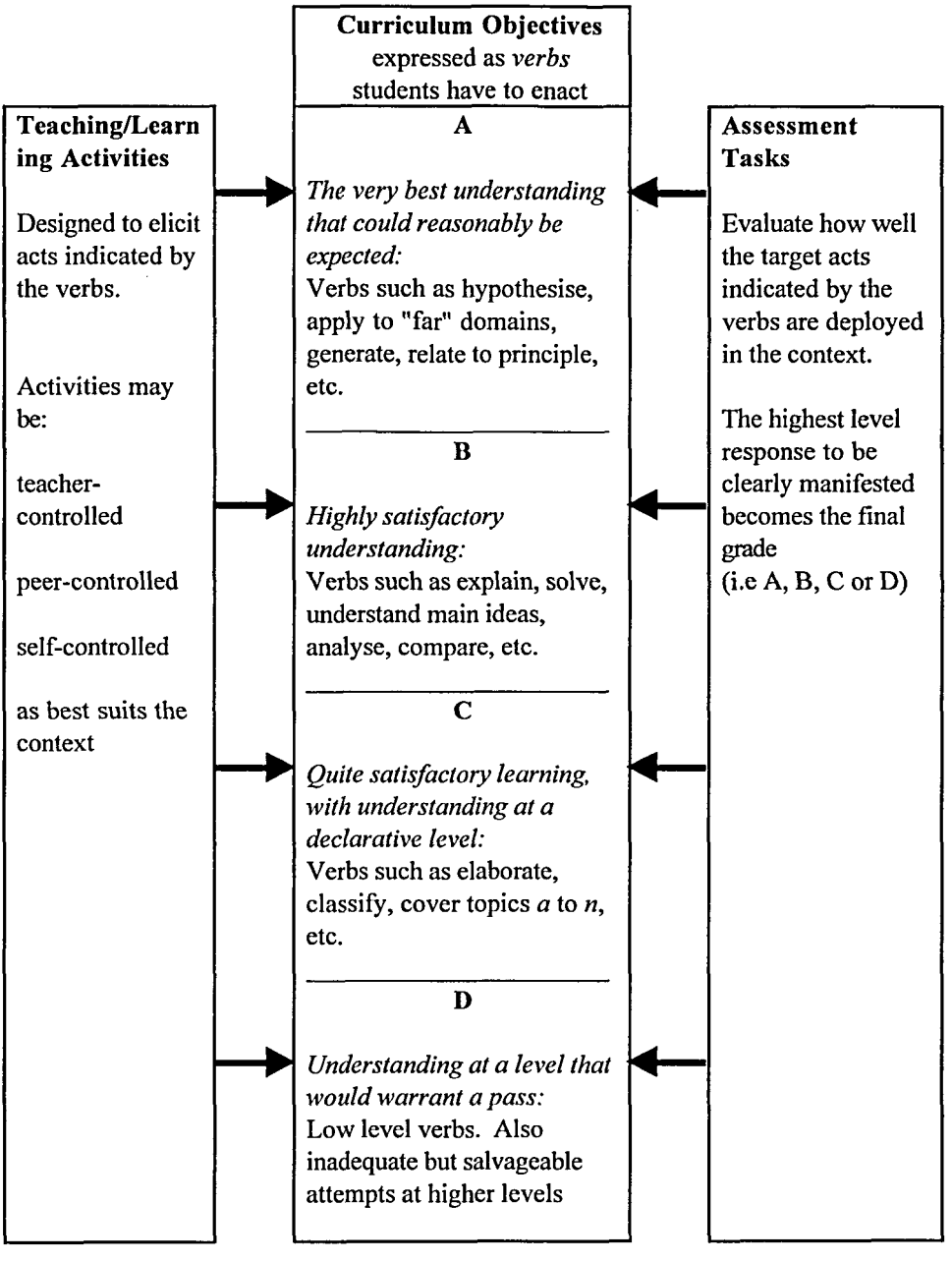

FIG. 2. Constructive alignment: aligning curriculum objectives, teaching/learning activities (TLAs), and assessment tasks.

performances lack the flair that distinguish "A". "C" is quite satisfactory, while "D" denotes a quality and complexity of understanding that is passable only, and anything less is Fail. It is then necessary to specify how to recognise "highly

satisfactory", "minimally acceptable", and so forth; the verbs are helpful in making these distinctions.

The categories are defined by a particular *quality* of learning and understanding that suits the unit in question, not by the accumulation of marks or percentages. The assessment tasks, embodying the crucial verbs, denote whether the quality in question is present or not. Finer discriminations within categories (reporting in "marks") may be useful for reporting and other administrative purposes, but that is functionally quite a separate issue. The first priority is to state the objectives qualitatively, and to assess them accordingly.

Teaching/learning activities are chosen that would be likely to encourage students to engage the optimal verbs, and that are practicable within the resources available. Objectives, teaching, and assessment, are now aligned, using the verbs in the objectives as markers for alignment.

It remains to elaborate on alignment at the three main stages of teaching, and to point to some examples of aligned teaching.

Aligning Objectives, Teaching, and Assessment

Stating objectives in terms of the nature of understanding. In a criterion-referenced system, the criteria must be clear. But while most teachers would agree they teach for "understanding", that word has many values. We frequently express one meaning of understanding but assess another. In making our objectives clear it is essential that we unpack and make explicit the meanings we want our students to address. The very highest levels of understanding that we want students to display by the end of a degree program—and in some cases very much before the end—are "performative"; that is, students *act differently* when they really understand (Perkins & Blythe, 1993). Students need to understand to the extent that a particular sector of their world has changed, and is now coming under their control. They behave differently towards that which they truly understand. Capturing that difference in an assessment task is what Perkins and Blythe mean by "performances of understanding".

The initial task in teaching any unit is therefore to clarify the kind of understanding that is wanted, and if the unit is to be graded (A, B, C, D, etc.), the objectives need to be stated in such a way as to allow the information from the assessments to specify the level of pass. Various models can be used to define the hierarchical nature of understanding in order to derive such a framework. One such is the SOLO taxonomy, which is represented schematically in Figure 3.

The diagram is intended to depict the cumulative nature of learning, and the nature of some major transitions. Some verbs typical of each level are suggested on top of the boxes. Usually, a major idea or procedure is learned (unistructural), then extended quantitatively (multistructural). Some curriculum targets or objectives might address these lower levels, but not important ones. Major objectives would refer to at least relational levels of understanding, where students are not only expected to know facts and information, but to structure them in forms that can be

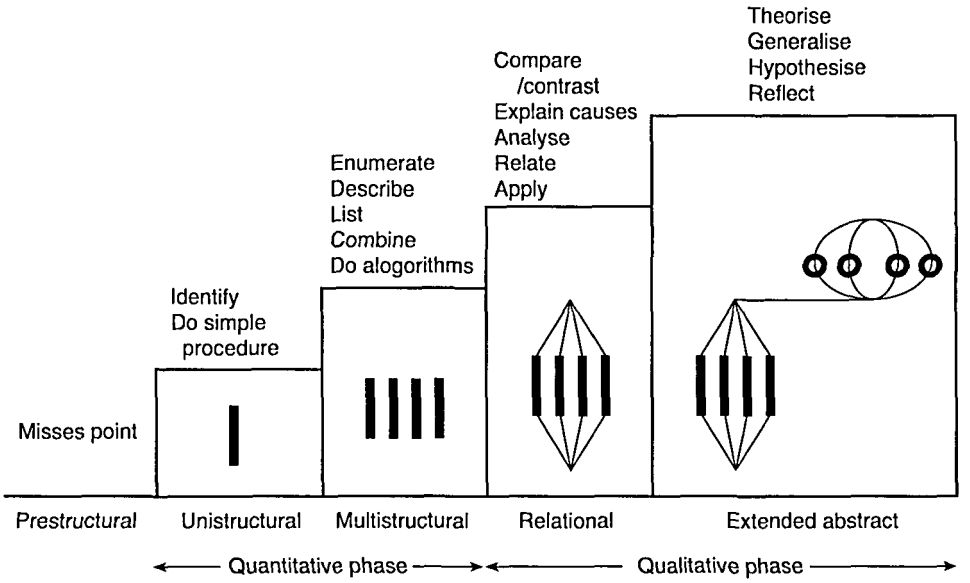

FIG. 3. A hierarchy of verbs that may be used to form curriculum objectives.

applied to common problems and domains. By the end of professional training, students should be extending knowledge to hitherto unseen problems and domains.

It is not intended that the SOLO levels exactly parallel grade levels: that "D" is unistructural, "A" extended abstract. Rather, the intention is that the SOLO levels provide a hierarchical framework within which specific levels may be defined to suit the unit and grade level in question (see Biggs, 1992).

Selecting TLAs. The next step is to set up the teaching/learning context so that students have every encouragement to react with the level of cognitive engagement that the objectives require. For example, most tertiary objectives require students to use knowledge, but much tertiary teaching is not about using knowledge but telling students about using knowledge. Such declarative knowledge—knowledge that can be talked about meaningfully—does not necessarily imply that it can be used functionally. Certainly, students need to know about important concepts, and lecturing is not a bad way of letting them know, but there are better ways. Table 1 lists several TLAs and the kinds of learning that each might be expected to elicit most readily.

Teachers of large classes often see little option but to lecture. However, the lecture can easily be turned into a session in which the student is also an active participant. Other and more generative TLAs can be peer-directed or self-directed, both of

TABLE 1. What learning activities are teaching methods most likely to elicit?

Teaching/learning activity (TLA) →	Form of learning
Teacher-controlled	
Lecture, set texts	Reception of selected content
Think-aloud	Demonstrate conceptual skills
Questioning	Clarifying, seeking error
Advance organiser	Structuring, preview
Concept mapping	Structuring, overview
Tutorial	Elaboration, clarification
Laboratory	Procedures, application
Excursion	Experiential knowledge, interest
Seminar	Clarify, presentation skills
Peer-controlled	
Various groups	Elaboration, problem-solving, metacognition
Learning partners	Resolve differences, application
Peer teaching	Depends whether teacher or taught
Spontaneous collaboration	Breadth, self-insight
Self-controlled	
Generic study skills	Basic self-management
Content study skills	Information handling
Metacognitive learning skills	Independence and self-monitoring

which take the heat off the teacher. Class size, although constraining, is no reason to abandon the principle of alignment (Biggs, 1999).

Assessment tasks. Assessment in practice has two functions: to tell us whether or not the learning has been successful, and in conveying to students what we want them to learn, as stated by Ramsden (1992):

> From our students' point of view, the assessment always defines the actual curriculum (p. 187).

Backwash from assessment is not a problem, it is the solution. In a criterion-referenced system, the objectives are embedded in the assessment tasks. So, if students focus on the assessment, they will be learning what the objectives say they should be learning. It is only when the assessment tasks elicit lower level cognitive activities than the objectives nominate that backwash gets a bad name. Unfortunately, that is most of the time, as seen by the psychology student quoted in Ramsden (1984):

> I hate to say it, but what you have got to do is to have a list of "facts"; you write down the important points and memorise 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 (p. 144).

You shouldn't get a good mark, but you do, because the assessment is not aligned to the objectives, unless that teacher really did think memorisation was adequate.

Lack of alignment is a major reason why students adopt a surface approach to learning. Poor alignment often results from such institutional policies as requiring assessment results to be reported in percentages or "marks", or requiring results to be distributed along a pre-determined curve. The first can be mitigated by assessing qualitatively but reporting quantitatively, but the second is crippling. There can be no *educational* justification for grading on a curve.

Such practices exist for two reasons, which feed each other: administrative convenience, and genuinely confused thinking about assessment. The confusion arises because two quite different models of summative assessment co-exist (Taylor, 1994):

1. The *measurement* model was developed by psychologists to study individual differences. It is designed to assess personal characteristics of individuals, for the purpose of comparing them with each other or with general population norms. Such assessment is norm-referenced (NRA). The model requires reducing performances to numbers along a scale, so that comparisons between individuals can be made. It assumes that the characteristic being measured is stable, and frequently that it is normally distributed.
2. The *standards* model is designed to assess changes in performance as a result of learning, for the purpose of seeing what, and how well, something has been learned. Such assessment is criterion-referenced (CRA). This model is the relevant one for summative assessment at university. The point is not to identify *students* in terms of some characteristic, but to identify *performances* that tell us what has been learned, and how well.

None of the assumptions of the measurement model apply to the assessment of learning:

- quantifying performances gives little indication of the *quality* of the performance. Identifying only the quantitative aspects of learning sends the wrong messages to students, and guarantees unaligned assessment;
- teaching is concerned with change, not stability;
- teachers shouldn't want a "good spread" in grade distributions. Good teaching should *reduce* the gap between Robert and Susan, not widen it.

Marking quantitatively, constructing tests to "get a spread", and allocating grades along the curve, are all very common practices, but they make criterion-referencing of higher cognitive level performances all but impossible.

Criterion-referenced assessment in the constructive alignment model requires assessment tasks that are likely to elicit the learning verbs that are stipulated in the objectives. Table 2 lists some assessment tasks, and the kind of learning each is likely to elicit. This table parallels Table 1.

Assessment modes are in four groups: extended prose, such as the conventional essay; objective format, which can be assessed rapidly; performance assessment,

TABLE 2. Some different assessment tasks and the kinds of learning assessed

Assessment mode	Most likely kind of learning assessed
Extended prose, essay-type	
Essay exam	Rote, question spotting, speed structuring
Open book	As for exam, but less memory, coverage
Assignment, take home	Read widely, interrelate, organise, apply, copy
Objective test	
Multiple choice	Recognition, strategy, comprehension, coverage
Ordered outcome	Hierarchies of understanding
Performance assessment	
Practicum	Skills needed in real life
Seminar, presentation	Communication skills
Critical incidents	Reflection, application, sense of relevance
Project	Application, research skills
Reflective journal	Reflection, application, sense of relevance
Case study, problems	Application, professional skills
Portfolio	Reflection, creativity, unintended outcomes
Rapid assessments (large class)	
Concept maps	Coverage, relationships
Venn diagrams	Relationships
Three minute essay	Level of understanding, sense of relevance
Gobbets	Realising the importance of significant detail
Short answer	Recall units of information, coverage
Letter-to-a-friend	Holistic understanding, application, reflection
Cloze	Comprehension of main ideas

which assesses understanding as put to work (performances of understanding); and rapid assessments suitable for large classes. Each of these groups has its own advantages and disadvantages as do individual assessment tasks within each group. It would be impractical to discuss each of these assessment tasks here, beyond simply pointing out that alternatives to the traditional quantitative approaches to assessment exist—even for assessment in large classes. Further details may be found in Biggs (1999).

Two Illustrations of Aligned Teaching

Alignment can be achieved in a variety of successful teaching "methods". In fact, I would argue that the extent to which any teaching is successful is at least in part due to the extent to which it exemplifies alignment between objectives, TLAs, and the assessment tasks. Two very successful methods, in the sense that they engage students at a high level of cognitive activity, are problem-based learning (PBL), and the learning portfolio (LP).

Problem-based Learning (PBL)

Problem-based learning is alignment itself. The objectives are to get students to solve problems they will meet in their professional careers—the teaching method is to present them with problems to solve; the assessment is based on how well they solve them.

It seems so obvious. Yet for years, education for the professions followed a proactive model, where the disciplines are taught first, independently of each other, and armed with all that declarative knowledge, and with some skill training, the student is accredited as ready to practise as a professional. However, many are not. Their declarative knowledge has been framed by examination requirements, its range of application stopping at the final exam (Entwistle & Entwistle, 1997). Their ability to solve unseen problems is often untested. Professional practice requires knowledge that can be put to work immediately. If the objectives nominate professional competence on graduation, but declarative knowledge is the output, something has been missed. Curriculum, teaching, and assessment are not aligned. The reason why this model persists is not educational but institutional. Universities are usually organised by content departments, to which academics are appointed, and it is much easier to deliver programs on a content basis than on a multidisciplinary basis.

In PBL, the problems are carefully selected so that, by the end of the program, the learner is expected to cover much of the same content as is covered in a traditional program, but the *nature* of the knowledge so gained is different (Hmelo, Gotterer & Bransford, 1997). It is acquired in a working context and is put back to use in that context.

The TLAs follow from the presented problems. Learners are assigned to small problem-solving groups and begin interacting with teachers, peers and clients; they build up a knowledge base of relevant material and learn where to go to seek out more. Students meet with a tutor and discuss the case in relation to the knowledge they have obtained. The knowledge is applied, the case is treated. Subsequently there is a review process to ensure that learners develop self-management and self-monitoring skills.

The assessment is in terms of the original case studies. For example, medical PBL developed the "Triple Jump" (Feletti, 1997), a three-step exercise where the student is evaluated at each step:

1. *Dealing with the problem or case*: diagnosing, hypothesising, checking with the clinical data base, use made of information, reformulating.
2. *Review of independent study*: knowledge gained, level of understanding, evaluating information gained.
3. *Final problem formulation*: synthesis of key concepts, application to patient's problem, self-monitoring, response to feedback.

The alignment is evident. To practise as a particular professional requires solving problems that belong to that profession. Thus, professional skill is the goal,

professional practice comprises the TLAs, professional skill is what is assessed (amongst other things).

The Learning Portfolio

The final illustration is a case study involving the use of the learning portfolio. Although this started out simply as portfolio assessment in a unit in a part-time B. Ed. programme (for details see Biggs, 1996), the backwash took over, and in effect dictated the TLAs. In this case, alignment was created bottom-up.

The general aim of the unit was to get the students, who were practising teachers, to demonstrate that they could drive their classroom decision-making with their psychological knowledge, based on reflective practice. Such an aim would be applicable to advanced units in most professional programs.

The objectives. These were expressed as grading categories, the level of activity defining the category.

A: Students *reflect* on their own teaching, *evaluate* their classroom decisions in terms of theory, and thereby *improve* their teaching, *formulate* a theory of teaching that demonstrably drives decision-making and practice, *generate* new approaches to teaching on that basis.
B: Students *apply* course content, *recognise* good and poor applications of principles. "B" includes a "missed 'A'": the student had a good try at reflecting but didn't quite make it.
C: Students *understand* declarative; *discuss* content meaningfully, *know about* a reasonable amount of content. Also include "missed 'B'".
D: Students *understand* in a minimally acceptable way: essentially "missed 'C'", or "badly missed 'B'".

If students could unequivocally demonstrate in a portfolio item the level of performance indicated by the verbs in the category, basically the highest category grade successfully addressed would be awarded.

The TLAs. The TLAs were negotiated with the students when they realised what they had to do, which was to decide on the evidence for their learning, and to explain why they thought it met the objectives. The following dialogue, condensed from several sessions, illustrates how this happened (S = students, T = teacher):

S: What sort of items do we select?
T: That's up to you. Think hard about the objectives. Here's a list of sample items.
S: Can we have a trial run?
T: Of course. You can submit that as an item if you're happy with my assessment of it. If you're not, have another go.
S: How do we show we can reflect?
T: Use your journal [the one compulsory item].
S: What do we put in it?

T: Talk it over with your colleagues. Why don't you form a learning partnership with one or two others? Sit next to them in class, get their phone number, discuss the course with them. You can help each other.
S: Wouldn't it be better if we had discussion groups of students teaching the same subjects as we do? Then we can share experiences on similar problems.
T: Certainly. The two neighbouring rooms are free [*booked in anticipation*].
S: But we want to brush up on the topics. Will you lecture us?
T: Here's the schedule; there's a topic for each session. You have some pre-reading to do, just a few pages, before each session. I'll meet half the class at a time, while the other half is having discussion groups, and we can clarify each topic.

In short, the assessment tasks drove the students' learning activities, which became the TLAs. One student referred to the portfolio as "a learning tool". In fact, it is difficult to separate a TLA from an assessment task. For example, students used the learning journal to learn how to reflect, and it was used later as evidence of reflection. The same thing happens in PBL; it is a necessary consequence of alignment. Grappling with the task you want students to learn is automatically a learning process that becomes a learning outcome. When you are learning to drive a car, is the act of driving a learning process, or an outcome of learning?

In this case study, alignment evolved "bottom-up" in the course of negotiating with students struggling to cope with a new form of assessment. This might be contrasted with the "top-down" alignment of formally structured PBL. The important thing is that, however it came about, alignment with qualitatively and holistically defined objectives brings about quality learning in both cases (see Biggs, 1999).

Summary and Conclusion

In an aligned system of instruction, the teacher's task is to see that the appropriate verbs are:

1. Nominated in the objectives.
2. Likely to be elicited in the chosen TLAs.
3. Embedded in the assessment tasks so that judgments can be made about how well a given student's level of performance meets the objectives.

Because the teaching methods and the assessment tasks now access the same verbs as are in the objectives, the chances are increased that most students will in fact engage with the appropriate learning activities. This is, by definition, a deep approach.

Constructive alignment is common sense, yet most university teaching is not aligned. This is possibly because many academics, holding traditional transmission theories of teaching that ignore alignment, simply haven't seen the need to question their assumptions. Typically, the lecturer presents information throughout the semester. At the end of the semester a test is given, the main function of which is to "get a good spread" between students, to distinguish the good learners from the poor learners. This might seem reasonable at first sight, but our primary job is not

to discriminate between students but to teach content to all students in our classes. Tests constructed to discriminate assume no *inherent* relation between what is taught and what is tested. A good criterion-referenced system of assessment could certainly change that, as long as the *need* for such a system is perceived.

Some administrative requirements, such as reporting in percentages, make alignment difficult, while grading on the curve makes alignment impossible. Resource limitations are often seen to limit large-class teaching to "passive" methods such as mass lecturing, and non-aligned assessments such as multiple choice testing, but while resource limitations do limit the options, there are ways of rethinking teaching and assessment in large classes that at least acknowledge alignment (Biggs, 1999).

One advantage of the emerging top-down management of universities—possibly the only advantage educationally speaking—is that more enlightened educational policies could be required throughout institutions. Some certainly are going in that direction. It seems more likely, however, that as managerialism is itself a highly quantitative outlook, it is possibly even less likely now than ever that the major decision-makers in universities would appreciate the need for qualitative and holistic approaches to criterion-referenced assessment.

At all events, the current revolution in universities is putting teaching under the spotlight, which at least provides an opportunity for some reflection on current practice. Certainly, students are not learning as well as they might be. Aligning practice on the basis of what students should be doing is likely to be more fruitful than focusing only on what teachers and administrators do.

Address for correspondence: John Biggs, Professional Development Centre, University of New South Wales, NSW 2052, Australia. E-mail: jbiggs@bigpond.com

Note

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