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Student Learning Research and Theory - where do we currently stand?

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"There is nothing so practical as good theory"

Lewin is as right today about the relation of theory and practice as he was over fifty years ago when he first wrote the above words. However, the message has still not got across. Teachers, as Liz Beaty points out at this conference, "are only interested in practical solutions to problems", and with the lack of a common meeting place between researchers and teachers, teachers do not see that researchers can in fact offer practical solutions. My role here is to argue that some theories of learning and teaching are indeed eminently practical.

But there is a deeper, ideological, issue I would like to address first. That is the perception by many teachers and by the movers and shakers in education that interest-driven, non technological, research in educational issues has no worthwhile flow-on as far as practice is concerned. This is alarmingly evidenced in the current determination to shift the locus of teacher education from the university faculties of education to the schools. The academic input to teacher education will thus be diminished, that of the apprentice/master teacher enhanced.

This is a highly retrograde move for many reasons. What concerns me most is the underlying assumption that theory has little or no place in the practical mater of teaching; teacher training, that is to say, is best left to those who can teach. But even to say that is to assume a theory: the theory of osmotic learning. That is, place a novice in close contact with an expert, and by a process of osmosis expertise will flow from expert to novice. And of course osmosis is so much cheaper than proper professional education.

Yet this act of academic vandalism is not entirely undeserved. If educational psychologists had delivered the goods they had long been promising, the politicians would not have been able to carry through such a radical proposal. Since Thorndike (1992) underwrote arithmetic teaching with the theory of conncectionism, every decade or so someone

had bemoaned the lack of impact on practice that can be traced to advances in our understanding of the psychology of learning. The problem was invariably thought to be that the wrong theory had been applied, the solution of course being to apply the theory we now know in our latter-day wisdom to be the correct one. We have thus seen a passing parade of the Now-at-last-the-One-Correct-Theory-of Learning: behaviourism, Piagetianism, Maslovian then Rogerian humanism, cognitive psychology with information processing being the current academically correct version in some quarters, phenomenography (Marton, 1988) in others. Some theories were more applicable to education than others, but the strategy of top down application of the One Correct Theory is simply misguided, essentially because psychologically-based theories are derived to explain the data emerging from laboratory contexts, and they are stretched to snapping point when applied to classroom and institutional contexts.

In this paper, I want to review the kinds of theories that have been developed to explain educational, and particularly tertiary, learning contexts First, I shall start with the basic implicit and informal theories of learning and teaching held by educators, and then elaborate the more formal theories that are in current use.

Making implicit theory explicit

Any deliberate act is founded on some sort of theory, a coherent set of assumptions. You do this rather than that because you think it will work, and it will work because... of this, or the other. Argyris' (1976) distinction between espoused theory and theory-in-use is useful to capture what I am saying. The espoused theory is the "official" theory one holds of educational or other processes, the theory-in-use the implicitly held theory that drives action. The process of professionalisation involves matching the two; that is, where the espouses theory becomes the theory-in use. The osmotic theory of learning is a theory-in-use, but one that is far removed from the espoused theories of educational psychologists.

However, the problem is that much espoused theory remain declarative and self-referential: a public body of knowledge, supported by ingenious experimentation, and concerned with consistence within itself, all according to the academic rules, but not unfortunately easily translated into action. It is this aspect of theory that makes honest practitioners groan with impatience, while politicians delightedly sharpen their knives.

A student's or a teacher's conception of what learning is, or what teaching is, become an implicit theory-in-use learning and teaching; as a theory-in use, it directs the way the students learns or the teacher teaches. Common conceptions of learning are described in Gibbs (1992), and I imagine that these will be familiar to you. Following Cole (1990), I would make just two distinctions: quantitative and qualitative implicit theories of learning and teaching, which I would more simply call "outlooks" on learning.

The quantitative outlook

In the quantitative outlook, learning is conceived as the aggregation of content: to be a good learner is to know more. The context of learning are treated as discrete quanta of declarative or of procedural knowledge: bits of knowings, any one bit being independent of any other bit. Thus, the curriculum becomes discrete units of content, such as facts, skills and competencies. The competency movement, and the current concern with performance indicators, stem from the same tradition, but as elaborated later, they need not maintain that tradition.

The process of learning is this quantitative view is to aggregate more and more bits, internalise them, and be able to reproduce them accurately. Teaching is conceived as transmitting knowledge, or conveying knowledge from one head to another. In tertiary institutions, the most common method of teaching is of course by lecture and of learning by note-taking. The teacher's task is too expound, the student's to incorporate; hence, possibly, the learning-as-eating metaphor with which this conception seems to be obsessed: "assimilate", "absorb", "digest", regurgitate:, "spoon-feed", "chew over", "get you teeth into". Thus, once the teacher knows the content well, and can talk about it coherently, any failure in learning becomes the student's fault.

The quantitative outlook sees assessment as involving test situations that reliably indicate whether or not the student can reproduce correctly and speedily the taught item. It is assumed that the context is knowledge are learned in binary units, correct or incorrect, and that the correct units may be summed to give an aggregate or total score that is an index of competence in what is learned. Multiple choice tests, for example, represent learning as a total score of all items correct with or without guessing penalties), any one item being "worth" the same as any other. In standard methods of test construction and item analysis, items are selected on the extent to which they correlate with the total

test score, not in terms of their intrinsic content. even essay marking is likely to have a quantitative bias in practice. The most common procedure in marking open-ended essay responses is to award a mark for each relevant point made, and convert the ratio of actual marks to possible marks into some kind of number, which the teacher may then adjust for overall quality. The final grade (A, B, or D; Pass, Fail, or Distinction) is thus essentially arrived at quantitatively.
In the quantitative outlook assumptions are made about the nature and the acquisition of knowledge, that are untenable in the light of what is now know about human learning. However, the related test technology of item analysis, test construction, and establishing reliability and validity is sophisticated and in widespread use, so that conceptual deficiencies are masked by technocracy.

The qualitative outlook

In the qualitative outlook, it is assumed that students learn cumulatively, interpreting and incorporating new material with what they already know, their understanding progressively changing as they learn. Thus, learners' comprehension of taught content is gradual and cumulative, more like climbing a spiral staircase than dropping chips into a bag, with qualitative changes taking place in the nature both of what is learned, and how it is structured, at each level in the spiral. The curriculum question is to decide what meaning or levels of understanding are "reasonable" at the stage of learning in question. As regards teaching method, the teacher's task is not to transmit correct understandings, but to help students construct understandings that are more rather than less acceptable. Content thus evolves cumulatively over the long term, having "horizontal" interconnections with other topics and subjects, and "vertical" interconnections with previous and subsequent learning in the same topic. The process of teaching is to help the learner undertake activities that involve progressive understanding of the meanings. The process is multidimensional, not linear: it is to intrigue the gourmet, not to sate the glutton.
Teaching here then engages the learning in constructive, in addition to receptive, learning activities. Typically, these activities involve (Biggs, 1989):

- a positive motivational context, hopefully intrinsic but at least one involving a felt need-to-know and a aware emotional climate.
- a high degree of learner activity, both task-related and reflective

- interaction with others, both at the peer level with other students, and hierarchically, within "scaffolding" provided by an expert tutor.
- a well-structured knowledge base, that provides the longitude or depth for conceptual development and the breadth, for conceptual enrichment

How each of these dimensions may be utilised in tertiary contexts is well illustrated in the action research studies reported in Gibbs (1992).

Whereas the logic of assessment from a quantitative point of view implies aggregating units of earning, that from the qualitative tradition implies charting longitudinal growth. The outcomes of learning become the constructions the learner has made at any given stage, so the aim of the developmental model of qualitative assessment is to discover where students currently are in their understanding or competence in the concept or skill in question. It is thus necessary to first chart the course of development of a concept or principle, so that the stages of development can be defined. This may be done by establishing a hierarchy of conceptions of understanding on a topic by topic basis (Marton, 1988; Ramsden, 1988), or by using a general taxonomy that applies over a range of topics or of subjects as in the SOLO taxonomy (Biggs & Collis, 1982), as discussed later. In the ecological model of assessment, applied or procedural knowledge is applied to test situations that are "authentic" or ecologically valid. The question in this last case is procedural; can the students solve a problem involving instructed knowledge in a real context? This means that the test has to be situated in an "authentic" setting. In a sense, this is simply saying that tests should be valid, yet so detached and quantitative has assessment become that authentic testing has become a recent catch-cry, and testing problem-solving by giving students the sort of problem they would meet in real life, rather than giving them an exam in the declarative knowledge prerequisite to problem solving, a major innovation (Master & Hill, 1989; Wiggins, 1989).

I have presented the quantitative and qualitative outlooks as implicit theories of learning, but they are more than that; they also describe a person's whole orientation towards learning and teaching, affecting a very wide range of academic decisions. I once heard an academic remark at a Higher Degree Committee meeting that as a student's M. Phil. proposal mooted a sample size of over 2,000 subjects: "But that's enough subjects for a Ph.D.!" Now there's a quantitative outlook on the academic world.

Unfortunately, such outlooks are hard to modify, but a qualitative outlook is probably a necessary conditions for the more desirable ways

of teaching and learning. To effect that change is a major challenge to staff developers. An even greater challenge is when staff developers and educators try to drive teaching related decisions with a qualitative outlook, when the parameters within which they are forced to work are quantitative. Precisely this is happening at the moment with the performance indicators and competency based accountability drive.
I turn next to the question of formal theories of student learning, as opposed to informal outlooks on learning.

Explicit theories of student learning

Viable theories of students learning are, like any other form of intellectual construction, formed in situ, using one or more of the basic components in the tertiary context: the student, the teaching context, the ways of engaging or processing the task, the outcome of learning, and the institutional context. Each group of theories has its uses, but some are much more useful than others.

1. Student-based

This family of theories comes from individual differences psychology, the focus being on qualities inherent in the student that have a powerful effect on educability.

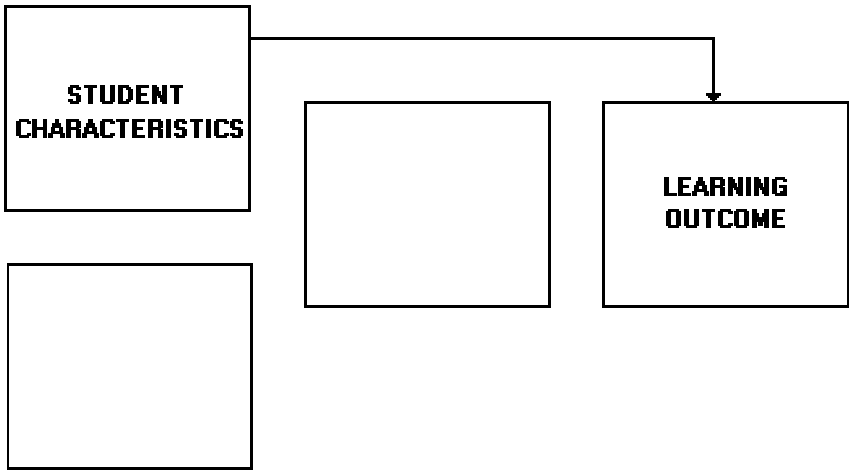

Figure 1 Student-based theories of learning

Such factors would include abilities, prior knowledge, motivation, personality facts that promote or lessen student teachability, quantitative or qualitative outlook on learning, learning styles, stabilised learning approach, and so forth.

Most of these factors focus on stable individual traits, such as ability or learning style, that are thought to affect the nature of the outcome,

independently or particular learning contexts domains. Learning style once had a considerable vogue under the name of cognitive style, instances of which had proliferated to what can only be described as a silly extent. Styles have been usefully synthesised by Riding and Cheema 1991), who find two generic styles: wholist-analytic, and verbaliser-imager. But the essence of these student based factors is that, like ability or socio-economic status, they are thought t be far more important than "educational" factors in determining educational outcomes, a view given inaccurate but influential support in the famous Coleman Report (Coleman et al., 1966)

There are two problems with the individual differences approach. First the lack of research demonstrating that styles and abilities do interact with teaching methods in ways that are practicable and usable. Second, it is another variant of the blame-the-student model, that is, when learning is inadequate it is because the students are unmotivated, of low ability, have poor backgrounds, and so on. The teacher is let off the hook.

However, good teaching involves helping students learn; it should not involve finding reasons that conveniently inhere in the student to explain when teaching fails. Thus, the student-focused model isn't about teaching at all; it may help teachers to find fault with their students more effectively, but it doesn't help them find fault with their own teaching, which is what being reflective practitioner means (Bowden, 1988; Schon, 1987).

2. Teacher-based

This family of theories might be called the traditional staff-development model, where the focus is on the teacher and on the development of teaching skills. This too is a blame model, in this case blame-the-teacher.

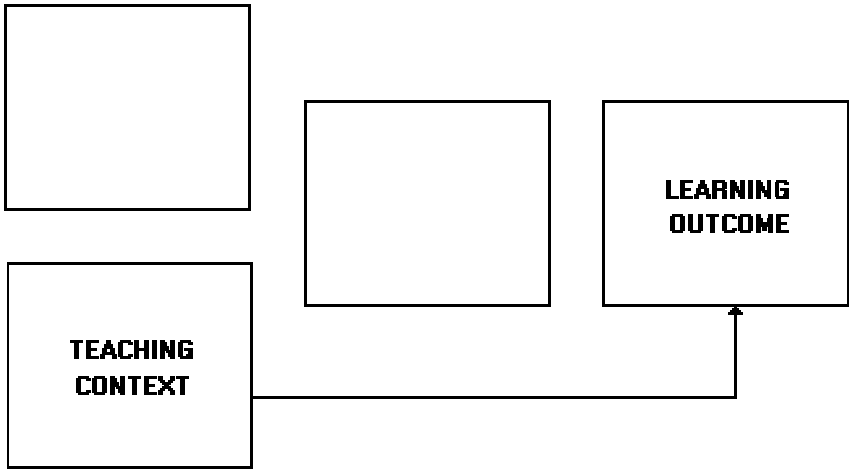

Figure 2 Teaching-based theories of learning

Blaming the teacher is precisely what the accountability movement is about; it sees the teacher as the prime actor, who should dazzle with a fine display of mastery of teaching skills, and other performance indicators of good teaching. Many staff developers still work on the assumption that their function is to increase the range and efficiency of an individual's teaching skills, and the linking of staff development with A/V or ed tech centres, which have the corresponding function of increasing the range of teaching related hardware, thus reinforcing the teaching skills model of staff development. The model appears eminently reasonable on the surface, but teaching skills are teaching skills only if students learn, otherwise teaching is a spectator sport.

3. Process-based

This family of theories derives from information processing psychology; the interest is in the efficiency with which basic cognitive strategies are deployed. The emphasis here is not upon individual characteristics, but upon the "on-line" cognitive strategies that students may be trained to use when handling tasks.

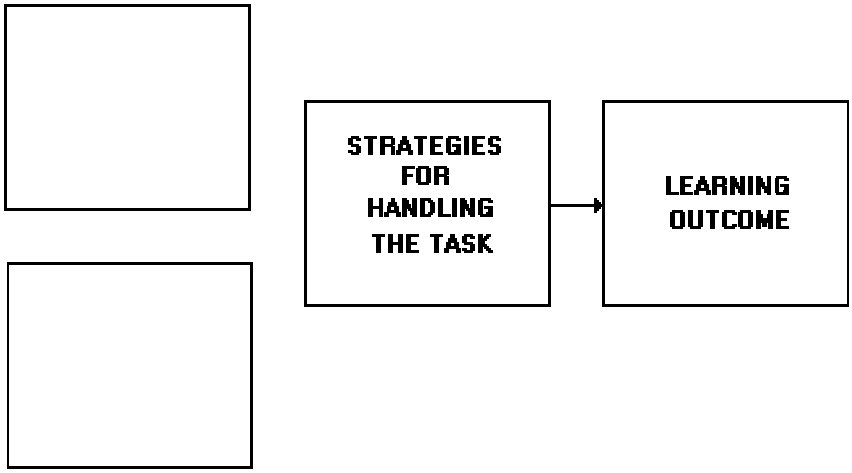

Figure 3 Process-based theories of learning

The information processing model is similar to learning style in that information processing strategies are conceived as being context-free or detached; elaboration, imaging, reversal, and the like (Weinstein and Mayer 1984). These strategies operate in much the same way whether the material being elaborated or rehearsed is being prepared for an examination or for a laboratory experiment. Study skills training, and heuristics training deriving from Polay's (1945) How to Solve it, also derives from this model. Students are trained to use appropriate strategies or study skills in one context (the training sessions) and are then required to carry them into actual work settings. There is an element of the blame-the-student deficit model in this approach in that the students are thought to lack something, in this case study skills, which of course may well be the case but it leaves the teacher out of the picture.

The evidence on strategy training is equivocal (Garner, 1990). In the case of study skills, given appropriate contextual and motivational backup there is some evidence that skills training can work (Biggs, 1988) but under other circumstances such training can even be counterproductive, Ramsden, Beswick, and Bowden 91986), for example, found that after a study skills course for first year students, the only noticeable result was an increase in surface approaches not deep as intended. The reason turned out to be that students perceived from the messages signalled from course structure, work loads, and assessment, that accurate reproduction of facts and study skills was what was required for success in first year, over several subject departments; accordingly, the study skills course was used selectively, those aspects seen to lead to better reproducing were taken on board, those leading to

better understanding were seen as at best irrelevant. Whatever their real intentions, it is clear that the teachers concerned had a massive selling job to do first, before study skill training could bear fruit. This study should however not be seen as evidence against study skills training, but as argued more fully below as evidence for the need to integrate both teaching based, student-based, and process-based, approaches to improving learning.

All the model discussed so far are deficit model; poor learning is seen to be due to lack of something, either in the student, the teaching, or in something the student a be trained to do. To improve learning, all you have to do is to add something. It may occasionally be the case that such an assumption does result in improvements, but it is avoiding the real situation; that you are dealing with a complex system of events, in which the parts interact, which brings me to the next model.

4. Classroom-based

This model sees, student, teaching method, learning approaches and outcome as interactively related:

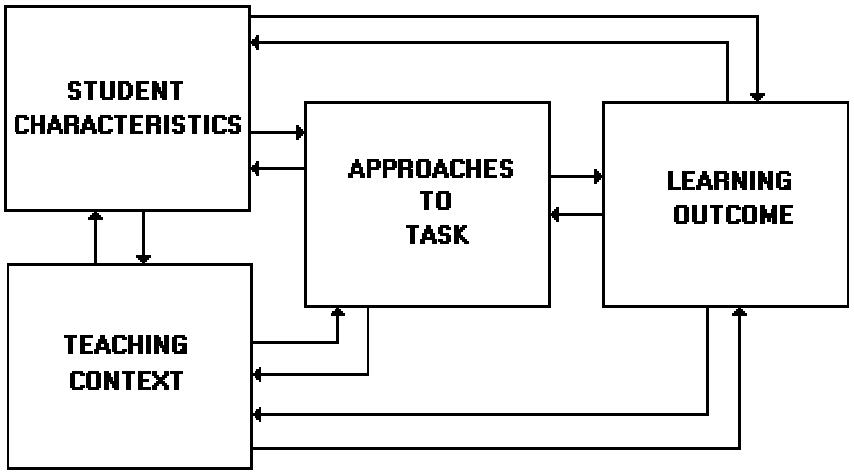

Figure 4 Classroom-based theories of learning

This model derives from Dunkin and Biddle's (1974) presage-process-product classroom teaching model, who saw a linear progression from presage (teaching context) through process (teaching acts) to product (class achievement). The present version (Biggs, 1993b) differs in two main ways:

- we are talking about student learning, not teaching
- all factors should mutually affect each other

Thus, student do not blunder on with their initial intentions or expectations regardless; they get a feel for the course and for the teacher once it is underway, and continually revise. Likewise, good teachers are sensitive to student feedback, even at the most informal, inter-ocular, level and revise their teaching and assessment conditions. Thus, too task processing is tuned (a) to students' expectations, prior relevant knowledge, preferred or stabilised approaches to learning, and so on, and (b) to their perceptions of task demands arising from the teaching context requirements. Feedback from the task processing from the student's point of view involves metacognition, deliverbate [sic] awareness and control over task processing; it is not something that the student runs of on cue, but which is planned, monitored, and if necessary revised according to progress and to perceptions of task requirements. This is why teaching detached skills, when ignoring both context and students' changing expectations and intentions, can be hit or miss. Task feedback also affects teaching decisions, if the teacher is sufficiently aware to take them on board.

Task processing determines the outcome in ways that are now very clear: surface processing leads to bitty, unstructured outcomes, deep processing to well structured outcomes (Biggs, 1979; Marton & Saljo 1976; Trigwell & Prosser, 1991; Watkins, 1983). Again, however, metacognitive monitoring of the outcome enables optimising the link between process and product; and at the presage level, adjustment by student and by teacher.

The open-ended, recursive feature of this model means that there is a tendency for the parts to attain equilibrium, in other words, it has the essential features of a system in balance (Von Bertalanffy, 1968). What this means is that any change will be absorbed into the existing balance, unless it is drastic, in which case a new system will be created, as happens so readily in the case of eco-system. The classroom is just such an eco-system; for example, the presence or absence of one or two key players can make a huge difference to, say, a group discussion in which all nevertheless participate.

Thus, teaching students how to study more effectively in a system in which surface learning is perceived as the adaptive way to go will result in more effective surface learning, as Martin, Ramsden and Bowden found. The answer is not to target the student, but to target the system of teaching and assessing that made the unwanted learning approach ecologically valid. Students tend to stabilise their approaches to learning according both to their ongoing experience of the teaching context, and to their own motivational and other predisposition, so that

an individual's preferred or stabilised approaches are ones that work for that person, in that teaching context. If the context is perceived to change, then the individual would readjust. Questionnaire assessments of approaches to learning, such as the ASI (Entwistle & Ramsden, 1983) or the SPQ (Biggs, 1987), thus reflect a current state of affairs in a student's institutional adaptation, and if averaged over a large class would give and index of the quality of teaching in that class (Biggs, 1993a). Approaches to learning are thus sensitive to individual differences, and to teaching contexts, in a way that is not the case with learning styles.

5. The phenomenographic model

Phenomenography is a highly influential methodology in the student learning literature (Marton, 1988), with Marton and Saljo's (1976) study of surface and deep approaches to learning, and their relationship to the quality of the outcome, a much-quoted source. Learning is studied from the perspective of the learner, not that of teacher or researcher, the object being to see how students construe the content, expressed as the form of the relationship the knower sets up with the known. Usually such constructions, or conceptions, can be expressed in a limited number of hierarchically ordered ways, some learners having partial or distorted conceptions of the intended topic, others sophisticated ones. Learners may "comprehend", more or less, the teacher's perspective, but they genuinely learn only what they construct from their own perspective. Their approach to learning is how they go about that construction.

In many respects phenomenography has much in common with the classroom level systems model, but it differs in other respects. In view of the popularity of this view of student learning, it would be appropriate to devote some time to a compare-and-contrast with the systems model.

The starting point of each is the student's perspective. This is quite explicit in phenomenography, but it is also clear in the systems model: it is the student's perceptions of the task demands, the student's construction of meaning that is important. This element is absent in the teaching skills model, where it is what the teachers does that is the important thing, not what the student does.

Learning (and teaching) are context dependent, an important difference from both the student- and teacher-based models. Learning takes place with respect to content and context; you learn something somewhere. Indeed, Marton is reluctant to talk about learning as an independent process at all; learning and outcome are as it were two sides of the same sphere. Thus, it is conceptually OK to view the elements in the

learning situation separately in the systems model, but it is not OK in phenomenography.

A major difference between the models is on the question of generality. Phenomenography derives from phenomenology, which takes as the only reality the student's immediate perception of the task; questions of overlap with other student's perceptions, let alone the teacher's perceptions, are ruled out of order. There are two consequences. First, individual personality factors are rules out; they may affect the immediate phenomenal space of the student, but how they do so is not relevant. A bright student will see things differently from a dumb student; the importance is the perception itself in each case, not the brightness or the dumbness which may affect the perception. This position necessarily follows from adopting the student's perspective as the only reality: brightness is a category used by an outsider, not by the experiencer. However, there is considerable evidence that perceptions are altered by "personality" factors (see Figure 4), and that is worth knowing, studying, and taking into account, as would be the case in the systems model.

The second consequence is that it becomes impossible to generalise across teaching/learning situations. If each individual's perspective is unique, you are left with an infinite number of perspectives. Thus, find it difficult to see where phenomenography can lead to action. On the other hand, Bowden (1988;1989) has adapted what he calls "phenomenography pedagogy", which he sharply distinguishes from phenomenography itself, as a basis for staff development. Teachers are faced with hard evidence that their students' understandings of taught concepts are in fact miserably below the expected level, and then "reflect on the learning experiences most likely to bring about conceptual change in teachers, i.e. the shift in student understanding" (1989:10). This work certainly brings about conceptual change in teachers, i.e. the shift to a qualitative outlook mentioned earlier, but the answer to the procedural question "But what can I do to improve my teaching?" does not appear to be forthcoming from phenomenography. Ramsden (1992), in addressing that questions, goes well beyond phenomenography itself.

Phenomenography and the systems model have in common, along with constructivist theories in general, the assumption that students learning cumulatively and in clear stages; assessment of learning, as stated in the qualitative outlook, aims to nominate the stage at which a student is presently at in the understanding of a concept. This may be done on a topic by topic basis, as is the case in phenomenography, or by

using a general taxonomy, such as the SOLO taxonomy (Biggs & Collis, 1982) that applies over a range of topics or even subjects. The topic-by-topic approach is more sensitive, but it requires considerable research and development for each topic addressed. The SOLO taxonomy assumes a general sequence in the development of many concepts and skills, and that sequence may be used to guide the formulation of specific targets or the assessment of specific outcomes, and can be used in a conventional letter grade scheme (Biggs, 1992).

Finally, in phenomenography there is a hint of a prescriptive return to the One-Correct-Theory: that this is the way to construe learning and that any other way is simply wrong. Systems thinking, on the other hand, is not so much a theory as a way of generating ideas about how a complex of variables may interact, when the predictability of relations between subsets of variable is low. As such, system thing is applicable to a variety of disciplines and situations, such as physics, biology, mathematics, cybernetics, management, or economics; it is not a theory belonging to any one discipline (Von Bertalanffy, 1968).

In short, there are many aspects that phenomenography and systems thinking have in common. Where they differ, is on the focus of interest: on the conceptions that people carry around in their heads, or on the complex factors that link thinking, action, and context.

6. The institutional model

An elaboration of the systems model brings institutional considerations into focus; recent events have rammed home the fact that systems thinking does not stop at the classroom. Teachers may have a certain degree of autonomy, but basically they have to work within the framework and structures dictated by the institution (which in turn has to operate within nationally dictated policies and resourcing limitations).

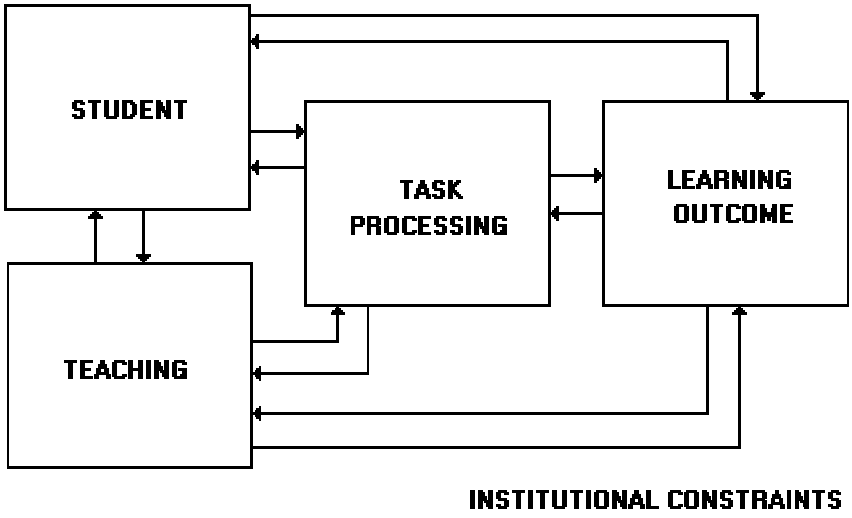

Figure 5 The Institutional System

Reid (1987) distinguishes three major components in the institutional system: the rhetoric, the technology, and the social system, with the social system setting the terms of equilibrium for the others, the "technology", or teaching know-how, mainly belongs in the classroom, to serve institutional rhetoric, but its effective application depends on the social system of the institution, which has two aspects;

- the formal requirements established on a collegian basis;
- the formal requirements of bureaucracy

Institutions vary in the extent to which deviance at the classroom level is tolerated.

One example that illustrates both formal and informal requirements comes from one university in Hong Kong, which like UK universities 20 years ago, has regulations preventing the release of examination results to students, obviously not on educational grounds, but on grounds of institutional and collegian convenience. On one occasion an academic claimed the right to use his own judgement on releasing marks, only to be told by a senior academic: "But if you do it, students will put pressure on al of us to follow suit. That's just not cricket!" And he was in this case able to add institutional support: "Anyway, you can't. It's against the regulations."

The use of external examiners may constrain the nature of the assessment tasks to ones that an outsider to the teaching process can handle. Feedback is written as much with an eye to the external's anticipated comments as to informing the student. The use is personalised assessment tasks such as portfolios, diaries, etc., or tasks involving self-

assessment and peer assessment, despite the relevance of these modes of assessment to teaching objectives and to higher order learning processes (Harris & Bell, 1986; Masters & Hill, 1991), are discouraged.

Most institutions require that the gradings obtained in course units are combined in order, inter alia, to determine levels of Honours or Distinction/Pass levels in the total programme. This puts almost irresistible pressure on markers to use quantitative marking schemes. It need not do so, as profiling or other qualitative schemes can be used, but as in practice teachers are required to come up with a grade that can be quantified in a common metric, they too easily mark quantitatively in the first place. This provides them with a frequently inappropriate mind-set when marking: "so many marks for this, so many for that ...". In an extended piece of writing, the shapes of the total argument becomes lost, the shape of the argument figuring minimally as just another thing to be tallied when arriving at the final grade.

A quite recent phenomenon in the concerns about assessment in tertiary institutions has to do with quality control, performance indicators, and their accountability to governments, as part of the market rationalism that had come to obsess the Western world.

There is nothing wrong with monitoring the effectiveness of one's operations. In the case of individual performance it's called being metacognitive. Now institutions are required to be metacognitive, but there are two problems. The first is translating self-monitoring into operational terms; what aspects are you monitoring, qualitative ones or quantitative? Economic rationalists think quantitatively to a person, so that raises problems when you bring in issues that go beyond immediate cost-effectiveness. The second problem is that of accountability. If institutions are being held in true metacognitive fashion to be accountable to themselves, that's one thing. But if governments who attempt to define the currency in which accountability is transacted, we are back again to a quantitative mind-set.

"Performance indicators" is the leading term given to this currency, and at its lowest would define output in relation to input, and the higher that ratio the better: the more graduates out for fewer dollars in, the more effective the institution. The real danger is that such indicators are usually but not necessarily quantitative, which have their own backwash, in exactly the same way a teacher's assessment techniques have their backwash on student learning. If we want quantitative approaches to assessment at the classroom level, the organisational climate of the institution as a whole is implicated, as discussed by Lublin and Prosser at this conference. It is very difficult for teachers to construct a

qualitative framework for their students to operate within, when they themselves have to operate within a framework of quantitatively defined performance indicators.

Conclusion

I have tried to give an overview of the state of play in theories of student learning. In summary, several features strike me.

1. Theory is at last being derived from the context to which it is to be applied, as opposed to attempting to applying psychological theories from a distance.
2. We are beginning to move away from deficit models, according to which you find out what's wrong and fix it. Education is not like that. Rather, education is as Schon (1987:3) describes it: "a soft, slimy swamp of real-life problems" to which adding or subtracting things will either have to measurable effect, or worse, will destroy the swamp's eco-system.
3. The palmy days of high degrees of autonomy for the individual teacher appear to be over. Independently of the colour of particular governments, a quantitative mind-set seems to be setting constraints not only on resourcing, hence on the numbers of students in a given class which itself of course suggests mass methods of teaching and assessing, but on the structure of degree programmes and how they are to be delivered and accounted for institutionally. The classrooms quite evidently a subsystem within the larger institutional systems, which is something that realistic theories of teaching need to take into account.

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