

FOSTERING DEEPER LEARNING

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"Society expects its teachers to care for students, to care about their learning, to be knowledgeable about curriculum content and to know how to induce learning in others" Jeans (1992). This last expectation, knowing how to induce learning in others, would appear to be obvious and yet evidence of student learning at the secondary and tertiary level indicates that teachers may need to give this expectation more attention. In recent years the emphasis in both research and government policy has been on improving the quality of teaching with a view to improving learning.

All teachers bring to the classroom or lecture theatre an inbuilt informal theory of teaching. This theory, which may be either consciously stated or implicit in what the teachers do, has implications for the way in which students learn. Fox (1983) asked newly appointed polytechnic teachers what they meant by 'teaching'. As a result he identified four basic theories underlying the approaches to teaching of polytechnic staff. First, the transfer theory, in which the subject matter is viewed as a commodity that can be transferred into an empty vessel waiting to receive it, ie. the student's mind. If certain students do not learn, despite the fact that the commodity has been transferred, it is because the vessel in this case is a leaky one. This amounts to the view that it is the student's fault if they do not learn. Where teaching materials are well prepared, effectively organised, and imparted, teachers are considered to have done all they can.

A second theory relates to the 'shaping' of the students mind into some predetermined form. This view sits easily with the notion of teaching as training rather than educating. Teachers, with this informal theory, use verbs such as 'develop' and 'produce' to describe the student learning

outcomes of their teaching. Fox classifies the transfer theory and the shaping theory of teaching as 'simple' theories which are more likely to be held by the less experienced or non-reflective teacher. Here there is a simple relationship between teaching and learning. If a topic has been taught it must therefore have been learnt. An essential feature of these two theories is that it is the teacher who is in control of the commodity to be transferred and who determines the shape of the finished product.

The third type of theory, a 'developed' theory is one which takes the view that the student and teacher are undertaking a journey of discovery together. This is the notion of the 'shared adventure' that Baird (1992) develops in his exploration of science teaching in Victorian secondary schools. The teacher's role according to this 'travelling' theory is to act as a knowledgeable and experienced guide and fellow explorer in the journey of education. Here a range of perspectives are explored, there is no 'right' body of knowledge to be learnt and the expectation is that the teacher will learn along with the students. Svensson and Hogfors (1988) extended this view in their work with engineering students where they concluded that encouraging students to consider a variety of alternative conceptions is an important element in bringing about lasting conceptual change in the learner.

The growing theory, the final type identified by Fox, is also a developed theory in the sense that students make a significant contribution to their own learning in terms of its pace, direction, objectives and process. The growing theory takes into account the past experiences, learning and knowledge of the student. It is flexible in its outcomes both in terms of the overall direction and the extent or level of that outcome. In travelling and growing theories the teacher's role has changed from being an infallible expert, responsible for a final product, to being a guide who is responsive to the context in which the learning is occurring.

The identification of these theories of teaching can be juxtaposed against studies of student learning. Several studies have identified contrasting styles of learning, Pask (1976) wrote of holistic and serial approaches to learning, Baird and White (1982) of contextual

rationalisation and task directed learning and Flavell (1976) of metacognition. Each of these approaches essentially identifies the extent to which students reflect and attempt to attach meaning to what they are learning.

Marton and Saljo (1976) in their seminal work asked students to read extended passages from academic articles. The students were then asked about the content of what they had read and how they had read it. From this experiment Marton and Saljo distinguished between deep and surface approaches to learning. The characteristics of students who employ deep and surface approaches to learning are summarised by Ramsden (1992) in Table 1

Students who use a deep approach are personally involved in the task and seek to obtain some underlying meaning. In addition they aim to understand relationships between the immediate task and other tasks or contexts. Such students are likely to read extensively around a given topic, to discuss the topic and ultimately to achieve higher grades on assessment tasks than students who use a surface approach, Biggs (1989). To the extent that such a student is an independent learner who is in control of his/her own learning, this approach to learning is complementary to either of the developed teacher theories. Indeed, this approach to learning may be encouraged by teachers who adopt a developed theory, Fox (1983).

A surface approach to learning on the other hand arises when the student sees learning as a means to achieve an end. This may be simply to do enough work to pass some assessment hurdle. Students who adopt this approach are motivated by an extrinsic objective and they will commit unrelated facts to their short term memory but are unlikely to be able to establish meaning or relationships between or within given tasks. This approach is likely to be fostered by teachers who hold simple theories. The student is dependent on the teacher for knowledge and is unlikely to achieve highly on assessment tasks.

Table 1: Different approaches to learning	
Deep approach	Surface Approach
<i>The intention is to understand. The student maintains the structure of the task</i>	<i>The intention is only to complete the task. the student distorts the structure of the task</i>
* Focus on 'what is signified' (the arguments, the concepts for solving the problem)	Focus on the 'signs'.(the words of the text, the application of formula needed to solve the problem)
* Relate previous knowledge to new knowledge	* Associate facts and concepts unreflectively
* Relate knowledge from other subject/course	* Memorise information for assessment only
* Relate theoretical ideas to everyday experience	* Treat the task as an external imposition
* Relate and distinguishes evidence and argument	Fail to distinguish principles from examples
* Organise structure and content into a coherent whole	* Focus on unrelated parts of the task
* Internal emphasis	* External emphasis

Source: Adapted from Ramsden (1992, p. 46)

A third approach, the achieving approach has been identified by Biggs (1979, 1987a) and Entwistle and Ramsden (1983). The student using this approach to learning is motivated extrinsically and creates a highly organised, productive, study skills approach to their learning. These students work to achieve grades which fit in with their egos or career aspirations. They have studied the game carefully and adjust their learning according to the rules as they perceive them.

Ramsden (1985) notes that whilst a surface approach will inevitably lead to poor understanding, and a deep or achieving approach to a high level of understanding this should not be extended to the view that a surface approach is necessarily adopted by weaker students and a deeper approach by highly competent ones. The approaches to learning are not necessarily mutually exclusive. Students may adopt different approaches according to the task, the course or the teaching context. In this sense teachers have a direct and powerful impact on the learning outcomes of their students. Similarly, a desire to understand at a deeper level of itself, will not necessarily give rise to this outcome as students differ in terms of their cognitive development, Perry (1970); their perceptions of the course or task itself, Meyer, Parsons and Dunne (1990); previous experience which they bring to the task, Entwistle and Ramsden (1983); and their

perceptions of the assessment demands of the subject, Thomas (1986) cited in Entwistle and Entwistle (1991) .

Where the approaches to learning and the teacher's theories about teaching are mismatched a series of frustration's for the student can result. Fox (1983) notes that a common mismatch occurs where the students

view the teaching and learning process as a transfer of knowledge. They will expect well-structured lectures which leave them with a set of comprehensive notes which they can learn and later reproduce in an examination. Such students will be impatient with any attempts at introducing experiential learning such as projects, simulations and games. They will see such exercises as a waste of time because they know that the information transferred in such procedures can be transferred much more rapidly in lectures and duplicated notes. Sometimes students see some of the more creative exercises (which they have to work on independently or in groups) as an abdication of responsibility by the teacher. The students are resistant to activities designed to help them 'learn for themselves' because they see it as the teachers job to teach them. Fox (1983)

In this case the teacher has a developed theory of teaching whilst the student has a surface approach to learning and the resulting frustration's are likely to lead to a mutual loss of respect.

To avoid this frustration there needs to be a change in the conceptions of both the student and the teacher in relation to their respective roles. Kember (1991) investigated how students could be encouraged to develop a deep approach to learning and how teachers could also be encouraged to adopt instructional strategies which would foster this deep approach. He observed that there was widespread support for a deep approach by lecturers and teachers and this was frequently noted as a goal of education. However, the difference between the espoused goals and the reality was marked in so far as there was little evidence that the goals were being achieved, Biggs (1987), Gow and Kember (1990). Surface level thinking and the transmission of factual knowledge occupied more time than the fostering of deeper critical level thinking.

It appears then, that staff in higher education expect students to develop a conceptual understanding of their discipline, and to apply critical analysis to the information and ideas they encounter. This would require students to adopt a deep approach in their learning. While lecturers may espouse these high level objectives, the teaching which students experience, and

the examination questions set, seem often to encourage much more limited goals - the accurate reproduction of course content. (Entwhistle and Entwhistle 1991)

Ramsden outlined the characteristics of the learning context which would encourage different approaches to learning in students, (Table 2).

Table 2 : Characteristics of the context of learning associated with deep and surface approaches.	
Deep approaches	Surface approaches
* Teacher demonstrates a commitment to and enthusiasm about the subject	* Teacher demonstrates a lack of enthusiasm for the subject
* Teacher demonstrates an interest in and knowledge of the subject	* Teacher demonstrates a lack of interest in and knowledge of the subject
* Academic expectations are clearly stated	* Cynical or conflicting messages about the subject and rewards
* Subject content meaning and relevance to the student is stressed	* There is an excessive amount of material in the curriculum There is little feedback on student progress
* Teaching and assessment methods foster active and long term engagement with the learning tasks	* Assessment methods emphasise recall
* Students have the opportunity to exercise some choice in the method and content of study	* There are few opportunities to demonstrate independence in student approaches to learning
* Students have previously experienced educational contexts in which deeper approaches to learning are encouraged	* Students have previously experienced educational contexts in which surface approaches to learning are encouraged

Source: Adapted from Ramsden (1992, p. 81)

Collis and Biggs (1983) note that universities generally foster deeper approaches to learning than do the more vocationally orientated amalgamated colleges of advanced education. Disturbingly however, several other studies (Biggs 1987, Gow and Kember 1990) have demonstrated that a deeper approach to learning in higher education actually declines as students move through the course.

The Draft Advice from the Higher Education Council on the quality of higher education (July 1992) reiterates the view that where there is quality teaching there will also emerge quality learning ie. there is a direct relationship between teaching and learning. However, it may not be as direct as it may first appear as the time students actually spend with their teacher is relatively small in comparison with the total amount of time they

spend in learning. A significant proportion of student learning takes place away from teacher contact hours, in private study or in discussion with their peers. Part of the notion of quality teaching therefore should also include adequate consideration of how students can best utilise their independent study time and in developing structures which can enhance deeper learning in this time.

The students' perceptions of the course, the teaching approach and the assessment instruments, the cognitive development and prior experiences of the student and the institutional framework and academic environment in which the teaching takes place, Bowden (1988) cited in Sheppard and Gilbert (1991), will all be reflected in learning outcomes. The tasks students are asked to carry out, such as background reading, text reading, oral or written class presentations and assignment work are part of the context in which the student is learning and student perceptions of these tasks and the assessment instruments will have a significant impact on the quality of their learning.

To risk stating the obvious, because students are exposed to a great deal of teaching they are in a good position to comment on aspects of its quality. Their evaluations provide useful insights into how teaching may be improved and have implications for the professional development of teachers and tutors. Marsh (1987) reviewed the literature on student evaluations at the tertiary level and described several dimensions of good teaching which both students and their lecturers identified as important. The first dimension, interest and relevance of content is also identified as a key component of Baird's (1992) notion of challenge. If the challenge of the content or task is too high students will be put off by it and will learn at a surface level, similarly if it is too low they will become bored by it and will adopt the same surface approach. If students perceive subjects to lack interest and relevance the challenge necessary for deeper learning, for purposeful inquiry will not emerge.

Another dimension relates to workload. This issue has become particularly controversial as many teachers suggest that if less is taught the quality of the subject suffers. However excessive workload is

associated with a surface approach to learning, Chambers (1992), Entwistle and Tait (1990). The nature of this association is uncertain, as it is not clear whether it is the student's perception that the work load is too heavy that causes the surface approach, as Entwistle and Tait (1990) suggest, or whether a surface approach to learning leads to the perception that the workload is too heavy. If the first tentative hypothesis is adopted it has implications for course design in that it suggests that teachers may need to teach less and to reflect more carefully about what they teach, Baird (1992). If the second is adopted teachers will need to introduce strategies to change the student's approach to learning.

Chambers (1992) attempted to predict how long it would take the average student to complete the activities proposed in a particular curriculum by carefully calculating reading speed and comprehension, density of the textual material and institutional expectations of work load.

As teachers calculate the work-load implied by the curriculum they can, in the process, see whether they are asking students to spend most time on activities that are likely actually to encourage them to take a deep approach to their studies. That is, through this process of work-load accounting, messages about the purposes and nature of learning that are 'hidden' in the curriculum are uncovered and can be addressed. Chambers (1992)

Clarity and organisation of lectures, and of the course itself, was also seen by students to reflect quality teaching. Thoroughly prepared lectures which allow the student to develop a 'good set of notes', lecturers who are enthusiastic, speak clearly, and have good blackboard and overhead projector skills are elements of this dimension.

Good teaching was seen as involving pitching the material at the right level, presenting it at an appropriate pace and within a clear logical structure, providing an explanation which facilitated understanding and demonstrated both enthusiasm and empathy, Entwistle and Tait (1990).

This dimension provides teachers with a paradox in that well structured organised classes mean that students don't have to think as much for themselves, the material is developed for them by the teacher. On the other hand poorly organised classes require students to think about the classes in order to make sense of them and in this way may encourage deeper learning strategies. This is not to say that disorganised teachers should be promoted, only that teachers need to develop strategies within

classes that will force students to reflect more deeply about the material and 'to make it their own'.

One strategy relating to preparation and organisation which has been demonstrated to enhance learning is concept mapping, Novak, Gowin, Johansen (1983) Mayer, (1989). (An example of a simple concept map is included in Appendix A.) In order to be able to apply knowledge to problem solving the appropriate knowledge must be recalled. Effective recall depends on how the knowledge is structured in the long term memory, Tan (1992). It is particularly difficult to accurately recall isolated facts and details. Concept maps help students to organise their knowledge into a framework of more meaningful patterns demonstrating relationships between apparently disparate parts.

The heuristic of concept mapping - a kind of metacognitive strategy - assists learners in understanding concepts and relationships between them, in seeing the hierarchical, conceptual, propositional nature of knowledge. Jegede, Alaiyemola, Okebukola (1990).

Concept maps can be devised by the lecturer to demonstrate where the lecture is going or where it has been. They can also be developed by students as part of their independent study to help them to organise their own thinking more effectively.

The influence of assessment instruments on learning outcomes has already been alluded to. Where exam questions or assignment tasks elicit factual or descriptive responses students will tend to adopt a surface approach to learning as deeper learning is relatively unrewarded, White (1992). This has implications for course design as assessment instruments should be developed which require a greater degree of analysis and synthesis. Tasks developed during the course should also encourage and reward this type of thinking. Problem solving tasks provide this type of challenge.

Teaching style, at least in so far as it relates to a polished and entertaining performance, has been demonstrated to enhance learning in some studies and in others is not to be seen as important (Jones 1981). Intuitively, it would seem that entertainment alone is not important but where a degree of entertainment is combined with other aspects of quality

teaching it is likely that quality learning will result as entertainment implies a degree of student involvement. The more involved students are in the learning process the more quality learning will result. Teaching style in terms of clarity of speech and ability to explain are regarded as important elements of good teaching by students. Professional development programmes are well able to cover basic elements of presentation as these are aspects of style which are relatively mechanistic. The ability to involve students through entertainment may be more difficult to develop.

Key elements of quality learning relate to the students' perceptions of quality teaching which in turn influences their approach to study and ultimately learning outcome. Teachers can change the way students approach learning by changing the way in which they teach their courses. In some preliminary work by Parsons and Meyer (1990) it has even been suggested that it is possible to influence student learning by changing student perceptions without actually changing the course. Teachers are able to change the level at which students learn by adopting strategies and structures which encourage a deeper approach to learning.

The basic premise on which deeper learning is based is that a participatory learning approach is fundamental. Biggs (1989) outlines his 'Presage', 'Process', 'Product' model and asserts that teachers can influence the outcomes or 'Products' of learning in three ways: additively, interactively, and contextually. It is the interactive (participatory) mode of teaching that can minimise surface level learning. What the student brings to the process of learning (the presage factors) are difficult to change whereas the factors within the teaching context such as content, method and structure are easier to modify. The notion that students should be involved in and responsible for their own learning should be a natural outcome of an interactive mode which forms the premise on which strategies for deeper learning are based.

To summarise, the following have been identified as factors in fostering deeper learning: the degree of interest, relevance and challenge provided by the subject content, a workload which is not perceived as excessive by students, clarity and organisation of classes, provision of a

framework through the use of concept maps which demonstrate interrelationships, assessment instruments which reward deeper learning, and student involvement in their own learning through the use of strategies such as group work or negotiation of topics for subject assessment tasks. Teachers need to surrender some control if the learner is to become independent and in this respect a 'developed' approach to teaching is required.

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