

Promoting deep learning through teaching and assessment: conceptual frameworks and educational contexts.

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Introduction

This part of the conference concerns ‘knowledge transformation’ which within the TLRP objectives describes “transforming the knowledge base relevant to learning into effective and efficient teaching and training practices”. The relevant knowledge base is, of course, vast and disparate. This paper describes one segment of it which has become influential within higher education and derives from research into student learning. The work originated in Sweden and Britain and was subsequently developed in other countries, producing a distinctive way of thinking about how teaching and assessment in higher education influence the quality of student learning. It has created a coherent framework of concepts and categories which makes the ideas readily accessible to university teachers, and has thus begun to influence practice in important ways. The concepts also have been used to produce equivalent conceptual frameworks for teaching in secondary school, and so seem usefully to contribute more generally to the pool of ideas being generated for the Teaching and Learning Research Programme.

Knowledge transformation depends, in part, on the nature of the concepts used. To have an impact on practice, in my view, the concepts have to be broad enough to map on to everyday experience and be couched in accessible language, preferably with metaphorical associations. Finally, impact depends on the findings provoking reflection on practice and suggesting useful changes to improve the existing situation: the conceptual framework provided should have *pedagogical fertility* (Entwistle, 1994), to draw an analogy with theoretical fertility in research. In carrying out research, we therefore need to identify ways of describing the types of learning we wish to encourage that are faithful to the theoretical representations and yet retain sufficient simplicity and metaphorical power to engage practitioners. And we also need to be able to describe the types of teaching-learning environment that are most likely to encourage and support such learning. Those of us involved in research on student learning believe we have a framework which begins to meet these requirements.

Research from the student’s perspective

The main characteristic of this research is that it seeks to portray the experiences of the participants – the students and the teachers. The starting point was to find ways of describing some of the main differences in how students think about learning and carry out their studying. Research has been carried out on two fronts. The concepts and categories were initially identified through interviews with students and focused on what students believe learning to involve and how they go about everyday academic tasks, such as reading academic articles or writing essays. The interviews have generally encouraged students not just to report their ways of tackling academic tasks, but also to reflect on their approaches in considerable depth. Analysis of the interviews follows a rigorous procedure to establish categories and the relationship between those categories, a technique which contributes to a research approach described as *phenomenography* (Marton, 1994).

The second line of development in this research has been to design inventories which measure these concepts and so allow relationships to be established in larger representative groups. The inventories produce sub-scales which cover the categories found from the interviews, with the definition of the categories being refined through factor analysis of the sub-scales.

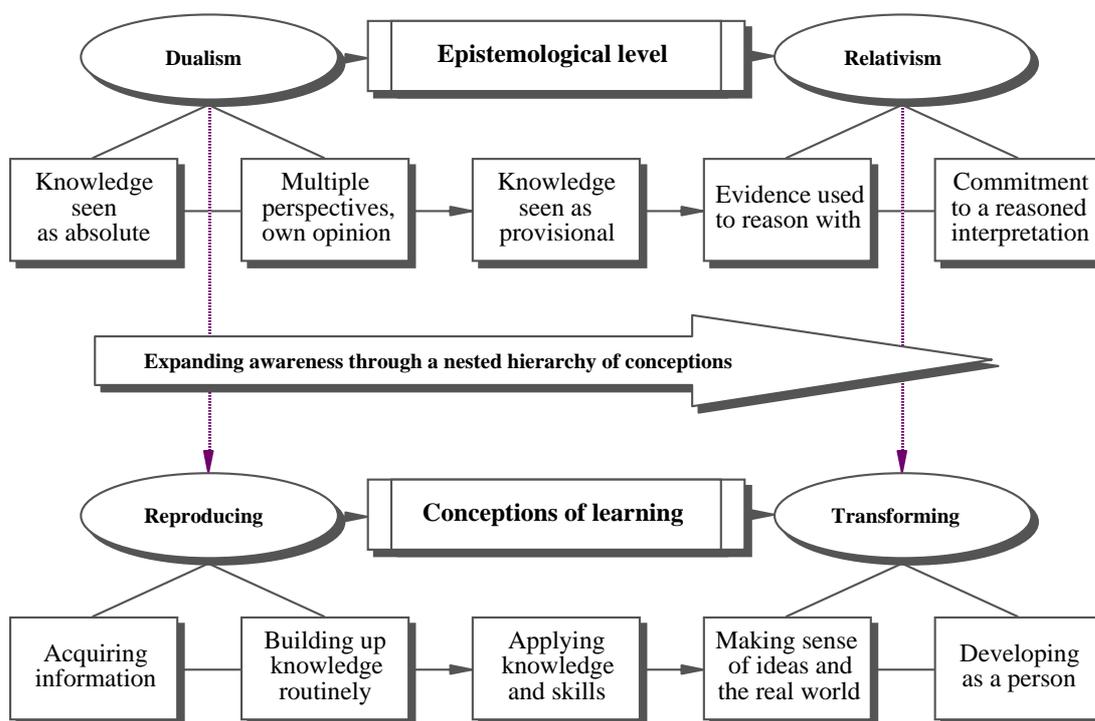
These complementary strategies have not just established relationships between inventory subscales, they have also indicated how teaching and assessment, and other aspects of the teaching-learning environment, influence students' ways of studying and the levels of understanding reached.

This paper begins with a brief summary of the main concepts which form the coherent framework. Other research will be used to show the influences on learning of the interaction between students and the teaching-learning environment. In this way, the process of knowledge transformation will be explored and used to suggest relevance beyond higher education.

Conceptions of learning and approaches to studying

Using interview methodology, the broadest of the concepts in research on student learning came from the responses of adults who were asked "What do you mean by 'learning'?". As in all this research, the variation in people's responses provided the research findings. They had very different *conceptions of learning* (Säljö, 1979; Marton & Säljö, 1997), which involved a hierarchy which has parallels with the developmental trend in students' thinking – their epistemological levels - identified earlier by Perry (1970) (see Figure 1). Perry found that students initially saw learning mainly as a matter of memorising and *reproducing* knowledge in ways acceptable to the teacher. During their time at university, students gradually began to recognise that learning was more rewarding when they sought personal meaning by *transforming* information and ideas in terms of their own previous knowledge and understanding.

Figure 1
Conceptions of learning and epistemological levels



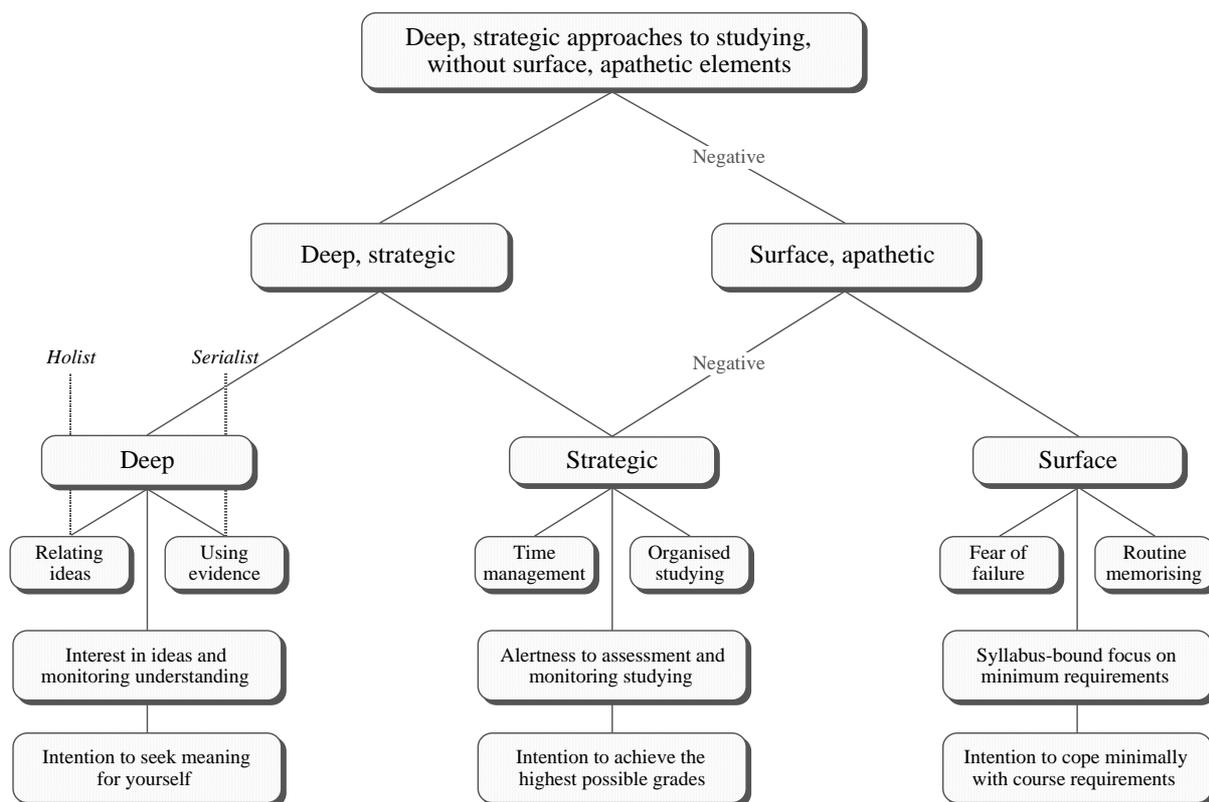
The epistemological level or conception of learning students have reached substantially affects the ways in which they tackle everyday academic tasks, which have been described in terms of approaches to learning and studying. The starting point of this research was an investigation into how students went about reading (Marton & Säljö, 1976; Marton, Hounsell & Entwistle, 1997). Students were asked, individually, to read an academic article and were told that they would be asked questions on it afterwards. It became clear from the transcripts that students had interpreted this instruction very differently, and their ability to answer questions about the meaning of the text depended on how they had decided to tackle the task. Some students had sought a thorough understanding of the author's message, while others had relied on 'question-spotting' - learning just those pieces of information expected to come up in the test. This distinction was gradually refined through qualitative analysis to produce a descriptive concept with two categories - deep and surface *approaches to learning* - in which a specific intention brings into play learning process which lead to qualitatively different learning outcomes.

In the deep approach, the intention to extract meaning produces active learning processes that involve relating ideas and looking for patterns and principles on the one hand (a *holist* strategy - Pask, 1976, 1988), and using evidence and examining the logic of the argument on the other (*serialist*). The approach also involves monitoring the development of one's own understanding (Entwistle, McCune & Walker, 2000). In the surface approach, in contrast, the intention is just to cope with the task, which sees the course as unrelated bits of information which leads to much more restricted learning processes, in particular to routine memorisation.

Interviews on everyday studying drew attention to the pervasive influence of assessment procedures on learning and studying. They suggested the need for an additional category - *strategic approach* - in which the intention is to achieve the highest possible grades by using organised study methods and good time-management (Entwistle & Ramsden, 1983). This approach also involves monitoring one's study effectiveness (Entwistle, McCune & Walker, 2000) and an alertness to the assessment process, aspects which are akin to metacognitive alertness and self-regulation (Vermunt, 1998; Pintrich & Garcia, 1994). Interviews with students suggest that strategic students have two distinct focuses of concern - the academic content and the demands of the assessment system. The interest in the content is typical of a deep approach, but the alertness to assessment requirements is typically strategic (Entwistle, 2000). Whereas the distinction between deep and surface approaches was derived from analyses which focused on extracting meaning from text, the strategic approach, together with its opposite - the *apathetic approach* (Tait & Entwistle, 1996) - indicate how students act in everyday study situations. They are therefore better described as *approaches to studying*.

The research on student learning began with interviews, but soon led to the construction of inventories to assess the predominant approach being used. One such inventory was the *Approaches to Studying Inventory* (Entwistle & Ramsden, 1983) which has led recently to *ASSIST* (Approaches and Study Skills Inventory for Students - Tait, Entwistle & McCune, 1998). The way in which the various sub-scales of this most recent inventory come together to define the characteristics of the successful student is illustrated in Figure 2. The links shown there also indicates that the deep, strategic approach, without any elements of surface apathetic, is generally associated with successful academic performance (Entwistle, 2000).

Figure 2 Components of the ASSIST inventory contributing to effective studying



The idea of approaches to learning and studying has had a powerful influence on both theory and practice related to teaching and learning in higher education, at least in Britain and Australia. The deep-surface distinction has metaphorical strength and is broadly applicable, while the term ‘strategic’ is also readily understood. There are important caveats, however, in using these categories. First, they are analytic categories derived from the research findings that can only be used to describe the relative prominence of each approach to studying in any student. It is wrong to try to put any student wholly into any one category. Then, the definition of the deep approach is generic, while the processes needed to develop deep learning necessarily vary between subject areas. Further, the categories are broad, indicative labels which do not do justice to the complexity of individual ways of studying (McCune, 1998; McCune & Entwistle, 2000). And finally, an approach, strictly speaking, can only be applied with any confidence to a particular teaching-learning environment, as the approach is the result of an interaction between the student and that context, as we shall see.

Outcomes of learning

A deep strategic approach to studying is generally related to high levels of academic achievement, but only where the assessment procedures emphasise and reward personal understanding. Otherwise, surface strategic approaches may well prove more adaptive. Even where the assessment does stress understanding, the levels students reach will still, of course, vary. The idea of qualitatively different outcomes of learning was another product of the work of Marton and his colleagues (Marton & Säljö, 1976, 1997), and was operationalised independently by Biggs and Collis (1983) through their SOLO taxonomy. In a series of interview studies in Edinburgh, we have been exploring the forms of understanding experienced by final year: five distinct categories were identified which varied in terms of their breadth, depth and structure (Entwistle, 1995, 1998a; Entwistle & Entwistle, 1997).

Building on the earlier research, we were able to suggest how to describe, in general terms, the qualitative differences in outcomes of learning found in the ways students tackle their written work. These are outlined in Table 1.

Table 1
Levels of understanding as outcomes of learning

<i>Mentioning</i>	Incoherent bits of information without any obvious structure
<i>Describing</i>	Brief descriptions of topics derived mainly from material provided
<i>Relating</i>	Outline, personal explanations lacking detail or supporting argument
<i>Explaining</i>	Relevant evidence used to develop structured, independent arguments
<i>Conceiving</i>	Individual conceptions of topics developed through reflection

These attempts at describing outcomes of learning have been generic and can only be used to guide the description of outcomes within a course or subject area. More recent work by Marton and his co-workers suggests how it is possible to identify the differing conceptions that students hold of specific topics within a course or discipline (Bowden & Marton, 1998), which can then be used to define the quality of learning outcomes and grades. The task of investigating conceptions for every topic in each course is clearly impracticable, but encouraging academic staff to think in this way about how to assess assignments and examination answers is one way of ensuring that personal understanding is given due weight within the assessment procedures.

Conceptions of teaching

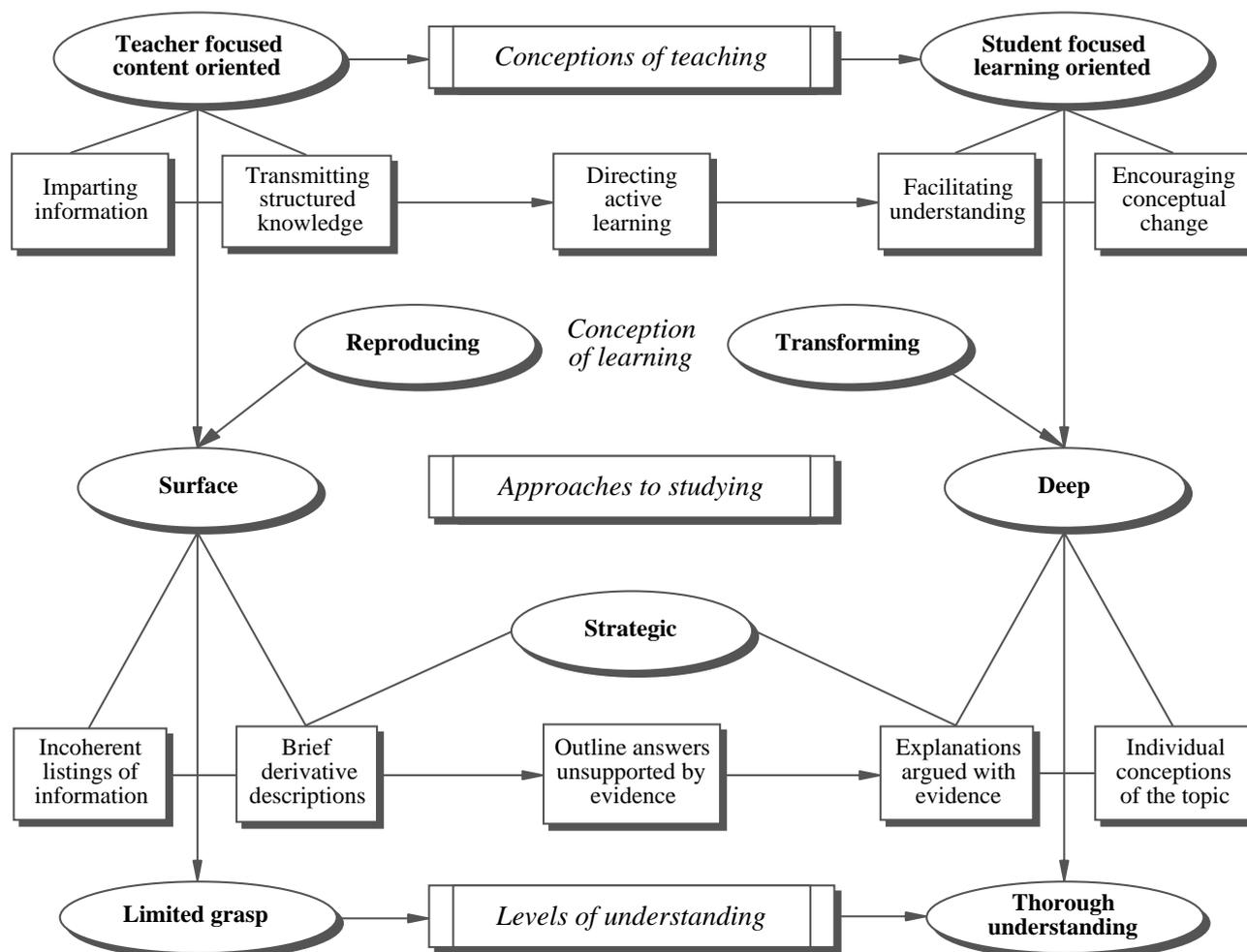
Previously, we introduced the notion of a hierarchy of conceptions of learning: more recent research has suggested a similar hierarchy describing conceptions of teaching. In interviews, faculty members have been asked to describe what they mean by 'learning' and 'teaching', and to indicate their beliefs about teaching and assessment (Prosser, Trigwell & Taylor, 1994; Van Driel *et al.*, 1997; Kember, 1998). From such studies, three main categories typically emerge, ones which closely parallel in their underlying meaning those found by both Säljö and Perry. Some colleagues talk about the importance of covering the syllabus and ensuring that students acquire the correct information and ideas: they have a conception which has been described as *teacher-focused*, and *content-oriented*. Another group was described as *focusing on student activity*, with an emphasis on providing assignments designed to ensure active learning and helping students to develop effective study skills. Yet this group still saw learning only from their own perspective. The final group, smaller than the other two, was labelled *student-focused*, and *learning-oriented*. Staff in this group were more concerned with helping students to develop personal understanding and more sophisticated conceptions, and designed their teaching and assessment accordingly.

Teachers with these contrasting conceptions of teaching, tend to hold corresponding views on assessment procedures and on the ability and motivation of their students (Van Driel *et al.*, 1997). Staff who are content-oriented are likely to see assessment as designed to demonstrate detailed factual knowledge of the syllabus. They also tend to consider the outcomes of learning as being almost entirely the responsibility of the students themselves, depending on their ability and motivation. The student-focused group tend to use more varied methods of assessment and to be aware of their own responsibility for encouraging students to develop deep levels of understanding. The conceptions of both learning and teaching held by teachers also affect their approaches to teaching (Trigwell & Prosser, 1999).

The chain has been completed by showing that the approaches to teaching adopted by teachers also influences their students' approaches to studying and through those, the learning outcomes.

Previously we traced a similar chain of connections from conceptions of learning, through approaches to studying, to levels of understanding. There are thus influences coming from the student's own ways of thinking and studying, and from their experiences of teaching. Putting the two sets of influences together produces the pattern shown in Figure 3.

Figure 3 Influences on approaches to studying and outcomes of learning

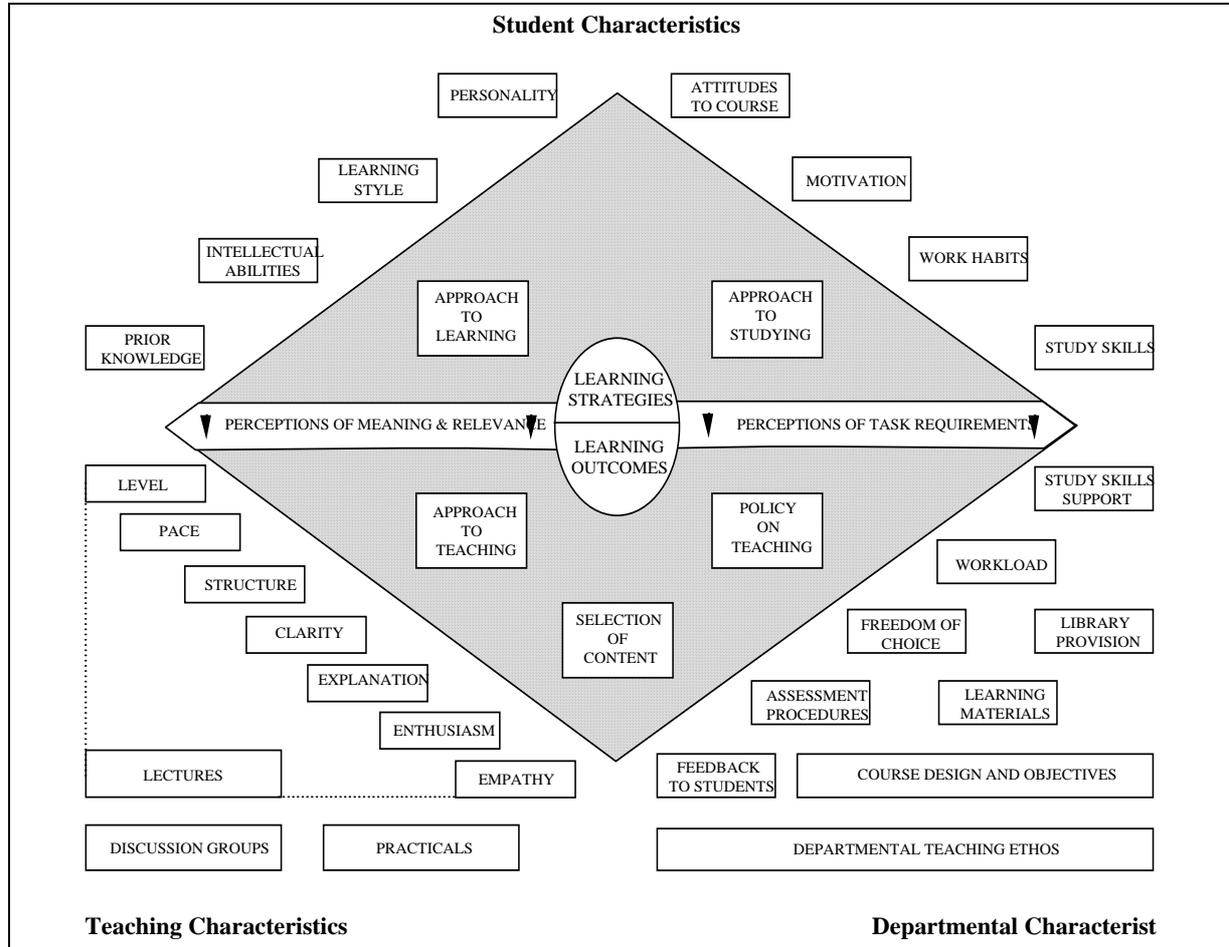


Transforming research findings into improved practice

The conceptual framework offered in Figure 3 shows the conceptual link, established by research, between conceptions of teaching and levels of understanding. If we are to transform this conceptual framework into a form more relevant to practitioners, we need to make clear how different ways of teaching and assessment, and other aspects of the teaching-learning environment, affect the quality and effectiveness of student learning. This is suggested in Figure 4 and explained more fully elsewhere (Entwistle, 1998b).

It provides a much broader concept map in which teaching, assessment procedures, and other aspects of the teaching-learning environment are all shown as influencing the outcome of learning. Again this diagram derives from research findings, but the links have only been partially established so far; gaps have been filled by drawing on professional experience.

Figure 4 A conceptual overview of the teaching-learning process



Essentially, Figure 4 seeks to draw attention to the interaction between the characteristics of the students in the top half of the diagram and those of the teacher and the department in the bottom half. Student characteristics are divided into those which describe cognitive aspects and ways of thinking on the left, and those which are mainly affective or related to study practices on the right. The influence of teaching is indicated in the bottom right quadrant, but the approach to teaching is shown in detail only in relation to lecturing, where most research evidence currently exists. The bottom right indicates aspects of the teaching-learning environment over which individual lecturers have much less control, such as assessment procedures and the choice offered to students.

An important feature of the diagram is the division between the upper and lower halves, where the perceptions of meaning and relevance and of task requirements are shown. Research has shown that, while teaching-learning environments affect approaches to learning and studying, they do not do so in a uniform way. The effects are mediated by the ways in which the individual student perceives aspects of the provision (Entwistle & Ramsden, 1983).

One problem with the diagram is that it cannot bring out the nature of the relationships between the concepts shown. Research findings have indicated, for example, that while level, pace, structure and clarity all contribute to the effectiveness of lecturing, it is generally explanation, enthusiasm, and empathy which are most likely to evoke a deep approach. Similarly, it appears that assessment which encourages students to think for themselves – such as essay questions, applications to new contexts, and problem-based questions – shifts students in a class towards a deep approach. In contrast, procedures perceived by students as requiring no more than the accurate reproduction of information lead to a predominance of surface approaches (Thomas & Bain, 1984; Scouller, 1998).

Another problem with the conceptual overview is that it fails to indicate the influence of different ways of selecting and organising content. To some extent at least, the teacher can decide the aims of a course, the assignments set, and aspects of the assessment procedure. As Project Zero at Harvard has demonstrated, careful design of the curriculum can have a powerful influence on what students come to learn. The research group there has developed a *Teaching for Understanding* framework which encourages teachers to set overarching goals in terms of understanding, to select generative topics which encourage thinking, and to design assignments which require students to reach and demonstrate understanding (Wiske, 1998). These *understanding performances* not only demonstrate understanding, they are also intended to develop it by requiring higher level thinking.

Performances of understanding require students to show their understanding in an observable way. They make students' thinking visible. It is not enough for students' to reshape, expand, extrapolate from, and apply their knowledge in the privacy of their own thoughts... Such an understanding would be untried, possibly fragile, and virtually impossible to assess. (Blythe et al., 1998, p. 63)

In higher education, Biggs (1999) has built on this framework to argue for the importance of *constructive alignment*, in which the aims of a course are stated in terms which stress the importance of personal understanding, with the curriculum and teaching-learning environment then being aligned directly to support those aims.

Finally, recent research is suggesting that we need to take more account of the effects of past experience and knowledge on how the teacher selects and interprets content knowledge. For example, Marton and Booth (1997) see effective teaching as being dependent on the *object of study* created by the teacher, and note that teachers can present their classes with very different objects of study even from the same syllabus. Effective teaching, in their view, depends on 'meetings of awareness' between the teacher and the class, with the teacher shaping the knowledge in ways designed to help students to understand it. That ability depends on an empathetic awareness of what students already know and how they learn. They argue that

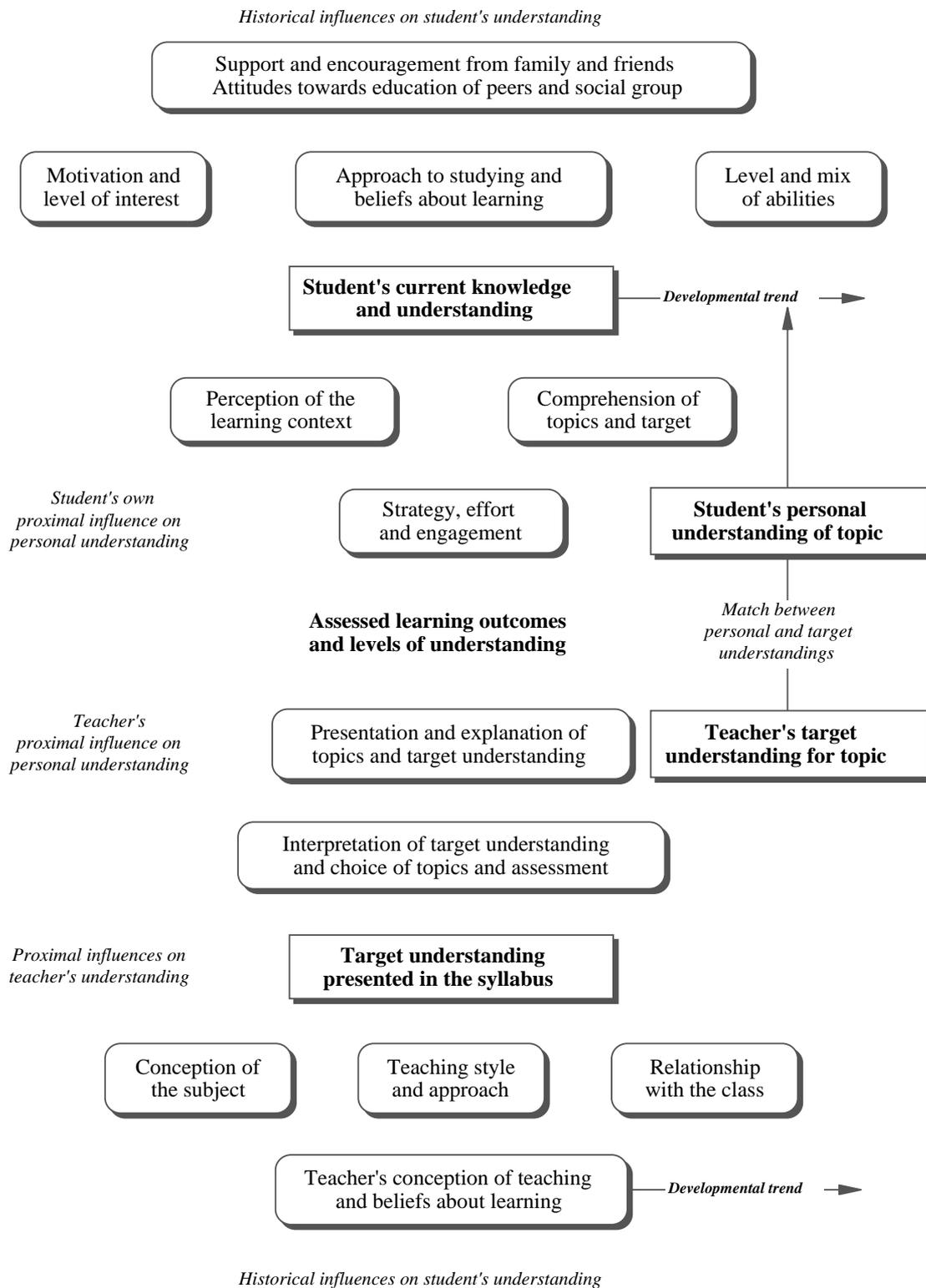
(pedagogy depends on) meetings of awareness, which we see as achieved through the experiences that teachers and learners undertake jointly... Teachers mould experiences for their students with the aim of bringing about learning, and the essential feature is that the teacher takes the part of the learner... The teacher focuses on the learner's experience of the object of learning. Here we have (what we call) 'thought contact', (with) the teacher moulding an object of study (for the students). (p.179)

A similar line of argument has been developed by Entwistle and Smith (2000) in distinguishing between *target understanding* and *personal understanding*, and between historical and proximal influences on both teachers and pupils in affecting outcomes of learning. The content of an external syllabus is the result of a consultation process (and political will) which arrives at a certain content appropriate for a particular age and ability group. That represents the formal target understanding. The syllabus, however, has then to be interpreted by the teacher, and that interpretation depends on the teacher's prior knowledge and experience, not just of the subject matter, but also of pedagogy. Those are the historical influences. Proximal influences come into play as the teacher constructs the specific object of study for the class.

The pupils experience a presentation of the teacher's understanding of the syllabus - the teacher's target understanding, rather than the syllabus itself - but that is then interpreted in terms of their own personal history and their current knowledge and initial understanding. This personal understanding is not just formed from content knowledge; it also includes beliefs and feelings about the educational context based on past experience. All of these components affect how the pupil reacts to the target set by the teacher. Proximal influences are found within the classroom (emotional climate and social pressures) and from the tasks set. Together, these then influence the strategies the pupil adopts, and the levels of effort and engagement employed, and hence the level of understanding reached. When the teacher examines the evidence of this personal understanding, it is judged in terms of the teacher's own understanding. Thus, when a teacher refers to a pupil 'having understood', that is actually the extent of the match between the pupil's personal understanding and the target understanding set by the teacher.

This whole pattern is illustrated in Figure 5 overleaf, but this diagram still captures only part of the overall picture emerging from the research findings, and remains knowledge without the necessary direct impact on the teacher. It is difficult enough to conceptualise all the influences on the processes of teaching and learning, let alone to present them in ways which suggest practical ways of improving the quality and effectiveness of learning outcomes. These tasks face the Teaching and Learning Research Programme. The process of transforming research findings into workable and effective practice is both extremely difficult and enormously important: without progress towards this end, research will still have little direct impact on practice.

Figure 1 Concept map of influences on understanding in the classroom



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