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## **University Teaching-Learning Environments and Their Influences on Student Learning: An Introduction to the ETL Project**

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### **Introduction**

The project is part of a major Teaching and Learning Research Programme (TLRP) established by the UK Economic and Social Research Council (ESRC) which is intended to carry out collaborative research with practitioners to bridge the gap between researchers and 'end-users'. The programme had its origins in the British government's focus on promoting evidence-based practice within professions that had not previously seen that as a priority. Teaching was an obvious target, and there had been a series of critical attacks on both the quality and the direction of educational research in the late 1990s. The result was a transfer of funding for educational research to the ESRC for the purpose of setting up a programme of research to create a stronger evidence base for teachers to use in improving educational standards.

The programme was established in 2000 and has developed through three phases; by 2004, there will 36 projects within it running within budget of £26m. The programme established as its overarching aim enhancing learning outcomes for learners, but it also expected projects to work towards other programme goals. They have to actively involve 'users' – teachers or whoever – working collaboratively with them to whatever extent is practicable. The projects are also intended to contribute to knowledge transformation – taking existing theories and conceptual frameworks and shaping them in ways which make them more accessible and usable by practitioners. The programme also looks for 'synergy' in bringing together multidisciplinary and cross-sector perspectives to examine general issues affecting teaching and learning. It also expects efforts to be made to enhance the UK's capacity for high quality educational research. Above all, projects have to demonstrate clear strategies for disseminating findings to 'end-users' in ways likely to make a difference to the quality of learning outcomes.

The research objectives and research design of our own project thus reflect the early thinking about what the programme was intended to achieve. But they were, of course, also determined by our

own view of the directions in which research into teaching and learning in higher education was then moving. It has been clear for some time that student learning depends on a complex of influences from the whole teaching-learning environment (Entwistle, 1987; Biggs, 1993). And more recently there have been attempts to describe general characteristics of 'powerful learning environments' designed to impact strongly on learning outcomes (De Corte *et al.*, 2003). In higher education, however, the marked differences across subject areas, and across institutional contexts (including contrasting student intakes), suggest that there are bound to be systematic differences in what will be effective teaching-learning environments across differing subject areas and institutional contexts.

Those anticipated differences became the main focus of our investigation, but we still needed a general framework within which to frame our research design and, for that, we drew on the idea of *constructive alignment* outlined by Biggs (1999). The need to ensure that teaching, assessment and every aspect of the teaching-learning environment are aligned to the main aims or intended learning outcomes of a course has been accepted for many years. But the term 'constructive alignment' goes beyond this to require that the aims of the course are in line with constructivist principles of learning and the findings of what Biggs has called *student learning research*.

## **Research objectives**

Our main research objectives were as follows:

- To explore the nature of recognised high quality teaching and learning in contrasting subject areas
- To develop the idea of constructive alignment and to use it in working with departmental colleagues to strengthen the teaching-learning environments experienced by undergraduate students
- To investigate the influences of teaching-learning environments on student learning processes and outcomes across contrasting subject areas and departmental contexts and to explore the extent to which subject- and context-specific pedagogies exist.
- To produce clear conceptual frameworks and straightforward data-collection procedures to enable university teachers to reflect critically on the teaching-learning environments they provide and on the effects on learning outcomes of various kinds.

## **Research design and implementation**

The ETL project is now half way through the third year of its four years' duration and involves two forms of collaboration. The research team is drawn from three universities – Edinburgh (which is the lead institution), Coventry and Durham. We have also been collaborating with 15 departments, drawn from five subject areas – electronic engineering, cell and molecular biology, economics, history, and media and communication studies – chosen to ensure contrasts in subject matter and approaches to teaching and learning. (Due to staffing changes, work on the last of these subject areas could not be continued, leaving the project involved with 13 departments.) The subjects were chosen to cover the range from applied science to the humanities that is found in the majority of universities.

The departments have been selected to represent all the main institutional types in British higher education. The major differences depend on when they became universities (ancient, pre-1960,

1960s, and post-1992 when the polytechnic system was merged with the university sector). There are also important differences in the balance between academic and professional degrees. Moreover, it is important to recognise that the majority of institutions have adopted a modular system within a semester pattern, and that course work can contribute substantially to the overall grades and the class of degree awarded in some degree courses. Within each department, we have chosen to work with university teachers who are teaching course units towards the beginning and towards the end of a degree course. Overall, the sampling framework has been designed to ensure that we are able to look at the main differences in teaching-learning environments that exist in British universities.

During the first year of the project (2001), reviews of the literature were carried out, along with the development of data gathering instruments. An analysis was also made of national evaluation reports of university departments. We chose eight departments from each of our five subject areas, all of which had received top ratings and then examined the reports to identify the aspects of the teaching-learning environments which had been used to justify the ratings given. We then carried out telephone interviews with staff in half the departments to explore in more detail the characteristics of the teaching-learning environments being provided.

Early in 2002, we began pilot work with several departments, and extended our activities to the complete set of departments later that year. The research design involves working with departmental partners, first to collect base-line data about the existing situation within a particular course unit. We then negotiate with them a 'collaborative initiative' designed to enhance the teaching-learning environments in ways indicated by the base-line evidence and by previous research findings and theoretical frameworks. The data involve descriptions of the teaching-learning environment drawn from documents, staff interviews, and questionnaire measures covering students' orientations, approaches to studying, perceptions of the environment, and self-ratings of knowledge, skills and performance. Group interviews provide additional information about students' experiences of the teaching-learning environments, while assessment results provide the institutional measure of academic performance. The effects of the collaborative initiatives are then assessed, comparing the successive year groups on the two sets of data.

This paper describes, in outline, the main developments in the project to date to set the scene for the more detailed findings presented in the following three papers. It also indicates some of the main themes that are emerging and that will be considered as the project nears completion next year. The 'Occasional Reports' from the project, mentioned below, along with conference papers are all to be found on the web at: <http://www.ed.ac.uk/etl/publications.html>.

### **Analyses of national reports on departments and telephone interviews**

The main purpose of this first part of the project was to provide an initial idea of the main aspects that national evaluations of departments were using to describe highly rated departments, and to see to what extent these were similar across the five subject areas in our study. The telephone interviews were also seen as the first step in investigating the teaching-learning environments typically used in each of the subject areas, and the types of learning that students were being required to carry out.

The main aspects identified from the national evaluation reports are shown in Appendix A. These aspects were described under the following main headings:

*Administrative* Most highly rated departments had well designed quality assurance procedures, effective staff management, detailed course handbooks, and appropriate, flexible teaching rooms.

*Research/professional* Departments across the differing institutions clearly varied in the extent to which research or professional activity were the main focus of activity. High ratings depended on departments using their experience and their particular focus effectively within their teaching programmes.

*Teaching* The evaluations highlighted clear structure, level appropriate to students' knowledge, relevance in what is taught, supporting material and learning technologies, small-group teaching, the monitoring of student progress, encouragement of self-regulation, and varied assessment procedures.

*Student support* This category covered aspects of student support provided by the department, but also those available from central university sources. Within the departments the importance of acting on student feedback, having regular meetings with study advisers and relationships between staff and students were all considered.

While this analysis clarified the general characteristics that had been used to evaluate departments' teaching, the reports provided no detail of what was seen as distinctive high quality teaching within the five subject areas. The telephone interviews did, however, offer valuable insights into what might be important in enhancing teaching-learning environments in contrasting contexts. They also helped us to decide how best to describe the different types of learning which were being expected of students in the different disciplines, as a starting point for discussions with our departmental collaborators. Only in biology have the findings of this stage been fully written up (*Occasional Report 1*). In the other subject areas, analyses of the telephone interviews are being integrated with the subsequent work with departments to contribute to the final reports.

## **Concepts and conceptual frameworks**

The overall conceptual map that we are currently using is summarised in Figure 1 and indicates the relationships we expect to find between the differing influences on student learning. It shows the overall framework within which our thinking has been developing. The concepts that are the main focus of our project are introduced below, while a more detailed discussion of an earlier version of the concept map is in *Occasional Report 3*.

The term *environment* has been used in higher education to cover different levels of description. At the institutional level, it describes policy, administration, regulations, buildings and social facilities, while at departmental or school level there is another set of administrative and organisational policies and arrangements, as well as collaborative decisions about how course content is selected and organised. The choice of course content in professional areas is, however, also influenced externally by validating bodies, and by the academic community within the discipline. These aspects all affect the setting within which learning takes place, but our use of the term *teaching-learning environment* is intended to concentrate on the aspects which are most immediately experienced by students, and has been referred to as the 'inner' TLE.

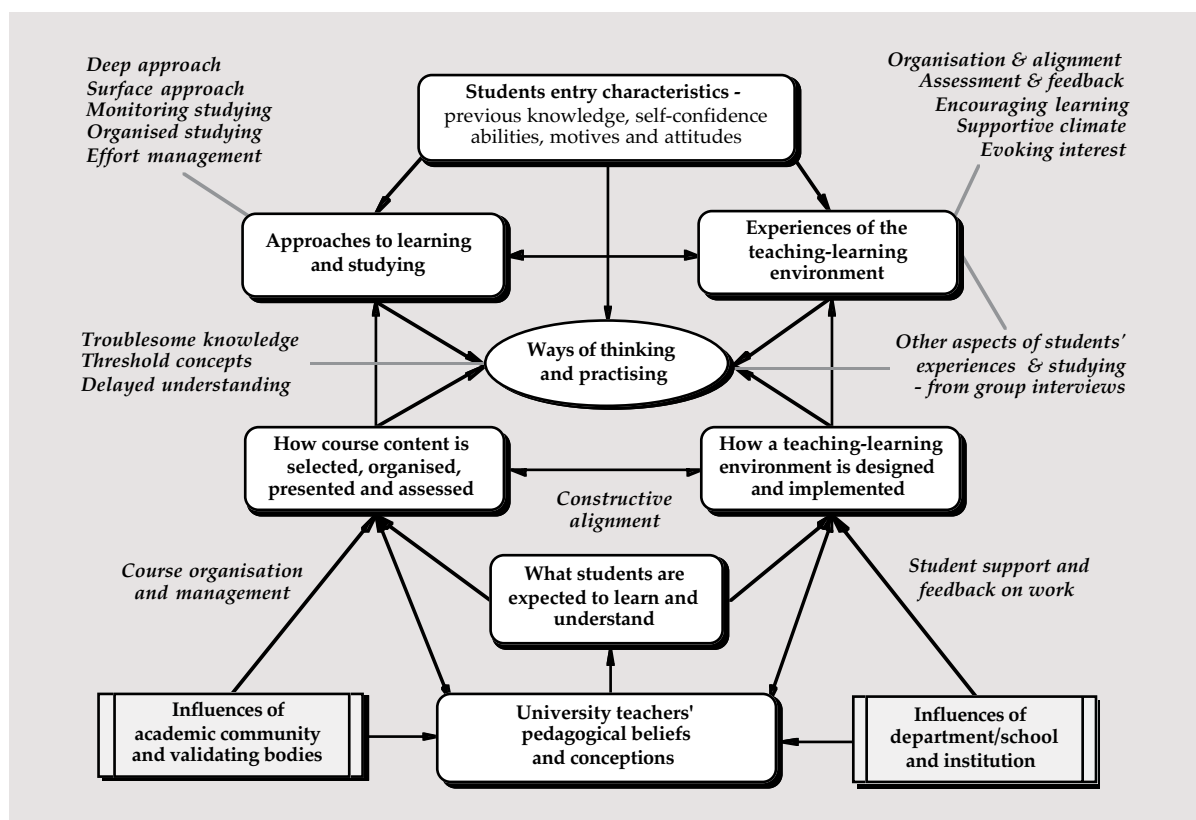
In some ways, the term *habitat* may offer a more appropriate metaphor to include all the members of an objectively described ecosystem and the inter-relationships between them, but we also need to add the notions of *niche* and *umwelt*. The idea of an ecological niche is well known, indicating the fit of the species to some part of the ecosystem. The term *umwelt* is less familiar, but indicates the habitat as experienced by the animal itself. Both these ideas can be helpful in thinking about the nature of the teaching-learning environment in higher education. For example, ???(???)....., while much of the work on phenomenography can be seen as an attempt to enter the world of the student and interpret the meaning of studying in more subjective terms

(Marton & Booth, 1997; Marton *et al.*, in press). There is an important difference from ecological descriptions of environments, though. There are opportunities for the main players within a university habitat to discuss and implement ways of making their situation more satisfactory to everyone involved, and that is what our project hopes to promote. Traditionally, however, the habitats provided for students have often forced them to find survival strategies under what are experienced as essentially hostile conditions (Scheja, 2002).

Our review of the academic literature on teaching-learning environments produced a concept map of the many different elements that directly affect students. This was described in terms of the overlapping contexts provided by the course, teaching and assessing content, staff-student relationships, and students and student cultures (see Appendix B, which is explained in *Occasional Report 2*). In thinking generally about the first two areas, we have had in mind the notion of *constructive alignment* mentioned earlier. While the notion has proved useful in guiding our thinking, we have also had to develop it further by suggesting additional aspects of constructive alignment. In biology, for example, three other aspects of alignment have been identified – to the students taking the course unit, of the learning support provided, and of the course organisation and management (*Occasional Report 1*). Issues of course organisation and management, for instance, become central in large first-year courses involving many different lecturers and tutors, while the part played by student support and feedback on assessed work is essential in providing an environment that makes learning more effective.

We have also realised that constructive alignment implies a rather simple causal pattern linking aims to teaching methods, assessment and the teaching-learning environment. The image of alignment does not do justice to the complex set of interactions between staff, students, academic content and institutional context that are experienced. The imperatives for teaching suggested by this framework also take little account of the realities of current university life. Staff have to design

Figure 1 Conceptual framework indicating influences on student learning



their courses within procedures and regulations over which they themselves have little or no control, and also within the severe constraints created by increasing student numbers and by teaching accommodation that limits the ways in which students can be taught. Finally, descriptions of constructive alignment interpret the situation mainly from the teacher's perspective, suggesting that the environment has to be designed to satisfy the teacher's aims, without taking explicit account of the variety of goals that students may have.

Our project is examining teaching-learning environments from the differing perspectives of both staff and students. We drew on the extensive literature which lies behind our conceptual map of the teaching-learning environment to help us to explore *students' perceptions* of such environments. We also used research on teaching and learning to decide how best to assess actual learning outcomes. Of course, teachers' assessments of students' work and examination marks are one indicator, but we were also interested in the extent to which students had become engaged with academic study. We decided to use students' *approaches to learning and studying*, as a proxy for high quality learning, as the deep approach provides an indication of student engagement in learning and also of the learning processes essential to conceptual understanding (Prosser & Trigwell, 1999; Entwistle, 2000). However, in our early conversations with staff, there was a concern not just with understanding but with a range of specific skills and professional attitudes and values. We therefore introduced the term *ways of thinking and practising in the subject* (WTPs) to broaden the description of what students are expected to develop by the end of their programme of studies (see *Occasional Report 1* and the second paper in the symposium).

In considering the topics being taught, we have been looking out for threats to the development of understanding, which can be seen from the students' perspective as *troublesome knowledge* (Perkins, 1999). The difficulty for students may reside in the way the content is presented, or in a lack of alignment within the teaching-learning environment. But there also seem to be inherent difficulties in certain key concepts, ones we have described as *threshold concepts* which, if understood, open up new and previously inaccessible ways of thinking for students (see *Occasional Report 4*). Failure to grasp their meaning, in contrast, may lead to considerable confusion and lack of progress. Examples of such concepts include the notion of 'opportunity cost' in economics or 'negative feedback' in electronic circuits. Without a full understanding of such concepts, students' progress are inevitably hampered to some extent. In some subject areas, we have also found it useful to think about *delayed understanding*. Scheja (2002) was the first to identify this concept in interviews with electrical engineering students who described a substantial time lag between topics being introduced and a comfortable level of understanding of what was involved. This experience appears to have a considerable effect on both students' attitudes and the ways in which they go about studying.

Within the literature there are continuing debates about the differences that exist in the ways in which university teachers think about pedagogical matters. One formulation parallels the description of conceptions of learning to outline contrasting conceptions of teaching, with a main contrast between a teacher-focused conception (with a content orientation) and student-focused conception (with a conceptual development orientation) (Prosser & Trigwell, 1999). Some of the research suggests that these are nested categories, with the less sophisticated conception being overtaken and incorporated (probably in an altered form) within the more sophisticated one. But having a conception does not necessarily lead to equivalent approaches to teaching, especially with deteriorating resources and increasing time pressures. Moreover, current models do not seem to allow specific content knowledge a sufficiently prominent place, nor do they take into account differences in pedagogic practice between contrasting subject areas.

Some of our initial interviews with staff have already shown major differences between subject areas in how teaching and learning are conceptualised that seem to be a reflection of *pedagogical ways of thinking and practising in the subject* (McCune & Riemann, 2001). Combining knowledge of their subject with ideas and experience about teaching, creates what Shulman (1987) called *pedagogical content knowledge*. The concepts, models and analytic procedures with which colleagues are most familiar also colour their thinking about teaching, affecting the metaphors and models they use (Martin *et al.*, 2001), the evidence they find convincing, and the nature of the relationship they see between teaching and learning. Economists, for example, seem to use cost-benefit analysis in deciding what teaching methods to adopt, while staff involved in cultural studies mention concern about the nature of their relationships with students and the underlying values those imply (Cousin, in preparation). It is also clear that the nature of the concepts within each discipline will affect the ways in which the ideas are organised and presented, what forms of assessment are considered to be appropriate, and how assignments are assessed. And this subject specificity is central to our project.

### **Collecting the base-line data**

As already indicated, our data involves course documentation, interviews with both staff and students, and two questionnaires. The *Learning and Studying Questionnaire* (LSQ) is given out in the first few weeks of each course unit, while the *Experiences of Teaching and Learning Questionnaire* (ETLQ) is completed towards the end of the unit. Both questionnaires contain sets of items that have been found to form coherent scales, although the analyses have also looked at individual items as well.

Small-group interviews were used to explore further the students' experiences around the same time that the second questionnaire was completed. A semi-structured interview schedule (Appendix C) was used to guide the focus of the discussions, but we also encouraged students to raise any other aspects that they felt were important; and that frequently happened. Transcripts of the interviews were produced and analysed, leading to an additional form of evidence that could be triangulated with the questionnaire findings.

#### *Student entry characteristics*

'Entry' here refers to the ways students see themselves in relation to the degree course as a whole, before they embark on the target course unit. The first two sections of the first questionnaire (LSQ) invite students to describe "What you expect to get from the experience of higher education" and "Reasons for taking this particular course unit or module". Both these sections drew on the distinction between intrinsic and extrinsic orientations to learning (Beatty, Gibbs & Morgan, 1997). All four aspects of intrinsic interest (academic, vocational, personal and social) held together under factor analysis to form a scale, but the extrinsic items remained separate. Prior knowledge and confidence in it was indicated by an item in the second questionnaire (ETLQ) which asked about the perceived demands of the unit in terms of "What I was expected to know to begin with". Students were also asked to rate themselves on their academic performance before beginning the unit, "based on the grades you have been obtaining".

#### *Approaches to learning and studying*

First-year students in our sample were generally in the second semester of their course when they completed the questionnaires and so had sufficient experience to report on their studying. The third section of the LSQ asked students to describe their approaches to studying prior to starting

the target course unit through a 36-item inventory developed from earlier inventories (ASI – Entwistle & Ramsden, 1983 – and ASSIST (Tait, Entwistle & McCune, 1998). The first section of the ETLQ used half the items to indicate approaches to studying in the course unit itself. Item factor analyses indicated five scales.

- *Deep approach* involves a combination of intention and process, with items covering ‘intention to understand’ along with the associated thinking processes of ‘relating ideas’ and ‘use of evidence’ that parallel Pask’s holist and serialist strategies (Pask, 1976). Additional items cover aspects of constructivist thinking (Phillips, 2000), which proved to be closely linked to ‘relating ideas’.
- *Surface approach* includes four aspects - ‘unreflective studying’, ‘unthinking acceptance’, ‘memorising without understanding’ (Meyer, 2000) and ‘fragmented knowledge’ (Meyer, 1991).
- *Monitoring studying* combines items describing ‘monitoring understanding’, ‘monitoring generic skills’ and ‘monitoring study effectiveness’. The first component is also related to the deep approach and is conceptually linked with self-regulation of learning processes and content (Vermunt, 1998).
- *Organised studying* also includes time-management and overlaps the more general form of study regulation described by Vermunt.
- *Effort management* also covered the ability to maintain concentration while studying.

#### *Experiences of the teaching-learning environment*

The second section of ETLQ asks students about their experiences of teaching and learning in the unit. The 40 individual items provides valuable information about how the class as a whole view their experiences, and factor analysis identified five coherent groupings of items.

- *Organisation and alignment* indicates how well the students recognised the main aims of the course unit, and how well organised the unit was perceived to be. Items also include the extent to which teaching and assessment aligned with the aims.
- *Assessment and feedback* asks about the extent to which the assignments and assessments required using evidence and developing understanding. It also covers the effectiveness of feedback in improving ways of learning and clarifying anything that had not been fully understood.
- *Encouraging learning* includes items derived from the literature describing the types of teaching and learning activities related to ‘constructivist’ aims and likely to encourage a deep approach to learning.
- *Supportive climate* covers two main aspects relating separately to staff and students. It indicates the extent to which teachers were seen to have provided patient explanations, shown both enthusiasm and empathy, and valued students’ views. It also suggests how much mutual support and collaboration came from other students.
- ∞ *Evoking interest* involves a group of items that partly reflect the student’s own interest in the subject matter (“I found most of what I learned in this course unit really interesting”), but also indicates a recognition of the teachers’ efforts to make the content interesting and relevant.



The third section of ETLQ asks about the perceived demands of the course unit and indicates how difficult the knowledge and skills were perceived to be, as well as the rate at which new material was introduced and “the amount of work I was expected to do”.

The group interviews allowed us to interpret the questionnaire findings with more confidence and provided important additional insights into the course unit from the students’ perspective. These were considered in relation to the scale scores and individual responses from the questionnaire and together generally have provided a strong indication of where a collaborative initiative might prove fruitful.

#### *Ways of thinking and practising in the subject*

In *Figure 1*, the central ellipse refers to the outcomes of learning. These are measured by the means and distributions of marks on course work and examinations, and by students self-rating of “how well you are doing in this course unit as a whole”. The ways of thinking and practising that had been developed were covered by the fourth section of ETLQ which asked “what you learned from this course unit” in terms of knowledge and understanding, and also skills relating to technical aspects of the subject, studying, communication and collaboration.

In the interviews with both staff and students we have been investigating what parts of the syllabus are found to be most difficult, and whether there are any threshold concepts that have a special importance in mastering the subject. The notion of delayed understanding has also been pursued where indications of it have come in the interviews with students.

#### *Teaching-learning environment, course design, teaching and assessment*

The actual teaching-learning environment, the course content and the approaches to teaching and assessment have been explored with staff. Generally, we used documentary material initially and then sought clarification from the lecturers involved. The staff interviews allowed us to grasp what students were expected to learn and understand (WTPs), the different forms of teaching that were provided, the types of support offered, and how feedback was given. We also sought to develop our own understanding of the particular circumstances affecting colleagues in each institution and the forms of knowledge and evidence that were important in each subject area. This understanding was also developed through reviews of the subject teaching literature that was available.

Our discussions with colleagues in departments will also give some indications of the pedagogical beliefs and conceptions held, and how those had been influenced by the specific requirements of the subject area, by validating bodies or the expectations of the discipline, and by general institutional policies and pressures.

### **Analysing the base-line data and developing collaborative initiatives**

Other papers are providing more details about the current stage we have reached in analysing and interpreting the base-line data, and indicate some provisional findings. Once the base-line data had been collected, the questionnaire data were analysed to describe how students approached studying in each course unit and to indicate their experiences of it, using simple descriptive statistics that did not require technical knowledge in making sense of them. The student interviews were transcribed, checked and then repeatedly read to identify the main themes mentioned by the students. These themes were described and quotes used to exemplify their meaning and coverage.

The research team has divided into groups of two or three to work on the remaining four subject areas with reports on the analyses of the base-line data being provided for each of the thirteen

course units. These reports indicate what the students found most enjoyable and satisfactory in their experiences of the course unit, but also draw from the analyses the main aspects where both questionnaire and interview data suggest that changes might be considered. Each report uses the evidence presented to indicate possible collaborative initiatives to be discussed with our departmental partners.

In three settings, the collaborative initiative has already taken place and we are now in a position to make comparisons between the approaches, experiences and outcomes of students during the previous running of the course unit and the one in which evidence-based changes have been introduced. It will be next year, however, before we shall be able to see the extent to which these collaborative initiatives have affected the outcomes, what patterns across settings are indicating about the influences of different kinds of teaching-learning environments.

## **Emerging themes**

Much of the research into teaching and learning in higher education has sought to establish general descriptions of teaching and teaching-learning environments that will help students to learn more effectively. Our project is following a more recent stand of thinking that suggests that differences in subject-areas, departmental climates, and institutional contexts must all be taken into account. It also stresses that the match of these to student characteristics is crucial. Thus learning outcomes depend on the complex interplay between staff and students within the specific context formed by subject and institution indicated in our conceptual map (Figure 1). The attempt to keep subject and context in the foreground of our analyses has led to certain themes emerging at this stage of our study. These should not be considered as 'findings': that would be premature.

### *Pedagogic WTPs in contrasting subject areas*

Across the five subjects that were initially included in our project, there seem to be marked differences across our sample of settings and also indicated in the literature describing subject-specific pedagogy. Interestingly, they spread across the categories describing contrasting conceptions of teaching – from teacher-focused to student-focused.

The teaching we have found in both electronic engineering and economics appears to be focused on transmitting structured knowledge and developing subject-specific skills. Biology, history and media and communications, in contrast show a greater emphasis on conceptual understanding and making explicit the ways in which professionals think and practice the subject. In both electronic engineering and economics we have encountered enthusiastic and skilled teaching that students appreciate. And yet the implicit theories of teaching and learning being adopted, both individually and collectively, appeared to be less sophisticated in these areas than in the others. In spite of that, in all subject areas, staff were clearly trying to develop in their students a distinctive way of thinking, whether it was about analysing an electronic circuit, a Keynesian view of economics, or seeing the world in the different way professional historians do.

What is still far from clear is the extent to which the predominating teaching methods are, up to a point, a logical necessity of the content, or indicate the current state of awareness of the variety of approaches available to help students learn more effectively and enjoyably.

### *Adjusting to TLEs*

In the earlier discussion of the biological metaphors, we noted that some existing TLEs could be perceived as hostile environments in which students had to adopt coping ploys for their academic

survival. They were forced to adapt their studying to trying conditions. Substantial adjustment is necessary to most university environments in the early stages to move from teacher regulation of studying to self-regulation (Vermunt, 1998). And students also have to adjust, to some extent, to different contexts as they move between subject areas and course units. By focusing mainly on first and final year course units, we are also finding problems of adjustment as students move into the final year, where there is often a marked change in teaching methods and in the requirements for independent study. It appears that a sophisticated conception of learning and studying may have to include a recognition of the different learning and study processes expected by staff; ones that may not be made explicit.

### *Environments in theory and practice*

Our project is investigating the effects on the processes and outcomes of learning of collaborative initiatives designed to enhance the TLE in that course unit. But, as we pointed out earlier, colleagues in departments are experiencing considerable pressure from competing demands on their time, and from increasing student numbers, and so have little time to work on any substantial changes to their teaching approaches. Not surprisingly, we are also finding that staff are more ready to consider specific steps that can change the ways in which a course is organised and delivered than to think in terms of conceptually driven ideas about 'powerful learning environments'.

The practical limitation to relatively minor changes in TLEs creates a problem for the project. Substantial effect sizes, and convincing qualitative evidence of effectiveness, will be more difficult to obtain. And yet the experiences of working closely with departmental partners in the research, and coming to grips with the changed ways of thinking and practising expected by staff and experienced by students, are affecting the ways in which we conceptualise teaching-learning environments. Research-based models of teaching and learning inevitably tend to become idealised and so remote from the everyday realities of classroom teaching and studying. Theories that do not make contact with the world experienced by participants are unlikely to make any impact on practice. Our project thus has the opportunity to influence the ways in which researchers think and practise in this area, and that is what we hope to achieve in contributing to the 'knowledge transformation' aim of the overall research programme.

### *'What works' in education*

Underlying the setting up of the ESRC programme was a demand from government that research should establish 'what works' in education. Unfortunately, that is believed to involve an evidence-based conclusion about methods of teaching that can be readily generalised across subject areas and settings: Ministers are not interested in the level of complexity that makes any such generalisations untenable. Our project will offer little comfort to politicians and administrators looking for neat and simple solutions to intractable problems. What it will offer is a systematic examination of the teaching-learning environments provided in both contrasting institutional settings and different subject areas. Already it is clear that we shall be reporting major, systematic differences in 'what works' that take account of the prior knowledge of students, the stage of the course, the subject area and, to some extent, the institutional setting. Our findings will necessarily include case studies that draw attention to differences rather than generalisations, but our expectation is that they will be of much more value to university teachers than any attempt of offer definite, general conclusions about "what works".

The other papers in this symposium begin the process of highlighting some of these differences and the kinds of conclusions that we may be able to reach from considering the complexity of teaching and learning within the contexts that university teachers experience them. So far, we can offer illustrations from final-year biology, first-year economics, and history, with electronic engineering yet to reach that stage. Later on, we shall have case studies of all the settings in which we have been able to negotiate collaborative initiatives, along with integrative analyses intended to bring out any distinctive differences in the TLEs provided by different subject areas.

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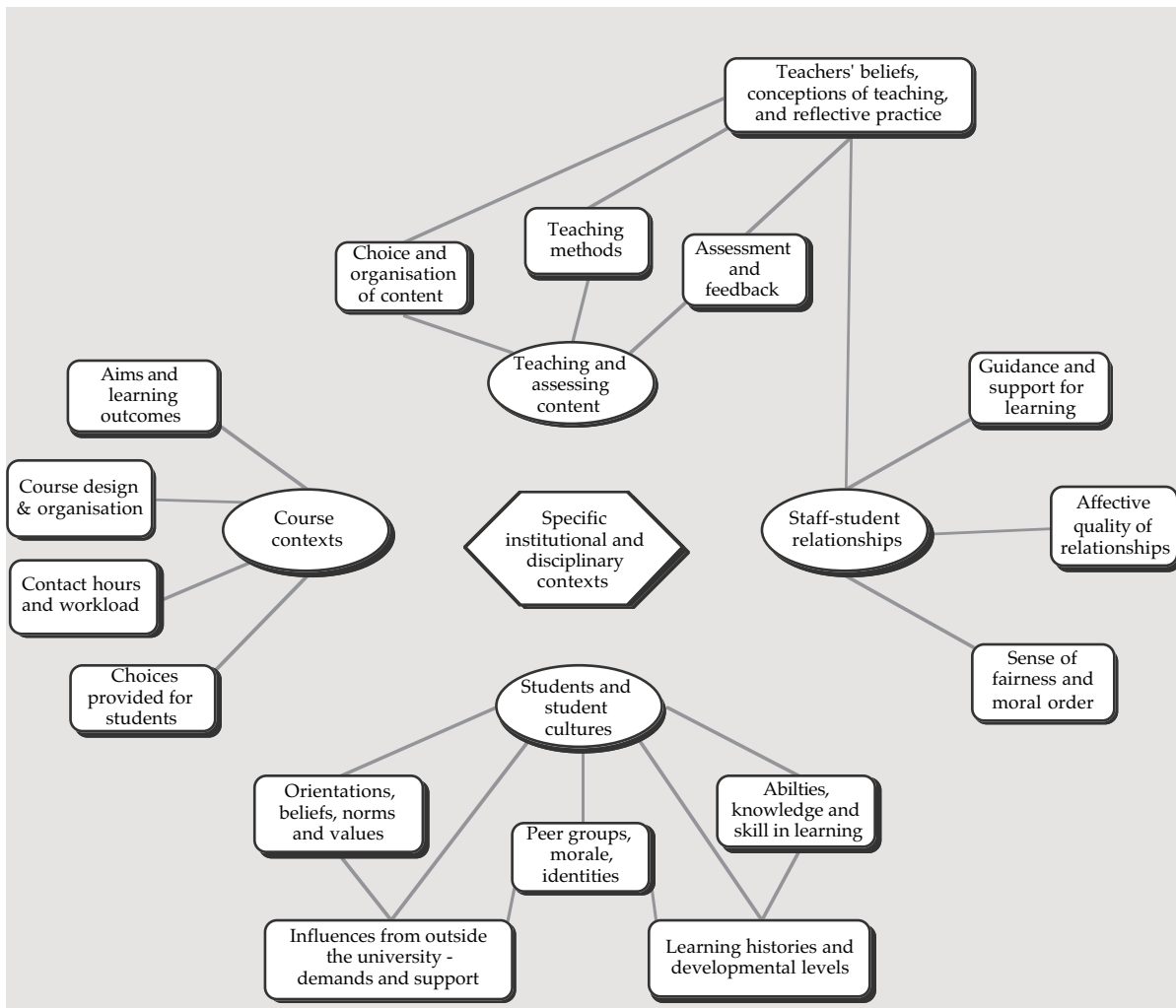
## Appendix A

### Aspects of teaching quality identified within national evaluation reports

Administrative	<p>Well designed quality assurance procedures with evidence of thoughtful implementation</p> <p>Effective management of staff appraisal and active encouragement of staff development</p> <p>Provision of course handbook detailing aims, teaching, learning resources, assignments, and assessment procedures</p> <p>Well-designed and flexible teaching rooms and good access to both computer and laboratory equipment</p>					
Research	<p>Research integrated into teaching to provide intellectually demanding and up-to-date content</p> <p>Creating vitality through well qualified staff who are enthusiastic about both teaching and research</p> <p>Using final year projects to bring together undergraduates, postgraduates and teaching staff</p>					
Professional	<p>Using strong industrial experience and close liaison with professionals as a curriculum resource</p> <p>Providing authentic and carefully designed work-based learning experiences</p> <p>Emphasis on developing both generic skills and professionally specific skills</p> <p>Providing a good choice of options and ensuring coherence in the overall programme design</p>					
Teaching	<p>Making clear the structure and aims of both module and individual teaching sessions</p> <p>Choosing content to match prior knowledge and understanding, abilities and interests</p> <p>Stressing relevance to aims/vocational value, and the interplay between theory and practice</p> <p>Teaching with a good use of supporting resources and teaching/learning technologies</p> <p>Providing small-group teaching and individual attention to support teaching</p> <p>Careful control and monitoring of student progress, particularly in the early stages of the course</p> <p>Encouraging progressively more self-regulation in learning</p> <p>Wide range of appropriate and varied assessment, backed up by timely, helpful feedback</p>					
Student support	<p>Identifying and supporting specific learning needs, including language, maths and study skills</p> <p>Seeking and acting on student feedback on courses and teaching</p> <p>Providing regular meetings with study advisers or personal tutors</p> <p>Staff-student relationships showing mutual respect and good rapport</p>					
STUDENT CHARACTERISTICS	RANGE/LEVEL OF ABILITY & QUALS	WORK EXPERIENCE	AGE RANGE & MIX	GENDER BALANCE	HOME CIRCUMSTANCES	ETHNIC BACK-GROUNDS

Appendix B

Concept map of the 'inner' teaching-learning environment



## Appendix C

### Interview schedule used to focus discussions with final year students

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#### EXPERIENCES

Reasons for choice	What led you to take this module?
Teaching-learning	Which aspects of the teaching have you found <i>most</i> helpful, in getting to grips with the key subject-matter? ... And which <i>least</i> helpful, do you think?
Support for learning	What sort of help/support has been available when/if you've encountered difficulties in learning and studying? (Could be from staff or from other students.) [Are there particular areas or concepts that are difficult? What makes them difficult?]
Sense of belonging	To what extent do you feel a 'sense of belonging' in this department/School? [e.g. relationships with other students/with staff?]
Assessment / feedback	Looking at the assessments for this module, how well do they relate to what you are expected to learn? [To what extent have they helped, or hindered, your learning?]  What sorts of guidance and feedback are you expecting on your essay assignment?
Module organisation and management	Looking at all the various elements that make up the course (the course design, teaching and learning, the assessments, and so on), how well have they come together, as far as you are concerned?
Engagement	Overall, has this module made you more or less enthusiastic about biology — and why, do you think?

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#### DOING WELL

Doing well in the module	What's necessary to do well in this module? (And what influences how well you do?)
Doing well in biology	What's necessary to do well in biology generally, as a subject? (And what influences how well you do?)
Ways of thinking in biology	To what extent do you feel you have learnt to 'think like a biologist'? [... Could you illustrate that with an example?]
Techniques and procedures in biology	To what extent do you feel you have learnt the techniques and procedures of a biologist?
Communicating in biology	To what extent do you feel you have learnt to speak and write like a biologist?
Using your degree	How do you think you're going to make use of what you've learnt from this degree?

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#### ANY OTHER COMMENTS

Is there anything else you would like to say about studying biology, or about your experiences more generally as students in this university?

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