



# ENHANCING TEACHING-LEARNING ENVIRONMENTS IN UNDERGRADUATE COURSES

*Final Report to the Economic and Social Research Council*

*on TLRP Project L139251099*

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# Enhancing Teaching-Learning Environments in Undergraduate Courses

## Research Report

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### BACKGROUND

1. From the standpoint of policy and practice, there has been a sea-change in undergraduate education over the last quarter-century that goes beyond the shift from 'elite' to 'mass' forms of higher education (Trow, 1973, Scott, 1995). Alongside substantially larger and less homogeneous student intakes have come greater economy as well as variety in teaching and assessment; more systematic course documentation; heightened emphasis on graduate employability and teaching quality; and new technology-enabled means of facilitating communication between students and staff and making learning resources more readily available. Yet there has been little thoroughgoing empirical research to chart the impact of these and other far-reaching changes, nor to examine the effectiveness of contemporary undergraduate education. And without a robust and up-to-date picture of teaching-learning processes and practices, it becomes difficult to identify ways of strengthening present provision which will make a significant, positive impact on the quality of student learning.
2. This report summarises the work of a project that has sought to close that gap, by investigating and enhancing undergraduate courses as teaching-learning environments (TLEs) in a cross-section of subject areas and institutions. Pursuing this ambitious goal has necessitated building from a firm foundation in a cluster of relevant domains of research and scholarship. The first of these is research on undergraduate students' experiences and perceptions of learning and studying, from which has emerged a conceptual apparatus spanning orientations, approaches, outcomes and conceptions of learning, together with extensive, cross-national empirical evidence on associations between how and what students learn in their day-to-day academic studies (see e.g. Marton, Hounsell and Entwistle, 1997; Entwistle, 1998, 2000). Though initially derived chiefly from analysis of semi-structured interviews, the core constructs have since also been investigated through questionnaires and inventories (Biggs, 1987; Entwistle and McCune, 2004; Prosser and Trigwell, 1999).
3. Second has been research on TLEs, the complex array of influences, direct and indirect, which make up the settings within which undergraduates study and are taught and assessed (Hounsell, 1997). Early student learning research (Entwistle and Ramsden, 1983; Ramsden, 1997) highlighted important contextual influences on learning such as staff commitment, curriculum choice and workload, but Biggs (1996, 2003) has subsequently developed the concept of *constructive alignment*, a framework for evaluating pedagogical 'goodness-of-fit' between intended learning outcomes, expressed in constructivist terms, and approaches to teaching and assessment. Also relevant to an understanding of contemporary TLEs are recent insights into disciplinary differences in academic cultures and discourses (Becher and Trowler, 2001; Northedge, 2003).
4. Lastly, there is work from two relatively discrete fields which can illuminate the enhancement of TLEs: studies in the management of educational change, which is typically depicted as protean and uncertain rather than ordered and predictable, and thus extremely challenging (Fullan, 1993; Trowler, Saunders and Knight, 2003); and the more diffuse domain

of educational development in higher education (e.g. Hounsell, 1994; Land, 2004), an extensive part of which documents initiatives to improve learning and teaching which are as likely to be practice-led or policy-driven as conceptually derived. Within this very broad church is an emerging debate about the need for greater attention to discipline-specific rather than generic purposes and practices (Healey, 2000; Pace and Middendorf, 2004; Riordan and Roth, 2005).

## OBJECTIVES

5. The principal original aim of the project was to explore the idea of constructive alignment as a way of working with departmental colleagues to strengthen the teaching-learning environments (TLEs) experienced by undergraduate students, so as to enhance engagement, motivation, learning processes and outcomes, and levels of achievement. The main focus of the study as implemented has been on engagement and high-quality learning. While the framework provided by constructive alignment was used during the data collection phases, it was reformulated into a more inclusive concept – ‘congruence’ – for the purpose of reporting our findings (see §17 below). The more specific objectives are summarised below; each of these has been addressed.
  - a) To identify the characteristics of high quality teaching across subject areas from TQA/QAA reports. (see §7).
  - b) To develop the concept of constructive alignment and integrate it with ideas of deep approaches to studying and high level outcomes of learning (see §17).
  - c) To discover which aspects of the TLEs provided in specific course units facilitate, or hinder, effective and high-quality learning (see §17-24).
  - d) To explore collaboratively with departmental partners how best to enhance these TLEs and investigate the effectiveness of these interventions (see §25-30).
  - e) To communicate the project findings widely in ways designed to influence thinking about teaching and learning in higher education and encourage reviews of current practice (see §34-37).

## METHODS

6. The research design was developed within the TLRP guidelines to ensure collaboration with ‘end users’, transforming theoretical knowledge into more accessible forms, and producing findings valuable for practitioners which related to students’ engagement and enhanced learning outcomes. ‘Collaborative initiatives’ – research-based interventions – were developed from an interplay between conceptual frameworks and evidence of students’ reactions to existing TLEs. The most important contribution of the project was thus seen as using conceptual frameworks and evidence of good practice in consort, not only to understand but also to improve high-quality learning-teaching experiences across contrasting subject areas and university settings.
7. The subject areas surveyed were all popular ones chosen to mirror contrasts between pure and applied subjects and science, and between social science and humanities. The five original subjects – electronic engineering, biological sciences, economics, history and media studies – became four when work in media studies had to be discontinued because of staff changes. The research design involved three main phases. The first combined a review of pertinent literature, an analysis of over 40 teaching quality assessment (TQA) reports on a cross-section of departments in the five subject areas, and follow-up telephone interviews

with key staff in 20 of those departments focusing on how high-quality learning was facilitated. These, in turn, guided the development of the questionnaires and interview schedules.

8. The main phase involved identifying and working with course teams responsible for course units in the early and late stages of degree programmes (usually first and final years). Data collection was designed, first, to obtain a clear picture of each course unit, the aims and intended learning outcomes, and the design of the TLE from documentary sources and staff interviews. The next step was to collect information on the students and their teaching-learning experiences. At the start of the unit a 'Learning and Studying Questionnaire' (LSQ) asked about reasons for attending university and taking that unit, and then invited students to describe their general approaches to studying in that subject area thus far (Annex 2). Towards the end of the unit, students were asked about the specific approaches to studying they had *actually used* and their reactions to their experiences of the unit as a TLE. Sets of items in this 'Experiences of Teaching and Learning Questionnaire' (ETLQ) created scale scores, based on item characteristics and factor analyses, which also covered the demands students perceived the unit had made on them and the extent to which they had developed the skills and knowledge required (Annex 3). Students' reactions were also explored through small-group interviews based on a semi-structured schedule which reflected the same conceptual framework but also aimed to encourage students to discuss what had constituted 'good' teaching and assessment from their perspective.
9. In Phase 2, a total of 6488 questionnaires were collected (providing complete sets of data for 1950 students), while interviews were conducted with 668 students and 90 staff. Analyses of these differing kinds of data were designed to provide detailed but readily understood evidence for course teams about their students' perceptions. Standard descriptive statistics at both scale and item level were used for the questionnaire data, while the interviews were read repeatedly by two or more of the research team to establish the main analytical themes and categories. Convergence in the findings from these different analyses provided a firm basis for reports back to the course teams and a starting point for discussions about a possible collaborative initiative. Where an initiative was agreed, an equivalent data collection and analysis procedure was then followed, with the outcomes again discussed with the course team. From the two sets of analyses across a range of settings, we were able to determine the characteristics of TLEs which were both appreciated by the students and related to engagement and self-rated improvements in knowledge and skills. (Actual grades proved impossible to compare across settings with any confidence.)
10. The final phase involved communicating findings through publications, conference presentations and seminars and workshops, to meet a variety of purposes and audiences, and is still ongoing. The four subject reports, which summarise the findings across settings, are being placed on the project web site – <http://www.ed.ac.uk/etl/publications.html> – and are referred to, as appropriate, in the Results section.

## RESULTS

11. The main findings can be considered in relation to four themes underpinning the project's work: high-quality undergraduate learning, undergraduate teaching-learning environments, evidence-informed pedagogical change, and subject requirements and practices.

## a. HIGH-QUALITY LEARNING

### **Approaches to Studying**

12. From its inception, the project sought ways of enhancing the engagement and attainments of students, and engagement was seen in terms of the balance between *deep* and *surface approaches to learning* (Entwistle and McCune, 2004). The *LSQ* questionnaire the project devised to capture differences in approach also incorporates a new dimension of *organised effort*, which taps into how students were organising their studying and using their time effectively (Entwistle, McCune and Hounsell, 2003). Overall mean scores on approaches across the four subject areas are shown in Annex 4, but must be interpreted with caution given the nature of the samples obtained. Comparing first-year with later and final-year units, mean scores on deep approach and organised effort were generally speaking quite similar over time while surface approach scores declined, except in engineering.
13. Factor analyses of the questionnaire scales showed the expected general links between approaches to studying and perceptions of the TLE (Entwistle, Nisbet and Bromage, 2005). More revealing were correlational analyses showing the specific relationships between individual scales (Annex 5). Substantial positive correlations were found between deep approach, organised effort and learning outcomes, measured towards the end of the target units, and the main descriptors of a supportive TLE: 'encouraging (deep) learning', 'clarity and coherence' of aims with teaching approaches, and support to students through 'set work and feedback'. These scales were equally strongly correlated, negatively, with surface approach. This pattern was also evident for 'staff enthusiasm and support', and 'student support', but less strongly. An equivalent pattern of correlations with approaches measured *before* the course unit began was also found, although with much lower coefficients, suggesting a certain amount of consistency in approaches to studying but also clear influences from the TLE.

### **Threshold Concepts**

14. An important insight emerging from the project's work in economics has been that of *threshold concepts* (Meyer and Land 2003, 2005). These seem to serve as portals, opening up previously inaccessible ways of thinking about certain aspects of the subject — a transformed way of understanding without which the learner cannot progress. However, such a transformation can be problematic as earlier, comfortable positions are left and disconcerting new ones explored. Students' developing understanding of two threshold concepts, 'opportunity cost' and 'elasticity', have been explored in a case study of a first-year economics unit (Reimann and Jackson, in press).

### **Ways of Thinking and Practising in a Subject**

15. *Ways of thinking and practising in a subject* (WTP) is another novel construct growing directly from the project's work, and reflects findings elsewhere on the powerful influences of disciplinary conventions and practices (Becher and Trowler, 2001; Hounsell, 1988; Lave and Wenger, 1999). WTP seeks to capture the richness, depth and breadth of what the students surveyed could learn through engagement with a given discipline or subject area at undergraduate level, particularly but not exclusively in the later, honours years (McCune and Hounsell, 2005). As the students' subject grasp began increasingly to resemble graduate-level mastery, so too did their appreciation evolve of what might be entailed not only in thinking within the subject, but also in going about it or 'doing' it, like an established subject



practitioner. And while WTP necessarily rested on a secure foundation of subject knowledge and understanding, it could also encompass subject-related skills, conventions and practices for communicating within the subject, and salient values and attitudes. It therefore has much in common with Shulman's recent depiction (2005) of professional education as a synthesis of cognitive, practical, and moral apprenticeships.

16. In final-year *bioscience*, WTP evolved through direct engagement with experimental data and the research literature, and mastering the conventions of oral and written scientific discourse (McCune and Hounsell, 2005). In economics, by contrast, ways of thinking and reasoning seemed to be more to the fore than the practice of the subject. Thus, while many of the final-year economics students felt they had learnt to be analytical, understand and apply economic concepts and write economic essays, they recognised that established economists did much more than that, e.g. writing research papers and doing econometric data analysis (Reimann et al., 2005 §5b). In *history*, where WTP could blossom even in first-year, it took such guises as an alertness to historical knowledge as contested, an openness to alternative interpretations, and a movement away from narrative to a conceptual and thematic understanding of historical events (Anderson et al., 2005, §7.2). Finally, the close focus on analogue electronics in the engineering units (see §32 below) revealed how WTP in a subject could feasibly be illuminated in a finer-grained way.

#### b. UNDERGRADUATE TEACHING-LEARNING ENVIRONMENTS

17. The opening phase of the project had a considerable impact on the refinement of constructive alignment as a conceptual and investigative framework. Themes emerging from the literature review (Annex 6), a synthesis of salient characteristics of high-quality TLEs as delineated by TQA assessors (Annex 7), and analysis of the follow-up staff interviews (Hounsell and McCune, 2002), together underscored the complex interplay of features contributing to effective provision and the need to take account of staff and peer support for students, and how well courses were organised and content structured. It was also apparent that outcomes and methods of teaching and assessment were not tightly interlocked, as Biggs' model had suggested: 'goodness-of-fit' was highly contextualised and relative, rather than absolute, depending on the constraints and opportunities within a given course setting. A revised framework thus emerged (Annex 8) focusing on the extent of *congruence* between various key aspects of TLEs and the facilitating of WTP and other high-quality learning processes and outcomes.

#### **Teaching-learning activities and learning support**

18. Notwithstanding some subject variations, teaching-learning strategies were generally varied, and more so in later years where smaller classes and students' more developed subject grasp could allow for greater flexibility and more active student involvement. Face-to-face teaching-learning activities were frequently complemented by web-based learning resources (lecture slides, unit handbooks, some supplementary self-study and self-testing materials) and students could use email to contact staff or fellow-students, and search the Internet for further assignment or reading materials.
19. Across the subject and course settings, examples of thoughtful and imaginative teaching activities were identified which were particularly well-received. These included, for instance, lectures which addressed students' needs for clear and lively explanations on

difficult topics; a mix of practical and group activities which embraced discussions, debates, writing tasks and poster presentations aiming to foster an array of subject-based skills; and a series of reflective and group-based activities centred around a mock classroom trial, supported by resource materials through a 'virtual learning environment' (VLE).

20. There was, for the most part, a relatively high degree of congruence of teaching-learning activities and of learning support. In student interviews, staff were widely seen as supportive and approachable, and there were high questionnaire ratings for 'staff enthusiasm and support' and 'clarity and coherence' (Annex 4). Scores on 'interest and enjoyment' were generally quite high, except in the early electronic engineering and economics units, where the 'pace' of teaching was problematic, while 'academic difficulty' and 'workload' were concerns in second-year engineering .

#### **Assessment, guidance and feedback**

21. Methods of assessment varied widely, reflecting both subject needs and innovative blending, and ranged from closed-book exam questions and formative tests through to coursework essays, portfolios, tutorial performance and oral presentations. Assessment methods were generally perceived by students as congruent with the pursuit of understanding.
22. Guidance and feedback, however, was less congruent, echoing similar findings elsewhere (e.g. McInnis et al., 2000; Hounsell, 2003; National Student Survey, 2005). With the exception of history and a bioscience unit rich in 'intrinsic feedback' (McCune and Hounsell, 2005), student concerns about guidance and feedback were pervasive in the interviews, and the lowest overall questionnaire ratings on the *Experiences* sub-scales (Annex 4) were for 'encouraging learning' and 'set work and feedback'. Interviewees' concerns encompassed the timing and frequency of feedback, the consistency and helpfulness of comments, the provision of worked examples (in engineering), and the adequacy of guidance about assessment expectations and criteria.

#### **Students' backgrounds, knowledge and aspirations**

23. Congruence with students' backgrounds, knowledge and aspirations emerged as potentially problematic in first-year courses with the large, diverse intakes and outflows characteristic of contemporary mass higher education. In economics, for instance, some students had subject knowledge that others lacked, and some majored in it while others took it only in first-year. One response to this dual challenge was to align the course chiefly to intending major students, and so retain the strongly mathematical character of the discipline; a contrasting one in another unit where non-majors were in the majority was to strip out much of the statistical content, focusing on core principles and using engaging examples. However, aligning TLEs too strongly with one group of students could prove under-stimulating or demotivating for others (Reimann et al., 2005, §5c).

#### **Course organisation and management**

24. A further consequence of massification was in the congruence of course management. In large first year courses, student diversity could be mirrored in course teams, the members of which could also vary markedly in their backgrounds, depth of experience, and their particular teaching or assessment roles. In bioscience, some students commented on staff distance and impersonality, uncertain lines of communication or inconsistent practices (Hounsell et al. 2005, §5b). The latter concern also surfaced in relation to tutorials in some first-year economics and history units and in second-year electronic engineering.

### c. EVIDENCE-INFORMED PEDAGOGICAL CHANGE

25. Identifying levels of perceived adequacy and congruence with WTP in the teaching-learning environments surveyed provided a rich base of evidence from which to judge the pedagogical effectiveness of each course, and thus to identify where, in appropriate cases, action might be taken by course teams to enhance the quality of learning. The analyses thus facilitated 'problem-setting' (Schön, 1987) and 'coherence-making' (Fullan, 1997), leading to agreed *collaborative initiatives*, which were then subject to a second cycle of data-gathering and review of findings.
26. The initiatives were in keeping with contemporary perspectives on change management (e.g. Fullan, 1993; Trowler, Saunders and Knight, 2003). They sought to be in harmony with local ethos and practices as well as module teams' own soundings of student opinion, had been collaboratively devised and planned, and were courses of action that module teams considered worthwhile and practicable within the limited resources available to them (McCune et al., 2005; Reimann and Xu, 2005).
27. However, taking initiatives forward proved more challenging than had originally – and perhaps too optimistically – been anticipated. First and foremost, course teams had limited 'room to manoeuvre' (Wallace and Pocklington, 2002): change from one academic year to the next (largely beyond their control) was recurring and pervasive, and had somehow to be accommodated within prevailing workloads and resource pressures. Obstacles could take many forms: a large-scale restructuring of curricula or assessment, quality assurance procedures which, ironically, prohibited substantive change to a module beyond a set date in the preceding year; a lack of interest in the findings amongst those staff for whom research had greater priority.
28. As a result of the discussions with course teams, eighteen relatively modest collaborative initiatives were provisionally agreed, of which fourteen were fully implemented and monitored. Analyses of impact were again based on questionnaires and interviews – in some instances, supplemented by an additional questionnaire on key features of the initiative agreed and analyses of grades.
29. The resulting findings, albeit mixed, can nonetheless be seen as encouraging, as the following examples indicate:
  - i. The baseline findings in three *electronic engineering* units had revealed a tendency for students to adopt surface approaches when tackling tutorial problems and to find difficulty in acquiring the ways of thinking entailed in solving them. In all three units, staff agreed to introduce *tutorial workbooks* as a common collaborative initiative to strengthen the emphasis on a deep approach. Students were asked to carry out all their workings in the workbooks and to write comments on any difficulties they met. Although there were substantial practical problems in implementing the initiative, students using the workbook as intended had generally found it helped them to work more systematically and provided a sounder basis for revision. They did feel, however, that fuller guidance on the best use of the workbooks was needed, and that the extra work involved should count in their assessment (Entwistle et al. 2005, §10.2.3).



- ii. In one first-year *economics* module, engaging directly with the baseline findings had been superseded by a policy of introducing multiple-choice exam questions (MCQs), but it nonetheless proved feasible to compare the baseline data with those following the adoption of the revised assessment procedures. Given research evidence provided by project staff on the potentially dysfunctional effects of MCQs on students' approaches to studying, the course team resolved to modify the existing short-answer questions (SAQs) that complemented the MCQs by putting greater emphasis on problem-solving. Various formative measures were also taken to prepare students for the new exams, while the need to rethink assessment practices in ways that would be congruent with intended learning outcomes set in train a wider reappraisal of teaching-learning strategies. In the event, the initiative appeared to have been a fruitful one, as interviews with students and staff indicated that the blend of MCQs and SAQs had called for breadth of knowledge as well as depth of understanding (Reimann and Xu, 2005).
  - iii. In *history*, first-year initiatives aimed to communicate disciplinary practices more explicitly and strengthen the thematic (rather than chronological) approach that some students had found problematic. Later-year initiatives varied: content was restructured and learning-teaching activities resequenced in one setting, while in another an assessment task was reconfigured to deepen students' reflection on their processes of historical reasoning, and in a third there was greater structuring of seminars to foreground the interplay of primary and secondary sources. In all cases the main thrusts of the initiatives were productive: questionnaire scores held up or increased somewhat (sometimes despite other changes in local contexts), and the interviews revealed heightened student engagement with the study and understanding of history (Anderson *et al.*, 2005).
  - iv. The *bioscience* initiatives sought mainly to enhance the congruence of guidance and feedback. In a final-year unit, there was striking questionnaire and interview evidence that the measures introduced – strengthened guidelines on the assessed work, and a blend of feedback on presentations from staff and fellow-students – had enhanced learning and engagement (McCune *et al.* 2005). And in a first-year unit where lab demonstrators had been more fully briefed and a marking-and-commenting pro forma introduced, beneficial effects were evident in the student interviews. Not surprisingly, successful enhancement was more challenging in large first-year courses where teaching and assessment responsibilities were quite widely distributed.
30. In reviewing these examples of “the real world of messy, multifaceted educational change” (Fullan, 2002), it is important to note that the collaborative initiatives involved fine-tuning rather than large-scale remodelling of practices, and therefore seem to have yielded the kind of incremental and evolutionary change that is more sustainable in the longer term (Trowler *et al.*, 2003). But these initiatives differed in other respects from those described in the change management literature. First, change was internally generated, fashioned and owned – albeit with support from the project team – rather than externally imposed. Neither ‘institutionalisation’ (Fullan, 2002) nor ‘adoption’ (Trowler *et al.* 2003) was therefore salient. Second, since each initiative was, by design, *sui generis*, the specific measures taken would not be readily transferable to other settings. What is transferable, however, is the *process* enacted in the collaborative initiatives, echoing the argument in the change literature that

what should be replicated is not a particular reform measure but the conditions which engendered its success (Healey and De Stefano, 1997). Thus it is the project's evidence-informed approach to pedagogical change, and the conceptual perspectives and research tools underpinning this, which would have the greatest benefits to offer to course teams and departments seeking guidance on quality enhancement.

#### d. SUBJECT REQUIREMENTS, CONVENTIONS AND PRACTICES

31. The final theme concerns the extent to which teaching-learning processes and practices are a function of a specific discipline or subject area, a concern which has not been prominent in past research in this field. This theme is inevitably closely interwoven into the other three: it was a major determinant of the characteristic *WTPs* to be found in a given subject area, it shaped perceptions and experiences of *TLEs* in various ways, and it influenced the kinds of evidence-informed change that were pursued. But there was other evidence too of its pervasive influence.
32. In the engineering units, for example, it was possible not only to identify *WTPs* for the overarching topic of analogue engineering, but also to articulate the main features of a pedagogy for developing these *WTPs* effectively (Entwistle et al., 2005, §12.1). In history, a leitmotiv of teaching and learning activities that enabled students to engage with disciplinary *WTPs* was *engagement through dialogue* (Anderson et al. 2005, §9), while in biology, interaction with external professional bioscientists (whether through placements or guest contributions to group problem-solving tasks) was a key influence on students' grasp of how the subject was practised (McCune and Hounsell, 2005). And in first-year economics – and reflecting the wider teaching of the subject – there was a striking pedagogical orthodoxy: adherence to a standard corpus of knowledge, a deductive, 'theory-first' approach and considerable uniformity in teaching methods (Reimann, 2004). Moreover, issues of teaching and learning were often viewed through the lens of the prevailing concepts and discourse patterns of the subject.
33. These observations underscore the importance within this field of caution in the extrapolation of findings, not only across institutional settings, but also across disciplines. Although empirical enquiries such as the present study can yield powerful concepts, analytical models and insights which resonate far beyond the samples and settings in which they were generated, just how salient any one of them might prove to be in a particular subject area is dependent on a complex web of learning and teaching conventions and practices which are, as yet, neither self-evident nor fully documented. Much greater attention therefore needs to be paid to what may be distinctive within a given subject area, as well as to what commonality may be uncovered across subject boundaries, in other 'academic tribes and territories' (Becher and Trowler 2001).

#### ACTIVITIES AND OUTPUTS

34. From the outset, the project has actively communicated its findings by varied means to a wide range of users. Its publications, reports, conference and seminar presentations and questionnaires can be freely downloaded from its website (<http://www.ed.ac.uk/etl>). To date the project has produced 22 publications and, in 2005 alone, gave 22 keynote and other presentations to UK and overseas audiences totaling over 1500 (<http://www.ed.ac.uk/etl/>

publications.html). A further nearly 150 participants took part in the workshops which the project organised jointly in 2005 with Higher Education Academy Subject Centres and other subject bodies. Further contributions to Subject Centre workshop programmes are being planned for 2006, as are various other conference presentations and invited lectures and seminars.

35. Key published outputs comprise the four Subject Reports, two TLRP Research Briefings (for policymakers/senior managers, and academic developers respectively), four ETL Research Digests for HE subject teachers, and a book in the Routledge/TLRP Improving Learning series for which a full manuscript will be submitted in spring 2006. Several other journal articles and book chapters have been commissioned or are in preparation.
36. There have been over thirty visitors from six countries and frequent enquiries about using the project's questionnaires in other universities, which have been encouraged wherever possible. The questionnaires have been translated into six languages, and some *ETLQ* items used in the National Student Survey. Additionally, the project team has sought to exchange insights with other relevant projects within and outwith TLRP, including the AHRB-funded Information Literacy Project (Sheffield/Strathclyde) and the LTSN-funded SENLEF project on enhancing feedback to students.

## IMPACTS

37. Three examples can be highlighted of wider R&D take-up of the project's work:
  - As an active member of the European research network on Powerful Learning Environments (Leuven University) it has contributed to two network books (Entwistle, McCune and Hounsell, 2003; Entwistle, Nisbet and Bromage, 2005).
  - Work on threshold concepts is being carried forward in the HEFCE Fund for the Development of Teaching and Learning project "Developing First Year Undergraduates' Acquisition of Threshold Concepts in Economics".
  - A programme of work on the theme "Integrative Assessment", under Professor Hounsell's coordination, is being funded as part of the Scottish Quality Enhancement initiative, and draws on the project's findings on congruence in assessment, guidance and feedback.
38. In an important sense, part of the project's impact on practice has been inbuilt and ongoing, through its collaborative initiatives and active dissemination strategy. But its impact can be expected to grow further as its outputs are progressively targeted towards a spectrum of end-users. For policy makers and senior managers, its findings raise important questions about quality assurance mechanisms (strictures on changes to modules, an over-reliance on generic, post hoc evaluation questionnaires) which can impede rather than facilitate enhancement efforts, and about the desirability of greater acknowledgement of the resource and course management challenges posed in large and diverse first-year units. For academic developers, implications arise about balancing activities geared towards individuals with work in tandem with course teams, but especially about the benefits of an evidence-informed approach to curriculum enhancement, and greater emphasis on working with the grain of

disciplinary purposes. And for these groups as well as for university teachers generally, there are implications in relation to using congruence as a tool for course planning, monitoring and review; in the greater surfacing of tacit disciplinary conventions in dialogue with undergraduates; and in WTPs as a device for refocusing attention away from over-particularised intended learning outcomes and towards fundamental subject goals.

## **FUTURE RESEARCH PRIORITIES**

39. Future research should treat subject area differences seriously in investigating the effects of teaching-learning environments on student engagement and the quality of learning outcomes. It should also capitalise on collaborations with course teams in extending the conceptualisations and techniques used in our project into other discipline areas. Studies with a more general focus might look at those aspects of congruence which proved problematic in several settings: engaging consciously with student diversity; providing adequate and supportive guidance and feedback; and ensuring coherence in the management of large undergraduate courses.

## Annex 1: References

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Annex 2: Learning and Studying Questionnaire

Annex 3: Experiences of Teaching and Learning Questionnaire

see separate PDF files, downloadable from [www.ed.ac.uk/etl/publications.html](http://www.ed.ac.uk/etl/publications.html)

Annex 4: Responses to the Questionnaires Across Subject Areas: Mean Scores on Scale Scores

<i>Subject area</i>	<b>Biosciences</b>		<b>Economics</b>		<b>Elec Eng</b>		<b>History</b>		<b>Overall</b>		
	<i>Year of degree</i>	<i>Late</i>	<i>Early</i>	<i>Late</i>	<i>Early</i>	<i>Late</i>	<i>Early</i>	<i>Late</i>	<i>Early</i>	<i>Late</i>	<i>Total</i>
<i>Sample size</i>	510	54	340	113	243	122	444	70	1570	380	(1950)
<b>MEAN SCORES ON 1-5 SCALES (5 high) (SD)</b>											
<i>Item or scale</i>											
<b>Reasons for taking the degree</b>											
Interest	4.18	4.06	3.92	3.73	3.94	3.84	4.07	3.91	4.07	3.91	(0.64)
Social and personal	4.05	3.90	4.14	3.64	3.96	3.91	4.01	4.08	4.04	3.86	(0.87)
Career	4.03	3.85	4.09	3.77	4.19	4.23	3.71	3.84	3.98	3.96	(0.98)
Lack of purpose	1.96	1.74	1.79	1.78	1.87	2.39	1.58	1.60	1.80	1.93	(1.11)
<b>Reasons for choosing the unit</b>											
Interest	4.26	4.46	3.86	3.91	4.10	3.92	4.40	4.50	4.19	4.14	(0.80)
Important	4.14	3.95	3.88	3.54	4.30	4.00	3.42	3.65	3.91	3.82	(0.78)
Easy unit	1.98	1.93	2.21	2.10	1.75	1.71	1.80	2.11	1.95	1.96	(0.90)
Career related	3.04	2.67	3.24	3.01	3.29	3.22	2.59	2.76	2.99	2.99	(1.17)
<b>Prior general approaches to studying</b>											
Deep approach	3.53	3.86	3.66	3.72	3.68	3.50	3.83	3.83	3.67	3.70	(0.64)
Surface approach	2.75	2.30	2.59	2.54	2.57	2.91	2.51	2.21	2.62	2.56	(0.81)
Organised effort	3.47	3.54	3.69	3.68	3.51	3.47	3.71	3.76	3.59	3.60	(0.89)
<b>Changes in approaches to studying on the unit</b>											
Deep approach	0.01	0.21	-0.09	0.06	-0.11	0.22	-0.02	0.22	-0.04	0.16	(0.57)
Surface approach	-0.05	-0.24	0.13	-0.08	0.26	-0.21	0.00	-0.28	0.04	-0.18	(0.79)
Organised effort	-0.03	0.41	-0.15	0.18	-0.17	0.13	0.03	0.36	-0.05	0.22	(0.77)
<b>Easiness of perceived demands (note that low scores indicate perceived difficulty)</b>											
Prior knowledge	3.53	3.74	3.31	3.78	3.60	3.46	3.42	3.91	3.46	3.71	(1.02)
Pace	3.31	3.89	2.93	3.85	2.88	3.29	3.29	3.79	3.16	3.64	(0.95)
Academic difficulty	3.40	3.32	3.10	3.39	2.83	3.00	3.33	3.59	3.23	3.28	(0.88)
Workload	3.19	3.26	3.28	3.36	2.89	3.15	3.19	3.59	3.17	3.30	(1.11)
Generic & info skills	3.71	3.79	3.63	3.81	3.48	3.52	3.77	3.94	3.67	3.72	(0.64)
<b>Experiences of teaching and learning</b>											
Clarity and coherence	3.79	4.00	3.94	4.23	3.80	4.06	3.89	4.43	3.86	4.17	(0.68)
Encouraging learning	3.25	3.84	3.47	3.65	3.19	3.40	3.65	3.95	3.42	3.66	(0.78)
Set work and feedback	3.37	3.82	3.32	3.72	3.37	3.70	3.85	4.29	3.50	3.82	(0.79)
Staff enthusiasm & support	3.86	4.34	3.72	4.14	4.11	4.32	4.24	4.64	3.97	4.31	(0.79)
Student support	3.86	3.91	3.81	3.44	4.03	3.94	3.89	4.18	3.84	3.84	(0.98)
Interest and enjoyment	3.66	4.12	3.39	3.69	3.15	3.74	3.91	4.44	3.60	3.94	(1.03)
<b>Levels of achievement</b>											
Knowledge acquired	3.78	3.87	3.69	3.86	3.69	3.95	3.89	4.24	3.78	3.98	(0.69)
Generic & info skills	3.71	3.99	3.45	3.61	3.27	3.39	3.89	4.04	3.64	3.69	(0.76)
Achievement on unit	3.57	3.74	3.54	3.80	3.19	3.44	3.68	4.11	3.54	3.73	(0.89)

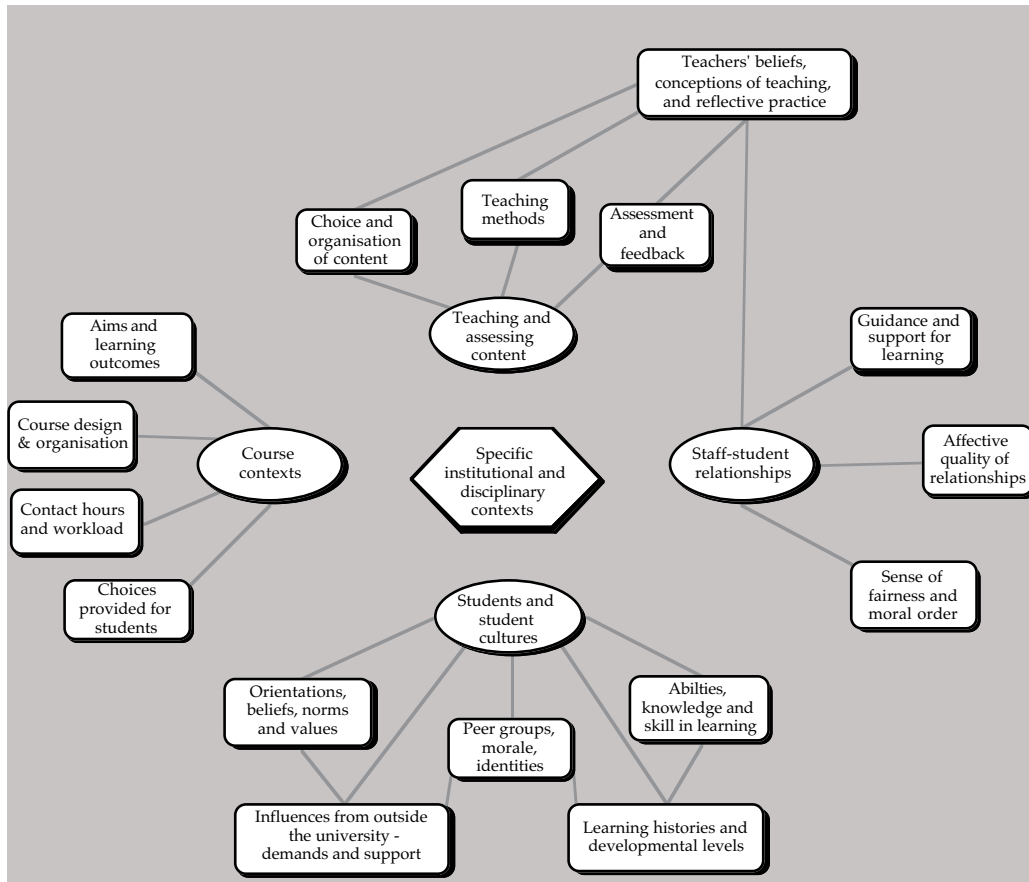
Annex 5: Correlations between Perceptions of the Teaching-Learning Environment and Indicators of Attitudes, Approaches and Learning Outcomes

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<b>Total sample (N = 1950)</b>	<i>General attitudes</i>		<i>Prior approaches</i>			<i>Approaches during</i>			<i>Outcomes</i>	
	Interest	Negative	Deep	Surf	OrgEff.	Deep	Surf	OrgEff.	Know	Achiev
<i>Easiness of demands made</i>										
Prior knowledge required	.06	-.03	.08	-.11	.04	.14	-.21	.07	.19	.24
Pace introducing material	.01	-.03	.06	-.06	.05	.19	-.26	.16	.26	.32
Academic difficulty	.06	-.05	.10	-.09	.03	.18	-.23	.12	.24	.33
Workload required	.01	-.06	.03	-.04	.04	.06	-.14	.08	.12	.25
<i>Experiences of teaching and learning</i>										
Enjoyment and interest	.23	-.18	.26	-.16	.18	.39	-.39	.29	.48	.39
Clarity and coherence	.08	-.17	.21	-.21	.14	.32	-.38	.25	.45	.28
Encouraging learning	.19	-.13	.37	-.16	.16	.52	-.33	.28	.46	.27
Set work and feedback	.10	-.12	.24	-.12	.15	.36	-.27	.26	.44	.29
Staff support	.09	-.12	.18	-.12	.12	.28	-.20	.21	.34	.19
Student support	.08	-.14	.14	-.05	.13	.22	-.08	.19	.22	.07

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Annex 6: Conceptual Map of the 'Inner' Teaching-Learning Environment





## Annex 7: Generic Features of High-Quality Teaching-Learning Environments identified within TQA/QAA reports

### *Course organisation and administration*

- a. Effective quality assurance procedures
- b. Course handbooks detailing aims, teaching, learning resources, assignments and assessment
- c. Well-managed staff appraisal and active encouragement of staff development
- d. Well-designed, well-maintained and accessible accommodation, equipment and facilities

### *Curricula, teaching, learning and assessment*

- a. Overall programme design, include. wide/coherent choice of options
- b. Structure of module/course, and of individual teaching sessions, made clear and linked to aims
- c. Content chosen to match students' prior knowledge, abilities, interests, and understanding
- d. Challenging content focusing on understanding, and academic and generic skills
- e. Good teaching, making appropriate use of supporting resources and teaching/learning technologies
- f. Careful control and monitoring of student progress, particularly in the early stages
- g. Encouraging progressively more self-regulation in learning
- h. Stressing relevance of content to aims/vocational value, interplay between theory and practice
- i. Wide range of appropriate and varied assessment, backed up by timely, helpful feedback
- j. Small-group teaching / tutor-student closeness

### *Student support*

- a. Staff-student relationships showing mutual respect and good rapport
- b. identifying and supporting specific learning needs, including language, maths and study skills
- c. Seeking and acting on student feedback on courses and teaching
- d. Meeting 'personal tutors' regularly

Annex 8: Differing Forms of Congruence within Teaching-Learning Environments

