

## Key Developments in the ESRC/TLRP Project on Enhancing Teaching-Learning Environments in Undergraduate Courses

### OVERALL PURPOSE OF THE PROJECT

The project seeks to develop subject-specific conceptual frameworks to guide institutional and faculty or departmental development of teaching-learning environments. The frameworks are being deployed to integrate findings from research both with the professional knowledge of academic staff and with national and institutional criteria describing high quality teaching and learning. By working collaboratively with departmental partners, ways of enhancing the system-wide capacity for research-based practice are being explored and disseminated.

### KEY CONCEPTS

Key concepts underpinning the project's work are as follows.

*Teaching-learning environment* This term is used to describe the whole set of teaching, learning support, assessment and administrative arrangements, as well as the facilities and resources provided within a degree course. Our particular focus is on those aspects expected to influence most directly the quality of student learning.

*Constructive alignment* This term is designed to capture the 'goodness-of-fit' between the aims of a course and the teaching-learning and assessment procedures followed; 'constructive' indicates that the aims involve a focus on developing conceptual understanding and ways of thinking and practising in the subject.

*Ways of thinking and practising in the subject (WTPs)* Initial work suggested that a term was needed to cover not just approaches to studying, but also the thinking processes and subject-specific skills that staff are seeking to develop in their students. Deep approaches to studying which are well organised and applied with effort are being used to indicate engagement with the courses being studied.

*Troublesome knowledge and threshold concepts* There is particular value in focusing on topics or ways of thinking that students find difficult, particularly when these act as a threshold to further learning. Examining these in relation to teaching and assessment provides a focused way of investigating influences on learning outcomes.

### OVERALL RESEARCH STRATEGY

The overall intention is to explore the applicability of these concepts and previous research findings in accounting for the extent to which teaching-learning environments encourage the active engagement of students, and deep approaches to studying, in achieving high quality outcomes of learning.

The project focuses on five subject areas, chosen to provide good coverage of academic disciplines and professional areas: electronic engineering, cell and molecular biology, business economics, history, and media and communication studies. Course settings have mainly been chosen in clusters of universities around Coventry, Durham and Edinburgh, where our research team is based, whilst also encompassing a variety of traditional and innovative teaching-learning environments.

The main strategy involves working collaboratively with departmental colleagues to look in detail at two target course units due to run in successive years, one at first-year level (or Scottish

second-year) and the other at final-year level, using interviews with staff and students, and questionnaires with students. During the first year of the collaboration we collect the data, analyse them, and report the findings back to the departments. Discussions of the implications of the findings for each course unit then lead to a collaborative initiative during the second year of work with the department, designed to enhance the teaching-learning environment in whatever ways prove to be acceptable and practicable.

The various outputs of the project will be brought together and disseminated through web-accessible resources, printed materials, as well as collaborative workshops and seminars. The aim will be to assist those responsible for modules, courses or programmes of study to monitor, review and enhance the efficacy of teaching-learning environments by deploying data gathering and analytic tools which are evidence-based and have clear conceptual underpinnings. Anonymised case studies of successful collaborative initiatives will also be made widely available.

### PROGRESS TO DATE

- Review of the literature on teaching-learning environments
- Review of existing inventories of approaches and perceptions [Article submitted]
- Review of conceptual frameworks describing teaching and learning in universities
- Analysis of TQA/QAA reports of 40 'excellent' departments [Report completed]
- Telephone interviews with staff in 20 departments across five subject areas
- Analysis of the telephone interviews with staff [Report on Biology completed]
- *Learning and Studying and Experiences of Teaching and Learning Questionnaires*
- Completed questionnaires obtained from students (LSQ = 517; ETLQ = 472)
- Preliminary item and factor analyses completed [Article submitted]
- Collection of background data from eight departmental partners
- Interviews with 22 staff and 8 students, together with 20 student focus groups
- Ongoing analysis of staff interviews and student focus group discussions.

## Analyses of the telephone interviews in Biology

### Departmental teaching orientations

- Professional
- Research
- Wider access/student support
- 

### Constructive

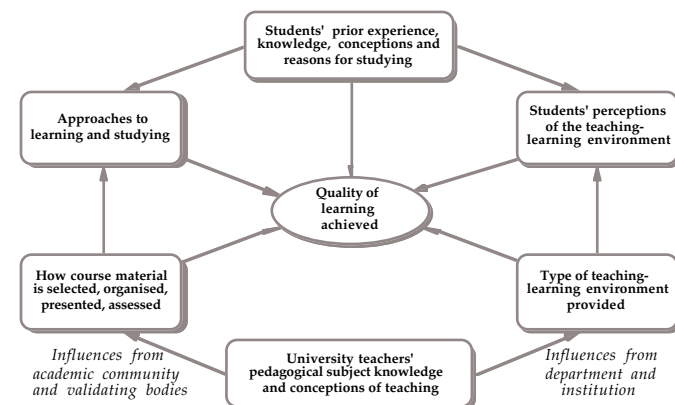
### alignment and the facilitation of high-quality learning

- *Alignment to students* through responsiveness of curricula to diverse student needs and capabilities, and the articulation of developmental perspectives on how curricula and materials might best be staged or sequenced.
- *Alignment of teaching-learning strategies* - the active promotion of ways of thinking and practising in the subject through a differentiated view of the functions of particular teaching-learning strategies, seen in interrelation, and a high valuing of tutorials, workshops and various other group-based activities.
- *Alignment of learning support* was geared to the quality of student learning more generally, and so had an auxiliary role in constructive alignment.
- *Alignment of assessment* indicating how a given assessment method would be purposefully deployed in a particular course setting to promote and evaluate students' grasp of specific ways of thinking and practising in the subject.
- *Alignment of course organisation* showed through a consideration of system-level course management issues rather than directly linked to high-quality learning outcomes.

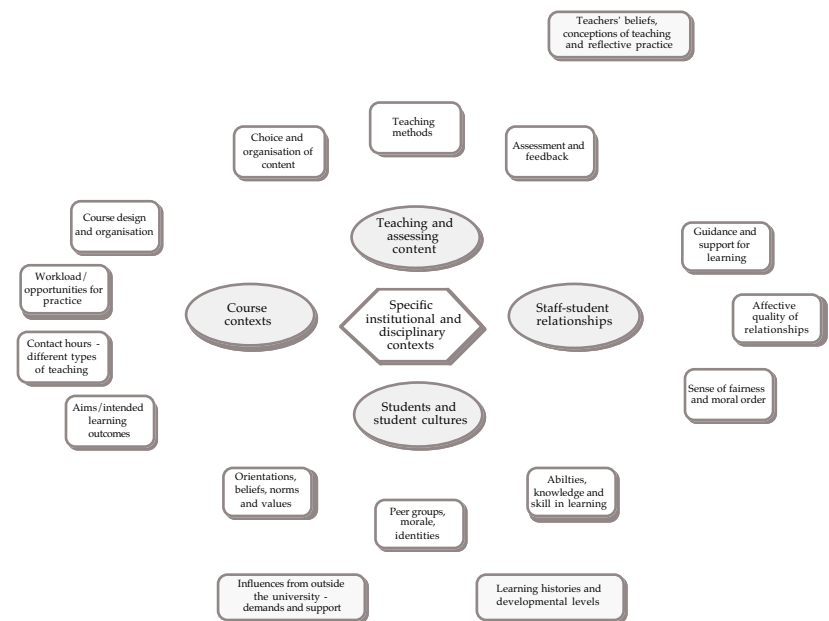
### Ways of thinking and practising in Biology (WTPs)

- *Foundations of understanding* included a sound grasp of key terms, concepts and principles, biological structures, functions and processes; and systems and levels of organisation.
- *Higher-order understanding* encompassed the real-world application of understanding, inter-connective and synoptic understanding and epistemic understanding.
- *Fundamental skills in biology* included experimental and practical skills; data- analysis skills, communication skills, critical reading and bibliographic skills, and student self-regulation.
- *Higher-order skills* were concerned with critical evaluation and interpretation of evidence, openness to changing one's ideas, arguing a case, experimental and research project design, and reflection and debate about areas within the discipline where knowledge is uncertain or where there are contrasting interpretations

## Concepts related to the quality of learning at university



## Conceptual map of the 'inner' teaching-learning environment



## **Learning and Studying Questionnaire (LSQ)**

*[Scales likely to be used in the main analyses shown in italics]*

### **Learning orientations (LSQ)**

*Intrinsic*

*Extrinsic*

### **Reasons for taking a particular course unit (LSQ)**

*Intrinsic*

*Extrinsic*

### **Approaches to learning and studying** (general across the subject area)

#### *Deep approach*

- Intention to understand for oneself
- Relating ideas
- Use of evidence

#### *Surface approach*

- Memorising without understanding
- Unreflective studying
- Fragmented knowledge
- Unthinking acceptance

#### *Monitoring studying*

- Monitoring understanding
- Monitoring generic skills

#### *Organised studying*

- Systematic planning
- Time management

#### *Effort management*

- Effort
- Concentration

## **Experience of Teaching and Learning Questionnaire (ETLQ)**

### **Approaches to learning and studying** (shortened and specific to course unit)

### **Experiences of teaching and learning (ETLQ)**

#### *Course unit coherence and alignment*

Course unit well organised

Constructive alignment

Relevance of content

Learning materials provided

#### *Teaching designed to support learning*

Choice provided

Links to outside world

Focus on understanding

Awareness of ways of thinking and practising in the subject (WTPs)

#### *Assessments and other set work*

Requirements clearly set out

Developing ways of thinking and practising in the subject

Feedback encouraging reflection

Supportive feedback on work

#### *Climate and relationships*

Teachers' enthusiasm and concern

Students' mutual support

#### *Enjoyment of, and interest in, course unit*

### **Demands made by the course unit (ETLQ)**

#### *Workload*

#### *Knowledge expected*

#### *Learning processes needed*

### **Knowledge and skills acquired in the course unit (ETLQ)**

#### *Knowledge gains*

#### *Development of learning processes*

## Abbreviated staff interview schedule

### BACKGROUND

Teaching Role	What particular responsibilities do you have for teaching and/or assessment in the unit/module?
Unit < – > Programme	How do you see this unit/module fitting in with the (main) degree programme? What, specifically, do you feel it contributes?
The Students	Could you tell me something about the composition of the class as a whole?
Student Engagement	In your experience, how committed, enthused and interested are the students in this unit? What influences this?
Peer Cohesion	Do the students taking this unit seem to be a fairly cohesive group, getting on well with each other? How encouraged?
Student-Staff Interaction	Do students get on well with staff? What scope is there for staff and student interaction beyond timetabled classes?

### KNOWLEDGE AND WAYS OF THINKING AND PRACTISING IN THE SUBJECT

Key Outcomes	What is it that you yourself most want the students to get from the unit/module?
Key Topics	Are there particular topics which are central to a student's understanding of the unit as a whole?
Ways of Thinking and Practising in the Subject	Are there particular ways of thinking or going about the subject or communicating knowledge and ideas within it, that you would like to students to develop while they are studying this unit?
Troublesome Knowledge and Threshold Concepts	Are there any of these topics, concepts or ways of thinking that students find particularly difficult to acquire? Are any of these that are also crucial to students' progress within the subject? In what specific ways have you tried to help students with such difficulties?

### TEACHING, LEARNING AND ASSESSMENT

Teaching and Learning	Looking at the various forms of teaching the students' experience, how do they contribute to developing the various key concepts, skills and ways of thinking you mentioned earlier?
Assessment	And similarly, what part do the various assignments and assessment play?
Challenges	What sorts of challenges do you find with teaching and encouraging learning in this particular area of the subject at this level? How do you try to deal with them?
Changes	Are there any specific ways in which you would like to change this unit? Would there be any difficulties in trying to make such changes? Could these be overcome at all?

### ANY OTHER COMMENTS ABOUT THIS UNIT OR THE WIDER SUBJECT

## Abbreviated interview schedule for final-year students

### ORIENTATION

What led you to take this module?

### EXPECTATIONS / OUTCOMES

Your Expectations	What were you particularly looking to get out of this module/unit?
Outcomes for You	What have you actually got out of it – and what had you expected?
Staff Expectations	What do the staff see as particularly important for students to learn?

### EXPERIENCES

Teaching-Learning	Which aspects of the teaching have you found <i>most</i> and <i>least</i> helpful?
Support for Learning	What sort of help/support has been available for difficulties in learning?
Assessment / Feedback	How well have the assessments matched what you are expected to learn?  In what ways have they helped, or been a hindrance to, your learning?
Relationships	How satisfied are you with the guidance and feedback you've been given?  How have you found your relationships with other students? / with staff?
Unit Organisation & Management	How well have the various elements in the course unit come together?
Engagement	Has this module made you more or less enthusiastic about the subject?
Changes	What would you most like to see changed?

### DOING WELL IN THE SUBJECT

What's needed to do well in this subject/discipline? What influences that?  
  
How does that compare with the other subjects you're studying?

### LEARNING & TEACHING COMMUNITY / WAYS OF THINKING AND PRACTISING IN THE SUBJECT

Sense of belonging	Do you feel 'a sense of belonging' in this department?
Ways of thinking & practising in the subject	To what extent do you feel you have learnt to think like a [...ist / ...ian]?
Using your degree	How do you think you're going to make use of what you've learnt?

**Factor loadings from a factor analysis of selected scales from the two questionnaires (LSQ, ETLQ)**

<b>Scales</b>	<b>Factor I</b>	<b>Factor II</b>	<b>Factor III</b>
Intrinsic orientation LSQ		<b>.29</b>	
Negative orientation – lack of purpose		<b>- .34</b>	
Intrinsic reasons for choosing course unit			
Extrinsic reasons for choosing course unit			<b>.26</b>
Deep approach to studying the specific course unit ETLQ	<b>.29</b>	<b>.51</b>	
Surface approach to studying that course unit	<b>- .29</b>	<b>- .33</b>	<b>.33</b>
Monitoring studying during that unit	<b>.26</b>	<b>.55</b>	
Organised studying for that unit		<b>.65</b>	
Effort management for that unit		<b>.80</b>	
Unit seen as organised, aligned and integrated ETLQ	<b>.78</b>		
Unit seen as encouraging learning and providing choice	<b>.83</b>		
Unit assessing understanding with good feedback	<b>.74</b>		
Unit providing good staff support	<b>.70</b>		
Unit encouraging good peer support	<b>.26</b>		
Unit evoking interest	<b>.73</b>		
Unit perceived as having light knowledge demands ETLQ	<b>.41</b>		<b>- .29</b>
Unit having light demands for learning processes		<b>.25</b>	
Perceived knowledge gains from unit	<b>.60</b>		
Perceived gains in learning process gains from unit	<b>.40</b>	<b>.30</b>	
Self-rating of attainment prior to taking the unit LSQ		<b>.31</b>	<b>- .64</b>
Self-rating of attainment on the unit ETLQ	<b>(.21)</b>	<b>(.22)</b>	<b>- .51</b>

Loadings less than /0.25/ have been omitted except for those relating to attainment)

Analysis of TQA/QAA reports on ‘excellent’ departments		Analyses of staff interviews	Analysis of LSQ & ETLQ	Attainment measures
<i>Departmental organisation, administration, and facilities</i>	a. Effective quality assurance procedures	<b><i>Ways of thinking and talking about teaching and learning</i></b>	Course unit organisation and structure	
	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			
<b><i>Constructive alignment of all aspects of provision</i></b>	a. Overall programme design, include. wide/coherent choice of options	<b><i>Ways of thinking and practising in the subject</i></b>	Perceived workload	
<i>Course design</i>	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			
<i>Course content</i>	d. Challenging content focusing on understanding, and academic and generic skills			
	e. Stressing relevance of content to aims/vocational value, interplay between theory and practice	Foundations of understanding	Prior knowledge expected	Perceived new knowledge
<i>Teaching</i>	f. Good teaching, making appropriate use of supporting resources and teaching/learning technologies	Higher-order understanding		
	g. Encouraging progressively more self-regulation in learning	Troublesome knowledge and threshold concepts	Teaching designed to encourage learning	Approaches to studying in the course unit
<i>Supporting learning</i>	h. Identifying and supporting specific learning needs, including language, maths and study skills	Approaches to teaching	Prior approaches to studying	
	i. Careful control and monitoring of student progress, particularly in the early stages	Fundamental skills	Prior skills expected	
<i>Assessment and feedback</i>	j. Wide range of appropriate and varied assessment, backed up by timely, helpful feedback	Higher-order skills	Assessment, set work and feedback	Grades obtained
	a. Small-group teaching / tutor-student closeness	Assessment procedures used		
<i>Student support</i>	b. Staff-student relationships showing mutual respect and good rapport	Attitudes to students	Supportive climate	Enjoyment and interest experienced
	c. Seeking and acting on student feedback on courses and teaching	Readiness to explore pedagogical innovations		
	d. Meeting ‘personal tutors’ regularly			

## SOME ISSUES ARISING AT THIS STAGE OF THE PROJECT

- How should the notion of *constructive alignment* be interpreted in different contexts, in relation to different forms of alignment through for example, course organisation, teaching and learning activities, assignments and assessment, and student support.
- How are *ways of thinking and practising in the subject* expressed and experienced in each of the subject areas?
- Do the concepts and models used within each discipline affect the ways staff in the various subject areas think about teaching and learning? And, if so, in what ways?
- How does the idea of *threshold concepts* or *threshold ways of thinking* apply in the contrasting subject areas?
- Does a focus on *troublesome knowledge* and/or *threshold concepts* provide a fruitful way of focusing on specific content through which constructive alignment might be illustrated?
- How can collaborative initiatives best be set up with departments in ways which are rooted in the analysis of data collected, draw on our emerging conceptual frameworks, and represent a worthwhile development for our departmental partners?
- Can we develop a language of description in university teaching and learning that accurately captures the key concepts but expressed within a discourse that is intelligible and immediately appealing to colleagues (*action poetry*)?
- How can we design conceptual frameworks that integrate important aspects of research on teaching and learning on the one hand, with, on the other, curriculum frameworks developed within staff development work and good practice found within the subject area in our telephone interviews and reviews of the subject literature?