

Learning and Teaching at University: The Influence of Subjects and Settingsⁱ

The coming of mass higher education has brought larger classes, more diverse students and leaner unit costs, but keener interest in teaching quality and graduate attributes. This research surveyed what and how undergraduate students learned in this changed landscape. It investigated how the quality of learning and teaching was shaped by subject areas and course settings, and also looked at ways of using research evidence to enhance course effectiveness.

Summary of key findings

Underlying what students learnt in specific course units was a developing grasp of how to think and go about the subject like an expert.	The concept of ways of thinking and practising in a subject offers a powerful means of planning and evaluating the fundamental goals of a degree.
There was an inescapable subject dimension not only to what students learnt but also to how they were taught and assessed in undergraduate courses.	In efforts to review and enhance teaching and learning, more attention should be given to what is distinctive about a given subject area.

The research

We worked closely with teams responsible for course units or modules in the early and late stages of degree programmes, usually the first and final years, in four contrasting subject areas – biology, economics, electronic engineering and history – at a representative range of higher education institutions. Data were gathered from questionnaires, interviews and course documentation. After a first round of data collection and analysis, we discussed our emerging findings with each course team and, where appropriate and feasible, helped them to devise ways of improving course effectiveness. The impact of these initiatives was then systematically monitored.

Key Concepts and Findings

Learning and engagement

We aimed to evaluate the quality of students' learning on a range of measures which looked at how they went about their studying as well as what they were gaining from their studies in each of the subject areas. One set of measures focuses on students' approaches to studying and differentiate between:

- Deep Approaches that aim at understanding, using evidence and relating ideas
- Surface Approaches, where the focus is on memorising rather than understanding or active engagement with the subject matter
- Organised Effort, which taps into how students are organising their studying and whether they are using their time effectively

We found good indications of growth in the quality of student learning as students progressed through their undergraduate studies. Across the four subject areas, scores for deep approach and organised effort were somewhat higher for the later and final-year course units. More noticeably, the scores on surface approach were relatively lower in the later years. Students' ratings of teaching indicated that highly rated teaching was linked with higher levels of deep approach and lower scores on surface. However, the learning processes involved in a deep approach differed markedly between subject areas, and increased in complexity over successive years of study. It therefore became more fruitful to

focus on students' developing grasp of the distinctive ways of thinking and practising (WTPs) characteristic of each subject area.

These became a prime focus of the project. We found that although these ways of thinking and practising called for a firm foundation of subject knowledge, they were more widely based. They also encompassed subject-specific skills and know-how, a growing familiarity with conventions for communicating within the subject area, and a widening appreciation of how new knowledge within the field was generated.

In the final-year bioscience course units, WTPs evolved through direct engagement with experimental data and the research literature, and by mastering the conventions of oral and written scientific discourse.

In economics, the emphasis was on describing and modelling economic systems and reasoning about them. In the history courses, where WTPs could blossom even in the first year, they took such guises as a movement away from narrative, an avoidance of 'presentism' (interpreting the past in terms of today's values), and an openness to alternative interpretations, recognising the contested nature of historical knowledge. Finally, the close focus on a specific topic within engineering – analogue electronics – drew attention to the importance of a deep approach to problem solving in understanding the functions of circuits.

A further insight emerged from our work in economics: the notion of threshold concepts which lead to higher levels of understanding. Two examples of such concepts were 'opportunity cost' and 'elasticity', which staff believed would open up previously inaccessible ways of thinking about certain aspects of the subject — a transformed way of understanding without which the learner could not progress. However, such transformations were likely to prove troublesome for students, since they entailed leaving behind earlier, comfortable positions to explore new and disconcerting ones.

The disciplinary dimension

In each discipline we studied, staff tended to describe their intentions for teaching their course unit in terms of broad disciplinary goals, rather than through the narrower 'intended learning outcomes' for the unit formally documented in course handbooks and prospectuses. It was in their discussions of these broader subject goals that staff most frequently demonstrated their commitment to fostering WTPs in their students. The subject areas proved to be distinctive not only in the ways of thinking and practising each called for, but also in the teaching, learning and assessment methods deployed within them. It was as if there was an inner logic which linked together the demands of each subject with how it was taught and assessed in supporting students' learning. We found correspondences between the specific WTPs of a subject and the elements of the teaching which students felt contributed most strongly to their learning. This suggested that the most successful approaches to teaching were those that addressed the disciplinary WTPs most directly.

Major implications

Here we focus particularly on the implications of our findings for sustaining and enhancing the quality of learning and teaching in contemporary higher education. These implications are not aimed solely at university teachers. They are also relevant to academic managers, to academic and educational developers, and to those with responsibilities for quality assurance and accountability for standards.

The development of WTP

Our findings on students' evolving grasp of ways of thinking and practising in a subject draw attention to what high-quality undergraduate learning entails. They suggest that students thrive on opportunities to engage actively with a subject in its various guises. This means that as well as assimilating subject knowledge, students need to master the skills, strategies and conventions that are inseparable from the practice of the subject at an advanced level. Current procedures for course design and review seem to concentrate attention on specific module outcomes rather than on these more fundamental goals. This can mean that students fail to make connections between topics and do not come to see the subject as an integrated whole.

Refocusing on the subject

Our findings also underscored the fundamental importance of the subject dimension to learning and teaching in higher education. As the preparation and development of UK university teachers becomes more formalised and better established, it is vital that activities and resources which traverse subject boundaries be complemented by opportunities to consider discipline-specific purposes and requirements. Generic approaches are valuable, but need to be reinterpreted within each disciplinary setting.

Teaching and Learning Research Programme

ⁱ Extracts from the Teaching and Learning Research Briefing, TLRP, Dec 2007; No 31