High Educ (2007) 54:867–884
DOI 10.1007/s10734-006-9029-1

ORIGINAL PAPER

The teaching:research nexus : a model for institutional management

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Received: 23 February 2005 / Accepted: 18 July 2006 / Published online: 13 September 2006

Abstract Teaching and research lie at the heart of higher education. The interaction between teaching and research has therefore attracted the attention of both researchers and policymakers. Much has been written about this relationship, looking in particular at the perceived mutual benefits between teaching and research. This paper presents some findings from a research project which, using a comparative approach, aimed to examine the nature of the teaching:research nexus and, in particular, to consider the response of institutional management. Based on the observations collected through the project, a new model is proposed for institutional management of the teaching:research nexus. This model is based on a range of contextual factors, classified as ideological or environmental, and two contrasting approaches to institutional management of the relationship between teaching and research, active and passive. This model offers a new approach to understanding the operation of the teaching:research nexus within institutions of higher education.

Keywords Research · Teaching · Management

Introduction

Teaching and research are central to the delivery of higher education. Indeed, for many observers, it is the relationship between teaching and research which is fundamental in defining the distinctive nature of the university as an institution. Yet, at the same time, this relationship—the so-called teaching:research nexus—is commonly misunderstood and/or is based on unconvincing or conflicting evidence, both theoretical and empirical.

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Many papers have now been written using both quantitative and qualitative methods to explore the nature of the teaching:research nexus; many views have been expressed, some suggesting a strong, symbiotic link and others arguing that there is no real relationship in practice between these two key drivers of higher education activity (see, for example, Breen & Lindsay, 1999; Brew & Boud, 1995a, b; Brew, 1999; Brew, 2001; Clark, 1997; Coate, Barnett, & Williams, 2001; Colbeck, 1998; Elton, 2001; Gibbs, 1995; Hattie & Marsh, 1996; HEFCE, 2000; Jenkins, Blackman, Lindsay, & Paton-Salzberg, 1998; Jenson, 1988; Kyvik & Smeby, 1986; Marsh & Hattie, 2002; Neumann, 1992, 1994, 1996; Ramsden & Moses, 1992; Robertson & Bond, 2001; Rowland, 1996; Smeby, 1998). These authors reflect many different research approaches and provide a wide range of different conclusions regarding the nature of the teaching:research nexus. Particular attention should be drawn to the work of Neumann in applying the term ''nexus'' to the relationship between teaching and research, and to the papers produced for two international colloquia on Research and Teaching held in the UK in 2000 and 2004 (Southampton Solent University, 2004).

This paper aims to offer a different perspective, commonly overlooked in the debate to date, that of institutional management. It aims to examine the factors which influence management of the teaching:research nexus by higher education managers and by academic staff, and, thereby, to derive a new conceptual model which will enhance understanding of how the relationship between teaching and research may be organised and influenced in practice. Whilst any model based on four institutional case studies may be of limited relevance in other institutions and other contextual settings, it is suggested that some of the issues raised will contribute to a wider debate on the relationship between teaching and research in higher education.

Few researchers have considered the management implications of the teaching:research nexus. Neumann (1993) considered the role of several academic administrators. Another important contribution is offered by Jenkins, Breen, and Lindsay (2003). However, their work is essentially practical in nature, using a range of case studies to indicate possible policy developments. Papers presented at the two international colloquia in Southampton offer many important insights, especially in terms of national policy, but do not offer any conceptual view of institutional management of the relationship between teaching and research. This paper takes an alternative approach, using grounded theory to consider how different factors can influence how research is managed, both by professional institutional managers and by academic staff (''the managed''). It aims to offer a new, more theoretical and conceptual basis for the activities undertaken by universities in shaping the interaction between teaching and research. It also seeks to move debate in a new direction, towards institutional case studies and the establishment of management concepts to go alongside educational practice.

Research project

The paper is based on the results of a comparative study looking at policy, perceptions and management relating to the teaching:research nexus in four universities, two in England and two in Sweden. Given that a key aspect of the project was to examine the underlying views and beliefs influencing higher education management, a qualitative approach was adopted. The four universities were selected on the basis of their publicly expressed commitment to the interaction of teaching and research

and their breadth of academic disciplines; all four institutions draw a high proportion of their funding from public sources. The four universities vary in size from about 15,000 students (University A) to about 25,000 students (University C) (2004 figures). A series of interviews and focus group discussions was undertaken with academic staff, Heads of Department, Deans and senior officers, both academic and administrative, including Vice-Chancellors and Rectors:

England:	University A	5 Senior officers
		1 Dean
		1 Head of Department (academic)
		6 Academic staff (focus group)
	University B	4 Senior officers
		3 Deans
		3 Heads of Department (academic)
		12 Academic staff (focus group)
Sweden	University C	3 Senior officers
		1 Dean (equivalent)
		1 Head of Department (academic)
		4 Academic staff
		11 Academic staff (focus group)
	University D	4 Senior officers
		1 Head of Department (academic)
		1 Academic staff
		6 Academic staff (focus group)

Interviews were also undertaken with senior members of the Higher Education Funding Council for England (HEFCE) and the Hogskoleverket and the Higher Education Audit Agency of Government in Sweden. In addition, a detailed study was undertaken of diverse plans and reports published by each university and by Government in both England and Sweden.

Having initially sought permission from each university to undertake the study, each institution was invited to nominate a senior manager to assist with practicalities, such as the arrangement of interviews and circulation of information. This person circulated management and academic staff inviting those interested to participate in the study. Once these volunteers had been identified, a final list of interviewees was devised; academic staff were drawn from a range of different subject backgrounds in each institution, in order to allow for variations in perceptions and practice by disciplines, and from different levels of seniority. Thus, the number of participants varied between different institutions. A short paper outlining the issues to be discussed was sent to all participants 2 weeks before the meetings. This paper formed the basis of discussions, using open-ended questions to stimulate a wide-ranging discussion. The interviews were transcribed and coded for detailed analysis, the coding based on themes identified from the discussions, thus reflecting the comments of the interviewees. Analysis was undertaken to examine how the teaching:research nexus was viewed by both managers and academic staff, the factors that influenced these perceptions and how the relationship was managed in practice. In this way, it was hoped to develop working propositions about the factors impacting upon the management of research and how such factors might shape the response of both managers and academic staff. Differences between the four

institutions were analysed in order to identify variations arising from the national setting and policy background. In a separate study, the data has also been used to look at the importance of policy matters rather than disciplinary differences in shaping the relationship between teaching and research.

Drivers of the teaching:research nexus

The project revealed a range of key drivers which shaped the commitment to and nature of the teaching:research nexus. These may be characterised as *ideological factors*, based on the fundamental views and ideas held by individuals or by the universities as corporate bodies, or *environmental factors*, external forces which impact upon universities and their staff.

Ideological factors

Ideological factors may be defined as those forces that impact upon the relationship between teaching and research drawn from an underpinning body of ideas, beliefs and philosophy. Such factors may or may not be supported by empirical evidence. These beliefs were expressed by both managers and academic staff.

Institutional mission

In some cases, the inter-relationship of teaching and research is expressed explicitly in the University's mission statement and corporate strategy, and thus formed part of the underlying philosophy of the institution. This was the case with both UK universities. University B asserted that it is ''a research-led institution in which teaching and learning take place in an active research environment''; University A stated that it would ''.... strive to enhance its position as a leading research and teaching institution *cultivating the synergy between teaching and research*'' (my emphasis). Both English universities demonstrated a very strong and public conviction that teaching and research were inter-related. In Sweden, senior officers at both universities argued forcefully that their universities had an equal commitment to teaching and research; both activities were seen as fundamental to the institutional mission. They stressed that Government would not accept any alternative view, and would not countenance an approach which favoured either teaching or research. At the same time, both universities themselves adhered to this view and neither wanted to see any alternative scenario.

Beliefs and values

Senior officers in both Swedish universities had a firm conviction that teaching and research worked together in a strong, mutually beneficial relationship. Beliefs and values were intertwined; not only was there a firm conviction that the relationship existed, but that it was also something of great intrinsic worth. These beliefs and values were deeply entrenched. It was assumed that academic staff would apply their research in their teaching and that teaching would benefit research: ''undergraduates are a greenhouse for new ideas'' (University C). The relationship was unquestioned

and did not need to be amplified or qualified. The precise scope might vary by level of study or by subject, and would be strongest at postgraduate level, but the strength and importance of the relationship was not in doubt. Officers spoke openly of staff needing to be ''up-to-date'' in order to teach; for some interviewees, ''up-to-date'' was equated with research activity, but for others a clear distinction was drawn between keeping ''up-to-date'' and undertaking original research. Officers actively promoted the idea that good research meant good teaching; one senior manager asserted very forcefully that ''the quality of undergraduate programmes can be equated with excellence in research'' (University C). This view was vehemently held, but when asked to justify this statement with hard evidence, no justification was forthcoming; most significantly, no justification was felt to be necessary. It was not clear that senior management held any firm conceptual or philosophical view of the nature of the teaching:research nexus; the strength and value of the relationship were simply accepted without any clear justification or rationale.

In England, interviews with senior officers and managers also showed a complex set of intertwining views and beliefs. There was a clear assumption that the interaction of teaching and research was linked to quality in both teaching and research, and that the active interaction of both activities was a distinguishing feature which marked out their universities from other higher education institutions. Neither university saw teaching and research as an ''either/or''; both went together. In both English universities, the emphasis was on outstanding researchers who were also outstanding teachers or *vice versa*; staff who were able to communicate to their students and able to inspire those around them.

Pedagogy

Academic staff in all four universities emphasised the importance of research in ensuring that teaching was up-to-date and relevant to the needs of both students and prospective employers. Many examples were quoted of staff using their personal research in teaching, especially in final year projects and in postgraduate study. Staff stressed the importance of research in ensuring that teaching was strong and informed by latest knowledge. In the four universities studied, there was a strong belief that this could only be achieved by active involvement in research and knowledge creation (as distinct from ''scholarship'' which was primarily concerned with ''keeping up-to-date''). Research also encouraged the establishment of high quality facilities and strong groups of postgraduate and postdoctoral staff who enhanced the overall vigour and creative environment of the department. In this way, the teaching:research nexus was both part of the philosophy of teaching and a practical outcome.

There was widespread agreement that the nature of the relationship between research and teaching could vary between subject areas and between levels of study. In broad terms, these variations may be summarised as follows:

- Across *all* subject areas, the pedagogic link was strongest at postgraduate level.
- At undergraduate level, the pedagogic link was relatively weak in the early years for science and engineering, where there was a major body of subject knowledge to be imparted, but the link could be strong by the end of the undergraduate programme when project work was undertaken. An alternative view, but leading to the same conclusion, was that in science and engineering, the pace and

complex nature of research did not lend themselves to early years undergraduate teaching.
- At undergraduate level, the pedagogic link could be strong for arts and social sciences in the early as well as latter parts of the degree programme because staff had more freedom to develop course content.
- In many professional subjects (e.g. Law, Medicine and Health professions), the scope for the integration of teaching and research was often limited by the learning requirements of professional bodies. However, in such subjects the use of problem-based learning was also relatively common, an approach seen by some staff as similar to research.

Academic staff recognised that, in practice, the inclination and motivation of individuals were significantly more important than subject area or institutional policy. Opportunities for the integration of research within teaching were identified in all subject areas, at all study levels. Without exception, staff in all four universities were agreed about the benefits arising from the application of research in their teaching: ''more lively teaching'' (University A), ''more interesting and stimulating'' (University D), ''staff who teach from their research show more enthusiasm and passion'' (University C).

It is clear that there was a strong ideological commitment to the pedagogic benefits of research-based teaching. There was also a recognition, more weakly expressed, that teaching benefited research. Students could come up with interesting ideas or solutions to problems which would then provide the basis for future research; other staff indicated that they commonly used their teaching, especially at postgraduate level, as a ''testbed'' for their research ideas. However, in the main, the teaching:research nexus was seen as a one-way process in pedagogic terms, certainly at undergraduate level. A sharp distinction was drawn between the relationship of academic staff with undergraduate and postgraduate taught students, and with postgraduate research students. For postgraduate research students, the supervisory relationship was seen as a genuinely two-way interactive process, linking teaching and research.

Student recruitment

In Sweden, university managers were totally convinced about the importance of research for student recruitment. Recruitment might be seen as a practical concern, more related to the external environment. However, the conviction went deeper and was also part of the beliefs embedded among both managers and academic staff. Prospective students ''know that they are living in a changing world and therefore want to go to a university which is active in research'' (University D). Recruitment is clearly a very practical concern and heavily influenced by the external environment. Yet the strength of conviction and belief was such that this was also an important ideological foundation for the teaching:research nexus. Senior officers believed that students ''knew'' that research benefited teaching and that students saw that a strong research profile attracted the best staff. Thus, research was critical in student decision making; weaker universities with little or no research were seen to be struggling to recruit students. Academic staff also stressed the ''professional responsibility'' of colleagues to share their research with present and prospective students, including the inspiration of future students through contacts with schools.

In England, this ideological commitment was less clear. Some interviewees suggested that prospective students might see staff research as a distraction from teaching. This was felt to be a view promulgated in less research-intensive universities. However, the effective integration of research and teaching was also seen as a positive factor which might assist in student recruitment in an increasingly competitive external environment. In English universities, staff asserted that the interaction of teaching and research was a feature which distinguished their own work or that of their departments from similar departments in other (by implication, ''lesser'') universities. This was seen as a major factor in the recruitment of high quality students and in producing outstanding graduates on completion of their studies. The view in England, therefore, was that the relationship between teaching and research might be a difficulty in student recruitment or could be shaped and presented to competitive advantage. This was a different view from that prevalent in Sweden where it was assumed that students would expect to see and benefit from the interaction of teaching and research. Recruitment may therefore be seen as both ideological and environmental in its impact.

Here, therefore, was a range of ideological beliefs which could influence how universities approached the management of teaching and research. At the same time, it is also possible to identify a variety of environmental factors which underpinned the teaching:research nexus.

Environmental factors

Interviews with staff in the four universities revealed a range of environmental factors which influenced the teaching:research nexus. Environmental factors may be defined as those forces or conditions that impact upon the relationship between teaching and research. In some cases, institutions, or their managers and academic staff, may have no choice as to whether they must respond; in other cases, institutions may have some freedom to accept, modify or resist these external forces. The environmental factors will typically be external to the institution, unrelated to the core beliefs of academic staff or managers.

Assessment and accountability

Academic staff in both English universities all believed that success in research was the key factor in achieving professional progression. This took many different forms: promotion; peer esteem; and financial rewards. From a professional point of view, academic staff maintained a clear distinction between their teaching and research activities. Teaching and research were separately accounted for in terms of time and resource commitments; ''teaching time'' and ''research time'' were commonly identified and clearly formed a regular part of the academic dialogue. Examples were also quoted of *curricula vitarum* which separated teaching and research. Staff believed that they were separately assessed for their teaching and research, in the early years of an appointment, through probation, through subsequent progression and in staff appraisal.

In England, there was also a widespread view that teaching was under-valued relative to research. Most staff attributed this to the impact of the Research Assessment Exercise and subsequent ''league tables'' of universities which had

prompted universities to emphasise the importance of research. At the same time, it was also suggested that it was much easier to measure quality and achievement in research then teaching, and that this made research performance easier to assess and compare between staff, departments and universities.

The separation of teaching and research in the UK was also emphasised in the external environment. Both English universities stressed the significance for institutional management of teaching quality assessments undertaken by the Quality Assurance Agency and of subsequent institutional review procedures, and of the Research Assessment Exercise; such procedures had a deep and profound effect on the teaching:research nexus, with different arrangements applied to the two elements of the relationship. In England, this separation reflected different requirements for quality assessment and assurance applied by Government, and the perceived absence of any strong Government commitment to the interaction of teaching and research. Both academic and managerial staff referred to the ''assessment culture'' in England which emphasised the distinction between teaching and research, and which was translated into institutional management practice. In Sweden there was a different fear, namely that the development of more formal assessment procedures might lead to pressures for specialisation or ''division of labour'' (University C) and thereby threaten the integration of teaching and research.

Market forces

Both academic staff and university officers, especially in England, but also to a lesser degree in Sweden, emphasised the growing impact of market forces and competition on higher education, compelling new forms of management reaction. Fears were expressed that Governments were looking to encourage competition in order to enhance efficiency and student choice; as a result, universities were finding it increasingly difficult to maintain a broad and balanced commitment to both teaching and research. Pressures were growing towards specialisation, in research, in teaching, in student access, in technology transfer and in other priority areas; with greater institutional diversification, it was suggested, went an erosion of the teaching:research nexus.

Market forces also required the provision of adequate information for those seeking to ''purchase'' or utilise teaching and research. This highlighted strengths but also exposed weaknesses, and again tended to emphasise the separation of teaching and research, reducing the scope for a broadbased portfolio of activity.

International and global competition

All the universities studied referred, in particular, to the growth in international competition. ''International status'' was a goal for each institution. This was normally associated with excellence in research. To this end, the universities concerned were looking to identify key research strengths for particular investment. Both academic staff and university officers recognised that such pressures tended to erode traditional views about the integration of teaching and research and placed a particular responsibility on the institution to manage the teaching:research nexus more effectively. The drive for international standing reflected increasing global

competition, for the best students (especially research students) and for the best staff; senior officers also referred to aspirations of Governments to have universities able to compete on the international stage, especially given the importance of universities in technology development and innovation.

Differential funding arrangements

The research study revealed very different attitudes towards the teaching:research nexus on the part of Government. Both English universities stressed that successive UK governments had questioned the existence of any positive relationship between teaching and research. Most recently, for example, the Government White Paper published in January 2003 commented as follows:

> ''We believe that the time has come to look carefully at the relationship between research and teaching. In reality, the connection between an institution's research activity and its teaching is indirect, and there is ample evidence of the highest quality teaching being achieved in circumstances which are not research-intensive. The scale and location of research activity has to be justified and decided on to own merits. We are also determined to promote other sources of recognition, achievement and prestige besides research, both with and between institutions.''
> (White Paper, 2003, para 2.7)

Whilst such comments have underpinned moves towards the conferment of the title of 'university' on institutions without any research base, it is also true that funding has recently been made available to encourage the development of research-informed teaching, especially in universities that do not receive large amounts of Funding Council income for research. Underlying this initiative, explicit in the documentation, are assumptions about the benefits of research and teaching taking place alongside each other.

In the eyes of the two English universities, however, the absence of any Government commitment to the teaching:research nexus has been reflected in differential funding arrangements. Since 1986, English universities have received a block grant from the funding bodies within which resources for teaching and research were separately calculated and separately identified. Both English universities saw these arrangements as a key influence on the relationship between teaching and research. On the one hand, the separation of funding encouraged universities to pursue policies which sought to maximise Government funding from the two distinct streams; many universities also pursued internal resource allocation procedures which were strongly influenced by external income flows. It was also emphasised that there was no financial incentive towards the successful integration of teaching and research. On the other hand, academic staff and university officers stressed that such arrangements underlined the importance of effective internal management actively to recognise, promote and reward the interaction of teaching and research.

In Sweden where Government offered more encouragement to the integration of teaching and research, funding of ''education'' (teaching) and research was also separately identified and universities were required to account separately for funding received. However, staff and officers did not see this separation of funding streams as a major issue or as a key challenge to management. The contrast between the attitudes and response of universities in England and Sweden may be explained by

different public and political perceptions. In England, higher education has emerged as a political issue, encouraging Government to intervene more actively and to seek further accountability. By contrast, an officer of the Hogsköleverket summed up the position as follows:

> ''In Sweden, higher education is not a key political issue; it is not high on the political agenda. Government seems generally content with the quality and relevance of higher education; it is not seen as unduly expensive. People accept the role played by the universities; they do not question it.''
> (Interview)

In this atmosphere of compliance, apparent inconsistencies between Government rhetoric and practice relating to the relationship of teaching and research were not seen to be a cause of concern to Government or the reason for a more proactive management response within the institutions.

The response of university management

Having identified a range of ideological and environmental factors influencing the teaching:research nexus at institutional level, it is necessary to consider the response of institutional management. On the basis of the four universities studied, it is possible to distinguish between *passive* and *active management.* Passive management may be viewed in essence as a non-interventionist approach, leaving the main responsibility for interpreting and delivering the teaching:research nexus to individual academic staff. Active management involves a more proactive, interventionist approach by institutional management in the development and assessment of the relationship between teaching and research.

The contrasting styles of institutional management were themselves the result of differences in the balance between different ideological and environmental factors. The preponderance of ideological factors tended to lead to more passive management of the teaching:research nexus. They provided a set of core beliefs and an essential rationale, but they were non-threatening and non-inquisitorial in nature; they assumed and relied on the independence of academic staff in shaping the nature and interaction of their teaching and research. By contrast, the preponderance of environmental factors tended to lead to more active management. Pressure for increasing assessment, accountability and value for money, and the impact of competition and market forces were driving institutions to specialise in particular areas of activity. Such environmental factors worked in several ways, leading Governments and institutions themselves to separate teaching and research and/or forcing universities to justify, defend and enhance the inter-relationship of teaching and research in a proactive way. Thus, environmental factors tended to contribute to active management within the institutions. In England, in particular, it was clear that university management, as well as individual members of staff, believed that the teaching–research nexus was under threat from a range of environmental factors. Their response was an uneasy compromise between replicating and implementing Government policy at institutional level and a proactive pursuit of the interaction of teaching and research.

Passive management

Passive management of research involved the creation of a supportive but non-intrusive working environment. This should not be equated with a ''do nothing'' approach; indeed, creating a supportive working environment is a very positive management objective. However, the approach is passive in the sense that direct institutional control over teaching and research is minimal.

Characteristics of passive management included the following activities.

Curriculum development

In all four universities studied in the project there was a strong assumption by institution managers, including academic managers such as Deans and Heads of Department, that academic staff would look to apply their research activities in shaping curriculum development, both existing programmes and new courses. For academic staff, this assumption was associated with their assertion of individual freedom to develop their own teaching and research interests; this was viewed as a fundamental aspect of academic life. Universities were keen to support this process, looking to exploit research strengths in the development of teaching programmes. Thus, in one of the Swedish universities studied, new courses had been developed at both undergraduate and postgraduate levels in the fields of visualisation and virtual reality, major research strengths of the university concerned (University C). These developments reflected in part an opportunistic response and a desire to secure a competitive market position, but also, in part, an underlying conviction that research and teaching could not and should not exist in isolation from each other. Both English universities also looked to link teaching and research in undertaking new academic developments, including new lines of research and new degree programmes. Even where particular initiatives were funded by teaching or research resources, both universities looked to develop complementary teaching and research activities. For example, in one of the universities, departments seeking authority for new degree programmes were required to demonstrate the integration of research within teaching and this was specifically monitored in ongoing monitoring and evaluation (University B).

The study revealed a wide range of different applications for research in the curriculum, varying from courses based on staff research interests to direct involvement by students within the research process. The universities aimed to create and nurture an atmosphere of enquiry where students would engage with research by asking questions and actively seeking answers. However, the main responsibility for developing the interaction of teaching and research lay with individual members of staff and/or course teams. A characteristic of passive management found in all four universities was the removal of practical obstacles to the teaching:research nexus, leaving the way clear for staff innovation. Examples included the development of organisational structures which encouraged intra- and inter-disciplinary collaborations (including the removal of financial disincentives to the transfer of student load between departments) and the introduction of flexible timetabling with long time periods more suited to in-depth study and research and experimental work.

Stimulation of research

All four universities were aware of pressures towards the stimulation of research for reasons of esteem and status relative to peer group competitors. Whilst they were aware of such pressures, both academic staff and university officers emphasised an equal commitment to teaching and research; both were seen as fundamental to the institutional mission. In Sweden, the universities believed that Government shared this view. In England, where the position of Government was different, the two universities were still looking to exploit the link between teaching and research to mutual and overall benefit. In both universities studied, there was strong resistance to the idea of more active intervention and the creation of either ''teaching-only'' or ''research-only'' units.

In Sweden, in particular, there was a broad acceptance that the stimulation of research activities could benefit teaching. This was not necessarily directed or defined. Rather, there was a general acceptance that resources would be deployed to the overall benefit of all concerned. When staff were able to attract external research funding, it was often possible to redeploy other resources. This could happen at institutional level or within faculties or departments, often to help other strategic priority developments or new subject areas. Some staff expressed concern at such transfers from research to education (teaching), a concern strengthened by a firm conviction that research was under funded; more generally, however, it was acknowledged that facilities developed for research could have a direct benefit on undergraduate students and could broaden their learning experience, especially in science, engineering and medicine.

The four universities in the project all had strong research records. However, all four recognised that different members of staff might be at different stages in their research careers and that individual productivity might vary; it was also recognised that different disciplines were at different stages in their research evolution. For example, some health-related studies, such as Physiotherapy and Nursing, were relatively new to higher education and had not yet acquired a strong research base.

The universities also recognised that the meaning of research would vary between different staff, disciplines and institutions. Colbeck has demonstrated in her research how one university defined research as the scholarship of inquiry (Boyer, 1990) whereas another viewed research as embracing the scholarships of inquiry, integration, application and teaching. She concluded that ''the broader the university definition of what counts for research, the more faculty are able to integrate research and classroom-oriented teaching'' (Colbeck, 1998, pp. 660–661). Thus, the definition adopted in each institution is crucial. In the context of the present project, passive management was intimately associated with a broad view of research, a desire to encourage research in whatever form was deemed appropriate and worthwhile by the staff concerned. Active management, by contrast, was more associated with scrutiny and assessment, and tended to encourage a much narrower view of research; the stimulation of research was more often targeted and associated with clear plans and target outcomes.

Quality and relevance

Whilst passive management is, by definition, non-interventionist, all four universities maintained an active oversight of the quality and relevance of both their teaching

and research activities. In both Swedish universities, staff were appraised regularly on the basis of both teaching and research. The emphasis was on quality assurance and the enhancement of quality on the basis of formative interaction. Similar procedures existed in the two English universities. However, the emphasis was on assessment against formal targets and performance indicators. In one of the English universities, departmental review procedures specifically addressed the inter-relationship of teaching and research as a holistic process; this was a reflective, formative process, underpinned by a strong belief in the mutual benefits of interaction between teaching and research and by a determination that this be translated into academic and management practice (University D).

In both Swedish universities, senior managers emphasised the importance of both teaching and research in securing promotion. It was suggested that, in the past, staff progression had depended primarily on research, but now teaching and research were equally valued; it was not possible to secure promotion on the basis of research alone. The change reflected a growing recognition of the importance of quality and innovation in teaching. Both English universities took account of both teaching and research in considering the initial appointment, probation, progression and promotion of academic staff. Whilst both institutions emphasised the importance of teaching as well as research, many staff took the view that the main factor driving promotion and peer esteem was achievement in research. Significantly, it was not apparent in any of the four universities that the actual integration of teaching and research was a critical factor in the assessment of staff performance; officers in one university were aware of this apparent shortcoming given the institutional commitment to the teaching:research nexus but felt unable to develop effective criteria with which to monitor staff performance (University C).

Active management

Active management meant that the universities to varying degrees sought to intervene in the development of teaching and research in order to ensure compliance with, or fulfilment of, institutional objectives.

Those universities which pursued the active management of the teaching:research nexus tended to work in three vital areas of activity (management tools):

Strategic and operational planning

The interaction of teaching and research occupied a central, very explicit position within the strategic planning of both English universities. The mission statement of University C refers to ''a research-led institution in which teaching and learning take place in an active research environment'' and the equivalent document from University D indicated that it would ''strive to enhance its position as a leading research and teaching institution cultivating the synergy between research and teaching.'' Clearly, both universities felt a need to assert in forceful terms their commitment to the teaching:research nexus as a crucial foundation for their planning activities.

Whilst both English universities emphasised the links between teaching and research, in their operational planning they both felt compelled to develop distinct strategies for teaching and research. In part, this reflected external pressures

(especially the requirement of the HEFCE for teaching and learning strategies and the importance attached to preparation for the Research Assessment Exercise). In part, it reflected internal management procedures. Both universities had senior officers (Pro or Deputy Vice-Chancellors) designated for teaching and learning or for research, either explicitly titled or holding a recognised ''sphere of influence'', and had separate administrative departments concerned with, for example, teaching support or teaching quality, or research support in technology transfer and the exploitation of research. It was not clear whether the co-ordination and day-to-day interaction of these operational units reflected the institutional commitment to the integration of teaching and research; in both universities, officers acknowledged that new developments in either teaching or research were often initiated in isolation. Both universities took the view that this did not diminish the overall university commitment, but also conceded that this was an area where there was considerable room for improvement. It was suggested that ''in the end, the relationship between teaching and research is confirmed at departmental level and through the work of individual staff (University C). Thus, active management at university level commonly translated itself into practical separation of teaching and research, and included the positive leadership and direction of both areas of activity; target setting and selectivity in the pursuit of research were both commonplace.

The two Swedish universities adopted a very different management approach. One of the Swedish universities (University B) had an overall corporate strategy, which emphasised the importance of both teaching and research. The strategy did not speak in terms of the integration of teaching and research, and did not contain clear targets for either area of activity. Operational planning was left to individual faculties and departments. The University did not possess specific written strategies for research or for teaching and learning at institutional or faculty levels. In the course of interviews with senior managers, it was clear that they felt no need to develop specific institutional plans for teaching and research; instead, their emphasis was on more specific project planning and on the response of individuals to broad guidelines set out at University level. Thus, the University did not advocate the separation of teaching and research in its formal planning procedures. At the same time, however, the University did not actively promote the integration of teaching and research; this was taken for granted and did not require a more interventionist approach. For some senior managers, the explanation, justification, development and planning of the relationship between teaching and research were seen as the business of individual academic staff, an area within which it was inappropriate for the University to intervene; for others, the relationship was simply accepted and did not require further scrutiny. Passive management, therefore, was characterised by a non-interventionist approach on the part of senior managers.

Resource allocation

The two English universities studied had very different resource allocation models, one based on historical expenditure patterns and the other based on income flows. However, in both cases, resource allocation at University level was based on separate funding of teaching and research in academic budgetary groups. Both universities monitored income for teaching and research separately and were acutely aware of changes in income flows and changes between departments, and of comparative

information studying the position of departments in other universities. In both universities, resource streams for teaching and research effectively merged again within departments and especially in expenditure on staffing, with considerable final responsibility resting with Heads of Department. Active management of the teaching:research nexus was therefore characterised by separation of income flows and by strenuous efforts to maximise income flows for all areas of activity, to be utilised either separately for teaching and research or jointly within a managed process. Active management was also closely associated with transparency and increasing accountability. In England active steps have been taken through the Transparency Renew and the development of transparent approach to costing (TRAC) methodologies, to unravel the cross-subsidisation between teaching and research funding. Such moves have been stimulated by concerns regarding the under-funding of higher education, but they also compel a proactive approach by university management, especially if the interaction between teaching and research is to be maintained.

The universities in Sweden followed a different approach. At university level, there were broad expectations about the commitment of resources for teaching and research which would be varied by income generation, but there was little sense of the competition for funding between institutions and between departments, and between teaching and research which characterised more active management of teaching and research. A key role was exercised by the Head of Department to negotiate with individual staff regarding the balance between teaching and research, with relatively little involvement from senior university managers.

Staff development

The third key activity which characterises active management of teaching and research is a major concern with staff development. Higher education managers emphasised that the delivery of teaching and research relied on the quality of academic staff and therefore needed to be promoted through active staff training and career development programmes. Both English universities had well established policies for the support of newly appointed academic staff, including adjusted workloads and monitoring, and for the continued appraisal of staff; training programmes included many areas of teaching and research. Staff performance in both teaching and research were regularly maintained, although both universities recognised that training and performance tended to emphasise teaching and research as separate rather than integrated activities. Academic staff emphasised the pressures they felt; one academic commented that ''there is no hiding place'' (University A). Most staff attributed these pressures to the effect of external assessment, especially the Research Assessment Exercise, which prompted universities to manage staff development in a proactive way.

Active management placed a strong emphasis on human resource development. The two English universities saw professional training and career rewards as key tools in the stimulation of the teaching:research nexus. It was less clear that current provision reflected these aspirations, but the intention was strongly expressed.

There were clear differences in attitudes and practice between the two English universities and the two Swedish universities in the study. In Sweden, staff training programmes were less well developed and staff performance was much less of an

issue. In fact, several academic staff expressed concern that the absence of strong management meant that poor performance could be tolerated; the emphasis lay with the Head of Department, commonly a colleague of many years, rather than with University management, leading to acceptance of staff weaknesses.

Conclusion

This paper has attempted to identify the main factors influencing the institutional management of teaching and research. Key concepts have been developed, including the identification of ideological factors and environmental factors and their subsequent translation into passive management and active management, with contrasting approaches to the organisation and character of academic life. These conclusions may be summarised and brought together to form a conceptual model to describe policy and management of the teaching:research nexus (Fig. 1).

Teaching and research remain central to higher education. In the present study, among academic staff in all four universities there was a powerful reaffirmation of traditional views of the teaching:research nexus. Staff argued strongly that there were mutual benefits between teaching and research which impacted upon the quality, relevance and delivery of teaching; the positive benefits of teaching on research were less well articulated, but were nonetheless felt to exist. However, the study also revealed very significant differences between institutions in how the relationship between teaching and research was articulated and managed. To summarise, in England, external pressures towards institutional competition, separate assessment and funding of teaching and research, and explicit Government scepticism towards higher education had forced universities to justify and defend their teaching and research activities and the inter-relationship between them, thereby requiring the development of proactive management of teaching and research, and of the teaching:research nexus. By contrast, in Sweden, with a more favourable, sympathetic external environment, the predominant drivers were ideological. As a result, universities felt less requirement to apply the same interventionist management procedures. Active management meant the vigorous involvement at university

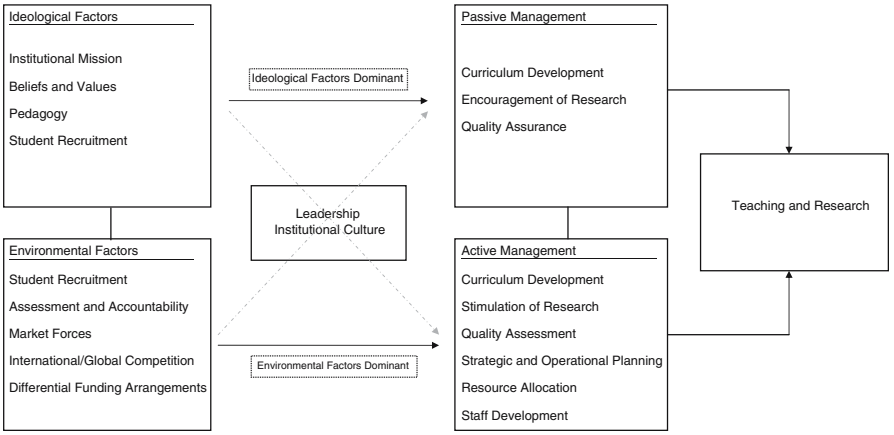

Fig. 1 The teaching–research nexus: a model for institutional management

level of senior officers, including both academic and non-academic managers, in shaping the research activity through planning, funding and staff development. Passive management emphasised the role of individual member of staff in the evolution of their teaching and research, possibly influenced by interaction with colleagues and their Head of Department.

In practice, the weighting attached to different factors varied between the four universities studied and will inevitably vary across other institutions. Similarly, the study did not aim to assess the extent to which academic staff sought to link their teaching and research or to establish a grounded theory covering the relationship between institutional management and the actual delivery of teaching and research by academic staff. That would be an important future line of research. However, more modestly, it is suggested that the model proposed in this paper will offer a new conceptual framework within which the management response of individual institutions can be analysed.

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