

A Guide to the
Research Evidence on
Teaching-Research Relations

Alan Jenkins



Author biography

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With colleagues at Oxford Brookes University, he has researched undergraduate and postgraduate views of (staff) research. They – Alan Jenkins, Rosanna Breen and Roger Lindsay (and Angela Brew of Sydney University) – published, in 2003, *Re-shaping Higher Education: Linking Teaching and Research* (SEDA: Routledge Falmer: <http://www.tandf.co.uk/books>).

He is adviser to the Fund for the Development of Teaching and Learning (FDTL) project Link: Linking teaching with research and consultancy in Built Environment Disciplines. (2000–04) <http://www.brookes.ac.uk/schools/planning/LTRC>. As part of that project, he has researched, with Bridget Durning, how issues of departmental and disciplinary cultures, and department organisation, shape teaching-research relations.

He directed a Learning and Teaching Support Network (LTSN) Generic Centre (now part of the Higher Education Academy) project (2002–3) *Linking Teaching and Research in the Disciplines*. As part of this project, he and Roger Zetter, Director of Project Link, wrote *Linking Teaching and Research in Departments*, York, LTSN Generic Centre.

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www.heacademy.ac.uk/resources.asp.

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Foreword

This Guide provides an up-to-date snapshot of research evidence on the relationships between research and teaching. It focuses on one of the three facets of this relationship – how discipline-based research impacts teaching practice and student learning. It is not concerned with research into teaching and learning (pedagogic research, action research and the like) nor with the application of the outcomes of educational research to teaching practice.

The question of whether and how discipline-based research impacts on teaching, and how this relationship may change with disciplinary, institutional or policy contexts, is, of course, highly relevant to a number of current higher education strategy concerns and developments. Certainly some of the publications and pronouncements in this area are based more on rhetoric, or on partial perspectives, than on a balanced overview. However, it is clear from Alan Jenkins' review that the nature of the relationships between research and teaching, whether direct and indirect, is complex and only partially understood. Professor Jenkins takes a wide-ranging, evidence-informed and dispassionate approach to the relationship.

I hope that the Guide will assist policy-makers, academics and managers in carrying forward informed discussion and decision-making.

The Academy would appreciate any comments or suggestions that arise from this Guide. These should be addressed to me in the first instance.

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Introduction

'I think it would be fair to state that there was a selection of evidence to support a conclusion', he said. 'I fear we got into a position in which the intelligence was not being used to inform and shape policy, but to shape policy that was already settled'.

'Cook doubts Saddam threat'. Robin Cook, MP, giving evidence on UK policy concerning Iraq to the Foreign Affairs Select Committee. Reported in the (UK) Guardian by Mathew Tempest, June 18, 2003.

<http://politics.guardian.co.uk/iraq/story/0,12956,979260,00.html>

'It seems entirely plausible that heavy involvement in research and publication, at least for some academic staff and departments, takes time and effort away from teaching undergraduates. However it is crucial to understand that the present evidence in no way refutes the proposition that the continuing study of and intellectual curiosity about a subject is necessary for effective teaching. Our results indicate that the simple model of more research, therefore better teaching is suspect' (Ramsden and Moses, 1992, pp.292-3).

Background

This report provides a guide to, and summary of the research literature on teaching-research relations. The immediate purpose is to enable informed discussion within institutions and nationally (in the UK) as to whether effective teaching is dependent on staff, departments and institutions being involved in discipline-based research. However, it is also aimed at academic staff and

policy makers in other national higher education systems since the issues it analyses and the policies it seeks to inform are international, as is the research evidence.

The sole focus is on the effect of staff involvement in research on the discipline *per se*, not on the impact of pedagogic research or research into higher education, whether or not discipline-based. It also does not consider in any detail the considerable amount of (scholarly) literature. What it does do is first, to set out the UK policy context and some of the 'classical' statements on the importance of the teaching-research nexus, and then focus on the primary or discovery research evidence as to the existence and value of the close connections between staff research and student learning. In that context, it considers the extent and possible variations in teaching-research relations in the disciplines – an issue of particular importance to the Higher Education Academy Subject Centre Network (previously Learning and Teaching Support Network Subject Centres).

Clearly, others could analyse the research evidence with different purposes from my focus on teaching effectiveness or teaching quality, including what are the circumstances that create quality research. Here, the sole concern is on how staff involvement in research might shape quality or effective teaching – and note that the issue of what is 'quality' or 'effective' teaching is left implicit.

A parallel review and a different perspective

Just as this publication was to go to press, the UK Government department responsible for higher education, the Department for Education and Skills (DfES), published its own commissioned analysis of the research evidence (Zaman, 2004).

Clearly, the immediate context was the review of UK higher education policy, in particular whether, and the extent to which, universities need be involved in research to support student learning (see page 7).

Zaman is a specialist in econometrics, and his approach is a very positivistic quantitative analysis. His objective is to review 'the empirical academic evidence on the link between teaching and research in higher education. The findings of the most reliable studies are highlighted, and future research directions are suggested' (Zaman, 2004, p.4). He concludes that:

'... the evidence gathered for this document suggests that research and quality teaching are not contradictory roles. However, we cannot conclude from the information at hand that the link is strongly positive. The evidence indicates the relationship may be modestly positive, though it is likely to be stronger at postgraduate than undergraduate levels. The overall quality of the statistical analyses on which these conclusions are based is not high' (Zaman, 2004, p.5).

The final version of this current report paper has benefited from Zaman's econometric analysis, and his identification of a number of studies I had not previously discovered. However, in my view it is a decidedly flawed review because of the narrowness of its perspective, its preoccupation with quantitative research methodologies, and the failure to really consider organisational and cultural issues. Key research and policy areas that have been analysed through largely qualitative methodologies are ignored – for example, how departmental and institutional cultures and organisation, and how national funding and policy effect teaching-research relations are not adequately analysed. I do hope that what the

publication states is true: 'The views expressed in this report are the author's and do not necessarily reflect those of the Department for Education and Skills'. However, I commend Zaman's report as an alternative and an additional view to the interpretation offered here.

Preamble: a chronological and thematic perspective

I have organised this review by considering a range of themes, using the following crude chronological perspective:

- In the 1970s and 1980s there were a large number of studies, generally statistical, analysing relationships between teaching and research quality, usually at the level of the individual academic. Much of this work was conducted in North America.
- That narrow statistical approach has since been criticised for failing to focus on the extent to which the substantive processes of teaching and research may be shared, and for failing to consider the particular institutional contexts. Brew and Boud (1995), in a review of the then research evidence, criticised the emphasis on statistical correlation studies and called for more fine-grained studies focused on how academics experience teaching and research. They hypothesise that 'if there is a link between the two, it operates through that which teaching and research have in common; both are concerned with the act of learning' (Brew and Boud, 1995, p.261).
- To an extent, subsequent work has (consciously) built on this perspective by using a wider range of research methodologies, both qualitative and quantitative, and by examining a wider range of research and institutional settings.
- In the USA, and then in the UK, research has examined the impacts of research selectivity – and funding for research and teaching – on institutional priorities regarding teaching and research and on teaching-research relations.
- Recently, a range of new research areas have developed, including how issues of departmental and institutional structures, cultures and policies shape teaching-research relations, and how the

character of disciplines, and their conceptions of knowledge and forms of research, impact on teaching-research relations.

- In short, we now know, if we did not know before, that the issues are complex and multilayered. Indeed, we may have to move away from seeing or disputing a single teaching-research nexus, and develop our understanding of the diverse and heterogeneous ways in which teaching and research are linked or not. As Brew (2001, p.21) states, research is a complex phenomenon. Adding the complexities of teaching and its relation to research significantly increases that complexity.

You may want now to read my conclusions on the research evidence: if so, go to the conclusions on page 30. Otherwise, proceed through the guide and draw out your own overall conclusions.

Scholarship: the missing link between teaching and research?

There is a linked and high-level scholarly literature on the nature of the university in the context of changes in society; in particular what is the nature of the university in the context of mass higher education, and how do governments see research and higher education as part of the knowledge economy? Particularly significant here is the work of Ernest Boyer and Ron Barnett, and their opening up of discussions on *scholarship* and the nature of knowledge universities need to support in their academic staff and students.

Boyer, then President of the US Carnegie Association for the Advancement of Teaching, in his book *Scholarship Reconsidered* (Boyer 1990), challenged US higher education to 'break away out of the tired old teaching versus research debate'. Boyer developed the role of scholarship as bridging teaching and research, and saw the work of the university and its staff as demonstrating four scholarships: of *discovery*, of *integration*, of *application* (or - now often - *engagement*) and *teaching*.

Many have since developed Boyer's ideas, in particular his limited but seminal discussion of the *scholarship of teaching* (for example, Glassick, Huber and Maerof, 1997). Examples are the review of these ideas in the context of UK higher education by Gordon *et al.* (2003), and Brown's (2004) setting out of his view of what contemporary research and scholarship tells us about research-teaching relations.

As to wider discussions on the nature of universities in contemporary society, Barnett (2003) most graphically notes that 'the twentieth century saw the university change from a site in which teaching and research stood in a reasonably comfortable relationship with each other to one in which they became mutually antagonistic' (p.157). This work on scholarship and the nature of the university is

thus important in shaping wider discussions on teaching-research relations. But to repeat: in this publication our focus is on the primary research evidence.

The case of the UK 2003 White Paper: *The Future of Higher Education*¹

The UK Government's 2003 White Paper, *The Future of Higher Education*, makes claims concerning research evidence on teaching-research relations, which are used to contribute to its case for teaching-only institutions. The White Paper argues that good teaching is not necessarily based on staff involvement in cutting edge research, and this assertion has been repeated by ministers on a number of occasions. The key section (4.31) states:

'At present, the *University* title is reserved for institutions that have the power to award both taught degrees and research degrees. The right to award research degrees requires that the institution demonstrate its strength in research. This situation is at odds with our belief that institutions should play to diverse strengths, and that excellent teaching is, in itself, a core mission for a university [...] *It is clear that good scholarship, in the sense of remaining aware of the latest research and thinking within a subject, is essential for good teaching, but not that it is necessary to be active in cutting-edge research to be an excellent teacher.* [emphasis added]

This is borne out by a number of studies undertaken over the last ten years. A report in the mid 1990s looked at 58 studies which contained ratings of both research and teaching, and found no relationship between the two (Hattie and Marsh, 1996). More recently, a report to HEFCE in 2000, involving contributions from more than 40 universities and colleges, concluded that not every teacher needs to be engaged in 'research' as a narrowly defined activity but might be expected to engage in scholarship to inform their work as teachers' (Higher Education Funding Council for England, 2000).

Ministerial statements on this topic include the following. On the link between research and teaching, Margaret Hodge (then Minister for Higher Education) said that both she and the Education Secretary, Charles Clarke, 'still need to be convinced'. She added: 'A good teacher needs good scholarship but I cannot see an inextricable link with being engaged in cutting edge research and being good at teaching' ('Hodge stands firm over research funding.' Reported in the (UK) Education Guardian by Donald Macleod, April 30, 2003).

<http://education.guardian.co.uk/higher/news/story/0,9830,946780,00.html>

¹ <http://www.dfes.gov.uk/highereducation/hestrategy>

Statements of belief on the importance of teaching-research connections

This guide is to the primary research evidence. However; it is important to set this in the context of what influential people and reports believe should be the case, for then one can see if the research evidence suggests whether that is being achieved.

A UK perspective: Robbins Report, 1963

The Robbins Report on the then future of higher education in the UK (1963) argued that university staff should both teach and carry out research on the grounds that:

'the element of partnership between teacher and taught in a common pursuit of knowledge and understanding, present to some extent in all education, should become the dominant element as the pupil matures [...] It is of the utmost importance that the ablest, who are capable of going forward to original work, should be infected at their first entry to higher education with a sense of the potential of their studies' (Committee on Higher Education, 1963, para 555).

A UK perspective: Universities UK, 2002

'It is clear that although there is substantial differentiation, all higher education institutions benefit from the vital interdependence of teaching and research. Government needs to understand the damage that would follow an irrevocable split between teaching and research. Teaching benefits greatly from the support of research work and many of the best teachers are attracted to universities by research opportunities. Every institution needs excellent teachers who are at the forefront of the latest knowledge and developments in their fields [...] Teaching and

research are mutually supportive and intertwined activities [...] It is important also that we do not create a second tier of universities at a time when we are involved in setting up the European Higher Education Area and European Research Area. According to the European University Association, the power to award PhDs is the defining characteristic of a European university' (p.5).

A US perspective

The American scholar Burton Clark (1997) argued that research activity can and does serve as an important mode of teaching and a valuable means of learning. He further argues that 'student involvement in research is an efficacious way to educate throughout the education system the great mass of students, as well as the elite performers, for the inquiring society into which we are rapidly moving' (p.242).

A New Zealand perspective

The New Zealand Education Amendment Act of 1990 identified five characteristics of a university, including that at universities '*research and teaching are closely interdependent* and most of their teaching is done by people who are active in advancing knowledge'. The Act also states that a degree is a qualification awarded following a course of advanced learning that is *taught mainly by people engaged in research* (Cited in Woodhouse, 1998, p.41). [emphasis added]

Research studies at the level of the individual academic

As we now look at the research evidence, we will see, as stated in the preamble, that researchers have looked at these issues with respect to a range of levels: the individual academic, the department, the institution and the national system. We start at the individual level.

Statistical studies of research and teaching quality

At the level of the individual academic, there have been a large number of studies that have considered the relationship between research *quality* (generally measured by number or level of publications) and *teaching effectiveness* (generally measured by student evaluations of that individual's teaching). (But note the work by Astin, 1993, that focuses on what is surely more significant – student cognitive development.) Most of these studies have been done in the USA. These studies include the work by Hattie and Marsh that featured so strongly in the UK White Paper (see page 7), and emergent themes include the following.

An enduring myth. 'That good teachers are good researchers is a myth; at best, the association between ratings of undergraduate instruction and scholarly productivity is a small and positive one, with correlations in the 0.10 to 0.16 range' (Terenzini and Pascarella, 1994, pp.28-32).

Teaching and research are loosely coupled. In a meta-analysis of these correlational studies of university academics, Hattie and Marsh (1996) considered 58 research articles contributing 498 correlations and found that the overall correlation was 0.06. 'Based on this review we concluded that the common belief that teaching and research were inextricably intertwined is an enduring myth. *At best teaching and research are very loosely coupled*' (Hattie and Marsh, 1996, p.529). [emphasis added]

No simple functional relationship. Ramsden and Moses (1992), in a large-scale Australian study, researched teaching-research relationships at the level of the individual and at the level of the department across all subject areas in a range of institutions. Two research indexes (weighted number of publications, and number of research activities) were used. Scores on a Likert-type scale of commitment to teaching undergraduate students formed the main criterion of teaching effectiveness. This was supplemented by student ratings. They concluded that 'there is no evidence in these results to indicate the existence of a simple functional relationship between high research output and the effectiveness of undergraduate teaching'. However they also concluded that: 'It seems entirely plausible that heavy involvement in research and publication, at least for some academic staff and departments, takes time and effort away from teaching undergraduates. However it is crucial to understand that the present evidence in no way refutes the proposition that the continuing study of and intellectual curiosity about a subject is necessary for effective teaching. Our results indicate that the simple model of more research, therefore better teaching is suspect' (Ramsden and Moses, 1992, pp.292-3).

Student dissatisfaction. Astin (1993) and Astin and Chang (1995), in a study of 200 US four-year undergraduate colleges using sophisticated measures of student development, concluded that: 'a college whose faculty is research-orientated increases student dissatisfaction and impacts negatively on most measures of cognitive and affective development' (Astin, 1993, p.363). The few institutions in this study that scored high on both 'teaching' and 'research' were a few rich, private colleges.

Teaching and research orientations. Some research studies demonstrate that for many staff their

motivation and commitment to academic life is strongly, and in many cases predominantly concerned with supporting student learning (Boyer, 1990; Ramsden, 1998). Such research also indicates that staff interests and motivations concerning research and teaching may change during a career and are shaped by perceptions of the reward system. Though here the research may be criticised for seeing teaching and research as separate categories, and for not sufficiently exploring how staff motivations or orientations are concerned with supporting student understanding of research knowledge and complexity. However, related research (see Ramsden, 1998) shows how most research-based publications are written by a limited proportion of university academics.

Academic identity. Henkel (2000, 2003) demonstrates the importance of the nexus to many staff's academic identity. She also points to key disciplinary variations in how staff see teaching-research relations – see the section on disciplines on page 17. Between 1994 and 1997, in a detailed interview-based study of seven disciplines and eleven English institutions (seven pre-1992 and four post-1992 institutions), Henkel (2003) shows that while wider national and institutional policies were questioning the nexus:

'Academics are the strongest exponents of the argument that research and teaching are central to their work [...] Not all academics, it must be said, regard the relationship between teaching and research as intrinsic, even if they see it as functionally complementary. Some regard themselves as essentially either researchers or teachers [...] The pressures to separate research from teaching manifestly affected scientists in our study [...] interviews with scientists across a wide spectrum of universities [...] made it clear that exposure to active researchers and the involvement of students in projects generated

from their research were still seen as basic features of undergraduate education.

Undergraduates needed to experience research at first hand. Academics in the humanities and the social sciences tended to describe the research-teaching relationship in more complex and varied terms, with differing emphases on what Neumann (1994) calls the *tangible* and the *intangible* aspects of the research-teaching relationship. The *tangible* aspects are those in which transmission of new knowledge and research skills or techniques occurs and the *intangible*, those in which transmission of understanding of and approaches and attitudes to knowledge takes place' (p.3).

Conceptions of teaching and of research. A current strand in the research on teaching-research relations is to investigate how individual staff see teaching and research. Brew's (2001 and 2003) phenomenographic research of leading researchers at a major Australian university concluded that:

'When research and teaching are both viewed as founded on a traditional empiricist framework, the relationship is always problematic [...] If, on the other hand, knowledge is seen as product of communication and negotiation, the links between research and teaching are quite different [...] A move towards a more pluralistic view of knowledge which fully takes on board the interpretive nature of academic work [...] means that research and teaching can be viewed as being in symbiotic relationship' (Brew, 2001, p.150).

For Brew (2003, p.12), bringing teaching and research together centrally involves developing 'a conception of teaching as being student focused, and concentrating on conceptual change'.

Relatedly, there is strong research evidence that

individual academics do have different conceptions of teaching: one key research strand has demonstrated clear differences between teachers with information transmission conceptions and practices of teaching and those with student change models (Prosser and Trigwell, 1999).

Conclusions at the individual level

- At the level of the individual member of staff, the simple models of staff who are heavily productive in research outputs being the most effective teachers, or that high productivity in research results in effective teaching, are clearly suspect.
- However, that does not tell us the extent to which staff involvement in research (and what types of research) is necessary or important for effective teaching. Nor does it help us to differentiate between the types and levels of knowledge necessary for effective teaching in different disciplines, types of institutions or perhaps, most of all, levels of the curriculum – such as ‘introductory year one courses’. Perhaps we can make informed judgments on these and other issues from reflections on practice, but that is not research evidence.
- For many staff – but certainly not all – their motivations to work in higher education are shaped by strong values of the importance of a teaching-research nexus, though there seem significant disciplinary differences in this belief.
- How academics conceive teaching and research may be central to understanding the relationships and how they might be linked; but this research is at an early stage.

Hattie and Marsh revisited: the key research evidence in the White Paper reconsidered

As the UK 2003 White Paper makes much of the Hattie and Marsh (1996) evidence (see page 7), this merits further elaboration as this is the research which is most used by policy makers. This is a tribute to that research; but it is also very clear that this research is often misinterpreted and used to argue policy positions justifying teaching-research separation. As we will see, that is not the policy conclusion Hattie and Marsh themselves make from their studies.

The 1996 study is a meta-analysis, a rigorous re-analysis of previously published studies, pulling out overall conclusions from these separately conducted primary research studies. To repeat, many are US-based, reflecting the availability of comparative student evaluation data. Most are from the 1970s and 1980s.

The White Paper fails to point out that some scholars of teaching-research relations point to the often 'crude' summary measures in the original studies (before analysis by Hattie and Marsh) to measure teaching effectiveness. Thus few of these studies look at or differentiate the levels and types of staff knowledge needed, say, to teach a large introductory course and a graduate seminar. The measurement of teaching quality in many of these research studies is reduced to a single metric.

In that connection, many scholars and researchers in this area would question whether these original research studies, and Hattie and Marsh's overall conclusion, of 'an enduring myth', reflect the organisational culture of much of US higher education, with perhaps its 'publish or perish' culture – so unlike the contemporary UK one! Imagine a parallel academic universe where staff are rewarded individually and collectively for effective teaching-research links: what would research then indicate? Of course we do not know, but for some of us it is an important

question that is seldom asked – though Hattie and Marsh do. (See further on in this section and in discussions of institutional policies on page 20.)

Certainly what was reported in the UK White Paper was, at best, selective. Hattie and Marsh drew a fuller and far more complex conclusion; and derived from their study very different policies than did the UK 2003 White Paper. Hattie and Marsh in their 1996 study argued:

'Based on this review we concluded that the common belief that teaching and research were inextricably intertwined is an enduring myth. At best teaching and research are very loosely coupled [...] *The strongest policy claim that derives from this meta analysis is that universities need to set as a mission goal the improvement of the nexus between research and teaching. The goal should not be publish or perish, or teach or impeach, but we beseech you to publish and teach effectively. The aim is to increase the circumstances in which teaching and research have occasion to meet, and to provide rewards not only for better teaching or for better research but for demonstrations of the integration between teaching and research [...]*

Examples of strategies to increase the relationship between teaching and research include the following: Increase the skills of staff to teach, emphasising the construction of knowledge by students rather than the imparting of knowledge by instructors [...] develop strategies across all disciplines that emphasise the uncertainty of the task and strategies within the disciplines [...] ensure that students experience the process of artistic and scientific productivity' (Hattie and Marsh, 1996, pp. 529, 533 and 544). [emphasis added]

Marsh and Hattie developed

However, the White Paper did not refer to recent work by Marsh and Hattie (2002). This would, in effect, have reinforced the UK Government's conclusion that teaching and research could be separated. The 2002 primary research by Marsh and Hattie – 'at a large urban university in Australia that has both teaching and research orientations' – studied at the level of the individual academic measures of research and teaching quality, and staff self-reports of ability and commitment to teaching and research. This research further confirmed their view that 'teaching effectiveness and research productivity are nearly uncorrelated, thus supporting the hypothesis that they are independent constructs' (Marsh and Hattie, 2002, p.35).

Hattie and Marsh criticise the UK White Paper *et al.*

Hattie and Marsh have commented critically on how their work has been misinterpreted in policy documents (and in effect other reviews of the research evidence). Given the importance of the issue, there follows a full quotation from their latest discussion of their findings:

'Overall, we have consistently found that there is a zero relationship between teaching and research at the individual academic level and at the department level. The greatest misinterpretation and misrepresentation of this overall finding is that it leads to the conclusion that research and teaching should be separated for funding purposes. This conclusion could meaningfully be made IF the correlation was negative, but it is not. Zero means that there can be as many excellent teachers AND researchers as there are excellent teachers, excellent researchers, and not-so-

excellent teachers or researchers. Zero does not mean that there are NO excellent teachers AND researchers. It could be claimed that universities have survived with a zero relationship, but that does NOT mean that all academics within those institutions are EITHER researchers OR teachers. The fundamental issue is what we WISH the relation to be, and then we need to devise policies to enact this wish. If we wish to separate teaching and research, this should be based on such a Mission, and a zero or positive correlation is immaterial to this Mission, except to demonstrate that there already are many excellent teachers AND researchers etc. (Indeed, it may be necessary to uncouple those who have research and teaching entwined!) It is reasonable to make a policy decision to separate funding or job descriptions but this can be done even if the correlation is perfect, zero, or negative. Such a policy decision is more a function of where the system wishes to go. Further, our research (so far) has been at the individual and the Departmental level, and we have not surveyed or commented on the relationship between teaching and research at the University level' (Hattie and Marsh, 2004, p.1).

'We note that the UK White Paper on Higher Education quoted a systematic literature review by Hattie and Marsh to support their argument that research was not necessary for high quality teaching in higher education. But this conclusion could only be made IF the research was based at the Institution level, and certainly it misinterprets what a correlation of zero means. We have been careful to disentangle the various levels of analysis – the academic, the department, and the University' (Hattie and Marsh, 2004, p.7).

Research at the departmental level

Research at the departmental level: the case of RAE/TQA, and issues of departmental policy

While much of the research has been at the level of the individual academic, another strand of research has analysed teaching-research relations at the level of the academic department. Clearly this is a particularly important level, for here is where staff roles are generally organised, and this is the level that probably has greatest impact on student learning.

UK: RAE and TQA correlations. In the UK, there are strong positive correlations at a subject or department level between separate external national ratings of departments for teaching and for research – the Research Assessment Exercise (RAE) grades and Teaching Quality Assurance/Quality Assurance Agency (TQA/QAA) ratings. This is often commented upon (for example, Cooke, 1998; Ellis, 2001; Johnston, 1996) and used to argue that good teaching is functionally dependent on high-quality research by staff in that department. (The reverse – that quality research is dependent on quality teaching – is less often argued.) However, many would suggest that TQA/QAA grades in part reflect higher levels of resources in research-based institutions or departments and external perceptions of reputation forged in large measure through research reputation. Even here, there are significant examples of departments which scored high on TQA and low on RAE (HEFCE, 1995; Hughes and Tight, 1995). There has been limited primary research on this issue, which is surprising given its salience to policy. A study by Entwistle (1995) in Scotland indicated that teaching quality assessors rated some departments as 'excellent' where they also noted that 'unimaginative teaching' prevailed. A comprehensive statistical analysis by Drennan and Beck (2001) clearly

points to the positive effects on TQA scores of the 'academic standards' of entering students, and levels of spending on computers and libraries – which, of course, say nothing directly about the impact of research on student learning. This research reinforces – if not proving a causal relation – the view that institutional research prestige, age of institution and resources is giving 'halo effects' to perceived teaching quality. However, some might ask why the UK Government in shaping policy used Hattie and Marsh's data/research and totally ignored the data on RAE/TQA correlations. (Note there is further discussion of the impact of the RAE in the section on the evidence concerning national systems on page 25.) Perhaps, though, the interpretation of what is limited research evidence reflects my position in a non-research-intensive institution. Certainly it is important to restate how limited the primary research is on this issue.

No simple functional relationship. Ramsden and Moses (1992), in a large Australian research study, analysed the teaching-research relationships at the level of the individual and at the level of the department across all subject areas. They concluded that 'there is no evidence in these results to indicate the existence of a simple functional relationship between high research output and the effectiveness of undergraduate teaching' (p.273). However, they then go on to state that their study 'in no way refutes the proposition that the continuing study of and intellectual curiosity about a subject is necessary for effective teaching. Our results indicate that the simple model of more research, therefore better teaching is suspect' (pp.292-3).

Intellectual currency. Rowland (1996) interviewed Heads of Department at the University of Sheffield (UK) about their views of teaching-research relations. Rowland's respondents saw the

connections as being particularly important in ensuring intellectual currency of courses – particularly, but not exclusively, at postgraduate level. They also perceived the connections as being stronger in those staff whose teaching demonstrated an interactive approach, and in particular those who conceived knowledge and research as being tentative and open to interpretation. (See page 17, and in particular the work of Angela Brew.) Whilst there may be issues of self-interest in Heads emphasising the value of research, given its currency in departmental and institutional reputation, it can also be argued that they have in certain ways a more informed and sophisticated view as to what is teaching 'quality', than is obtained by the many student questionnaire studies.

Complexity and the role of policies. Colbeck (1998) sought to move beyond much of the previous research which treated research and teaching as separate categories. The behaviour and roles of some twelve academics were studied in detail, amongst other things seeking to understand how 'university, departmental and disciplinary contexts influence the ways and extent to which faculty integrate teaching and research' (Colbeck, 1998, p.649). The staff studied were in contrasting disciplines – Physics and English – in two very different US institutions, with fictitious names: *Vantage University*, a high prestige research university (a 'Research University 1', according to the Carnegie classification) and *Cosmopolitan University*, a 'Masters University 1'.

Paradoxically, staff in the less well resourced comprehensive university found it easier in one respect to link their teaching and research. At Vantage University, 'research' for faculty evaluation was narrowly (or some would say precisely) interpreted to mean standing as an original researcher amongst peers in the discipline. By

contrast, at Cosmopolitan University faculty evaluation for 'research' included the writing of textbooks and creative works in the popular media. Colbeck (1998, p.661) draws a strong contrast between two physicists. Of her sample of twelve staff, the person who demonstrated the strongest integration between their teaching and research roles was a physicist at Cosmopolitan University 'whose research involved writing an introductory textbook incorporating new pedagogical techniques'. By contrast, at Vantage University a physicist who previously had written an acclaimed computer aided physics course text had declined to write a follow-up because he knew his 'department colleagues would not recognise the value of such a project'.

Organisational issues revisited. Recent research studies have further examined issues of department organisation. Coate *et al.* (2001, p.162), in a study of departmental organisation in the UK, showed that departmental managers found that 'it is more convenient for teaching and research activities to be treated as separate activities. On an academic level, however, managers would rather perceive the two to be synergistic'. In a study of Built Environment departments in four UK post-1992 universities, Durning and Jenkins (forthcoming) showed how issues of department organisation and culture – in particular the effective policy separation between teaching and research, and the failure to effectively ask how they can be linked – resulted in failure to support staff to achieve potential synergies between these activities.

Conclusions at the departmental level

- In the UK, while there are strong positive correlations between national research and teaching rating scores, this may reflect the greater

resources of the research-rich institutions, and perhaps a 'halo effect' of research reputation on the quality of incoming students and the judgments of external reviewers. It is clear from research in the UK and in Australia that there is not a simple functional relationship at a department level between quality in research and quality in teaching.

- Within departments and institutions, teaching and research are now often organised separately; and perhaps limited thought or explicit policies are given to how they might be linked.
- Given that it is at departmental level that disciplines are mainly organised for teaching and for research, the variations in the nature of the nexus by disciplines indicate that there may well be important variations between departments in how teaching-research relations are conceptualised and delivered. (Also see research on disciplines on page 17.)

Research on disciplines

One of the central research themes in recent years has been the extent and nature of how teaching-research relations are shaped by disciplines. As academic disciplines are generally organised in institutions at department level, some of this research is closely linked to issues of departmental organisation. (See section on research at the departmental level on page 14)

How disciplines shape teaching-research relations

Research cultures and practices. There is now a strong research strand that identifies different research cultures, practices and disciplinary types, in particular the work of Biglan (1973) and Becher and Trowler (2001). This focus on disciplinary types has also been extended to discussions of how disciplines shape pedagogic cultures and practices (Healey 2000, Neumann and Becher 2002).

Research organisation and scholarly-research connections. Colbeck's (1998) study of twelve academics in Physics and English showed that in Physics, the links lay in the way that undergraduates and postgraduates could be involved in (staff) research, for much of the research was team-based: the potential and actual links lay in the organisation of research and pedagogy. Much of the pedagogy was enquiry-based. In English, the connections between research and scholarship were strong: indeed the distinctions between research and scholarship were hard to draw. The teaching-research connections lay more in the content of the curriculum.

The role of professional societies. In some of the professional disciplines, professional requirements for accreditation may support or obstruct staff drawing connections between teaching and research (Griffiths, in press).

Student perspectives. Students vary in their attitudes to research (see section on research on institutions on page 20). It is possible that students with different conceptions of knowledge, of the role of universities and of obtaining a degree will choose different disciplines and thus shape the disciplinary pedagogic culture. A study of staff perceptions of teaching-research relations in business studies in the UK showed that staff who wished to emphasise the value of research experienced problems with students (and colleagues) who wanted a much more applied practical curriculum, and questioned the value of a research-based approach (Harrington and Booth, 2003). A study of student motivations in one UK institution showed significant disciplinary differences in how staff research affected student motivation (Breen and Lindsay, 2002 – see page 27).

Where are the research frontiers in relation to the curriculum? In some of the sciences, staff research may be so far ahead of the undergraduate curriculum that making strong connections between staff research and student learning is very difficult. Indeed in some disciplines or research areas, this is also the case at postgraduate level (Ben-David, 1977; Jensen, 1988).

Hierarchical disciplinary knowledge structure. The key role of the discipline in shaping the relationship, and the linked issue of how staff perceive both teaching and research, was a strong feature of research by Robertson and Bond (2001, p.11) in exploring the perceptions of staff at the University of Canterbury, New Zealand, concerning teaching-research relationships. Thus, for some of their interviewees 'in disciplines with a very hierarchical (knowledge) structure, the relationship between teaching and research can only be activated at postgraduate level. These staff perceived that at undergraduate level students lacked the disciplinary framework to engage in inquiry'.

In a later more intensive and extensive study, Robertson and Bond (2003) explored through detailed interviews the metaphors and understanding by which staff explain their conceptions of knowledge, teaching and teaching-research relations. In part, they in effect concur with Brew (2003) that how individuals see knowledge shapes the teaching-research relations they perceive and construct. But Robertson and Bond see these relations as also shaped by disciplinary cultures and conceptions of knowledge. They conclude:

'We suggest that it is our participants' epistemological and ontological beliefs that shape their understandings of the research/teaching/learning experiential field and hence of the research/teaching relation. In particular, beliefs about the nature of *knowledge* – what it is, how we create it, how we share it – determine the spatial relationship of research to teaching [...] In high paradigm consensus or 'hard' disciplines [...] knowledge is generally understood to be cumulative, hierarchical, and concerned with universals, quantification and discovery [...] The prevailing disciplinary epistemology [...] means that research and (undergraduate) teaching occur on different 'planes' in a hierarchical relation one to another and that teaching is conceptualised primarily in terms of *transmission* of research-informed knowledge *down* to the recipient. By contrast, in low paradigm consensus or 'soft' disciplines, scholars use new lenses to explore territory mapped by others and knowledge is concerned with particulars, qualities and understanding. The disciplinary community (teachers and students together) participate in the (de)construction of knowledge. The emphasis is on shared *participation* and *engagement*, even at undergraduate level' (Robertson and Bond, 2003, p.13).

The key role of practice in shaping knowledge and the curricula: the case of Health Care and Education.

In Education and Health Care (McKee 2002), as well as in Medicine, there are major discussions within these disciplines as to the nature of knowledge necessary to be an effective practitioner, and how such knowledge is best learned. For example, is teaching effectively an apprenticeship discipline and is such knowledge effectively 'craft or practice-based', or does effective practice need to be clearly based on research? What type of research is most likely to have profound implications for practice, and how is that research best connected to practice? Put crudely, there are some who value small-scale practitioner research and others who value large-scale scientific studies (Hammersley, 1997; Hargreaves, 1997). Others value the development of professional knowledge of practice, forged through personal and group reflections.

The role of 'Mode 2 knowledge' in professional disciplines. Gibbons *et al.* (1994) argue that much knowledge and research is developed and used in application, and the increased importance of what they term as 'Mode 2 knowledge':

'In a knowledge society, research is context-specific and multi-disciplinary rather than pure and discipline-based; it has social relevance rather than hypothesis led; it uses fuzzy, rather than empirically-based data; it is problem solving rather than deductive. In what might be termed the 'commodification' of knowledge, how knowledge is managed, synthesised and adapted become as important as knowledge itself [...] Employers will increasingly demand that graduates have the skills to conduct appropriate research, the capacity to formulate solutions to problems based on awareness of research evidence, and the ability to assess that evidence: in other words knowledge creation and use' (Jenkins and Zetter, 2003, p.11).

Mode 2 Knowledge and 'The Case of Built Environment: 15 Points from Project LINK',² In a knowledge-based society, research and consultancy skills are key attributes in vocational and professional fields like the Built Environment. Graduate professionals increasingly need core skills in managing, synthesising and deploying subject-based knowledge to derive solutions to real-world problems – integrating teaching with research helps to embed these core skills. Graduates with the skills and ability to conduct research in operational settings are more likely to have the capacity to formulate problem-solving solutions based on an awareness of where to find or collect evidence, how to critically test the reliability of that evidence and how to present the conclusions and findings. See also Griffiths (in press).

Conclusions at the disciplinary level

There is growing research indicating that there are important disciplinary variations in teaching-research relations. These variations are shaped by how disciplinary communities conceive the nature of knowledge, research and teaching, the forms of pedagogy and curricula in different disciplines, and for some disciplines, the impact of professional organisations and student interests on the content and practices of the disciplines.

² <http://www.brookes.ac.uk/schools/planning/LTRC/about.html>

Research on institutions

Perhaps the influences on teaching-research relations at the institutional level are limited, or at least somewhat tacit and cultural. For Clark (1993a), the role of the institution is formative, with the key enactments being at the department level. However, given the worldwide forces for institutional differentiation and the impact of audit cultures, there is an evident importance in researching and documenting institutional issues involving teaching-research relations. However, in comparison to the large amount of research at the level of the individual academic, there has been very limited work on institutions.

Institutional variations in delivering 'the nexus'

In a study done for the Australian department of education, Zubrick, Reid and Rossiter (2001) researched (through interviews and a document study) how three different institutions were seeking to deliver the nexus in very different institutional contexts.

At the University of Western Australia (UWA), an elite research 'sandstone' university:

- The institutional professed culture was that 'wherever possible in a research-intensive university, research should not exist without teaching, and vice versa' (Zubrick, Reid and Rossiter, 2001, p.35).
- It was recognised that the form of the connection varies through disciplinary and strong department cultures.
- There was strong emphasis on forging strong links through developing strong postgraduate programmes.
- There were a number of problems in

strengthening the nexus at UWA including: (a) a high number of research-only staff; (b) the isolation of some research centres from the rest of the department and its curriculum; (c) balancing the resource demands of postgraduate and undergraduate supervision.

At Curtin University of Technology, the focus of the nexus was on:

- Developing teachers' concept of themselves as scholarly resource specialists and professional mentors to students.
- Courses that emphasise students as independent learners.
- Widening the traditional discovery emphasis to research to a formulation of research that focuses more on impact (e.g. on the economy, on teaching).
- An internal research study recognising that staff perceive certain barriers to ensuring a positive teaching-research nexus. These included (a) 'a limited understanding of the teaching-research nexus among some staff'; (b) 'the need for a reward (promotion) system that values a range of scholarly activity; (c) 'part time and casual staff who have recently acquired doctorates and who may undertake little research or supervision' (Zubrick, Reid and Rossiter, 2001, p.50); and (d) 'high teaching loads and large classes' (p.54).

At the University of Ballarat, a regional HE institution formed from the merger of non-research-based institutions, the focus was on:

- Developing academic staff as 'teacher scholars, viewing them as lifelong students of the specialist knowledge of their fields [...] [and] as lifelong students of teaching' (Zubrick, Reid and Rossiter, 2001, p.27).

- Involving students in 'field research by students on projects of real significance to the regional community and local enterprises' (p.28).
- Schools and departments using the Boyer framework to 'incorporate enquiry-based learning, and integrate teaching with research and community service programs in all years of undergraduate study' (p.31).
- Development of a Graduate Centre and postgraduate coursework-based degrees and professional doctorates, partly aimed at regional professionals wanting to study part-time to upgrade their qualifications.

However, there is a legacy of staff at the last institution 'whose expectations of academic work are limited to teaching, without necessarily undertaking teaching in scholarly ways' (p.35).

What counts as research?

Colbeck's research (1998) based on two US institutions indicates that the wider the institutional definition of research, the more staff feel able to link their teaching and research roles. Specifically she states:

'University policies for evaluating faculty research provided *Cosmopolitan State* (the lower ranked 'Comprehensive' university) with more opportunities than their *Vantage University* colleagues (a Carnegie Research I university) to integrate classroom-oriented teaching with research. [...] The *Cosmopolitan State Faculty Handbook* (which defined research activities for funding and for promotion) began with articles or creative work published in refereed journals but also included textbooks, newspaper articles, and creative work published in popular media [...] In

effect, *Vantage* research evaluation policies limited research to [...] the scholarship of inquiry, whereas *Cosmopolitan State* policies embraced scholarships of inquiry, integration, application and teaching [...] *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). [emphasis in original]

Failing to connect through institutional (teaching) strategies

In the UK, recent policy-orientated research by Gibbs (2001) and JM Consulting (2000) indicates a failure of institutional planning and strategies to effectively link teaching and research, or perhaps to do this in a purposeful and explicit manner.

As part of a system-wide review of national research policies, JM Consulting (2000), through document studies and site visits, analysed institutional policies for teaching and research. They concluded that:

'In view of the central nature of research and teaching in HE, and the almost universal assumption that R benefits T, and the importance of scholarship, it is perhaps surprising how relatively few institutions have specific policies in place to either monitor, or to develop and maximise these beneficial synergies [...] There were some attempts to manage teaching and research workloads in departments, partly to allow more time for research. Some strategies may be having the unintended consequence of driving research and teaching apart for some staff' (JM Consulting, 2000, p.36).

Gibbs (2001), in a related study for the Higher Education Funding Council for England (HEFCE), analysed the impact of national funding requirements or inducements for institutional teaching strategies. From a largely document-based study he concluded:

'The teaching-research nexus was addressed only to a limited extent. It was very rare for institutions to make any mention of their research strategy in their learning and teaching strategy, and the potential conflicts or synergies between research and teaching strategies were generally not addressed [...] Mechanisms through which this nexus might be exploited are not yet articulated [...] Strengthening the nexus is at present an aspiration rather than a plan' (Gibbs, 2001, p.17).

Failing to connect in one New Zealand institution

Hattie and Marsh (2004) analysed the reality behind the institutional mission of one New Zealand institution. The context was the national audit (see section on research on national systems on page 24).

'The mission statement included 'retaining a core commitment to research-based teaching and enhancing scholarship through clearly linking research, professional practice and teaching' [...] However, it was difficult to find this Mission executed in the policy statements [...] [For example] the only instance in the processes of appointment, continuation, promotion, performance review, or application for study leave was for promotion to the rank of Senior Lecturer, whereby there was a criterion under the teaching category, 'application of research to teaching'. There was no reference to the nexus in proposals

for new courses, student evaluation forms, reviews of Departments, or internal grants procedures. [...] We suggest that if such a case study was conducted in most Universities, there would be a similar pattern of rewarding the parts separately, but rarely the nexus. *It is therefore not surprising that the context in which academics work is part of the explanation as to why there is a zero relationship between teaching and research'* (Hattie and Marsh, 2004, pp.5-6). [emphasis added]

National policies shape separate research and teaching policies

From the UK and the USA there is clear evidence that national policies and funding for research (see section on research on the impact on students on page 27) has resulted in structural separations between research and teaching within institutions.

Conclusions on institutions

- It is possible for institutions with different resources and missions to shape and deliver a view of the teaching-research nexus that reflects the resources available.
- In delivering an institution-wide nexus, how research is conceived is central. Perhaps a wider conception of research, which values a wide range of types or forms of research, better enables an institution to deliver such an institution-wide goal.
- In the UK, there is clear evidence that, while many mission statements in pre- and post-1992 institutions state the importance of the link, few teaching (or research) strategies have clear mechanisms for delivering the link.

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- From the UK and the USA there is clear evidence that national policies and funding for research (see 'Research on national systems' chapter) have resulted in structural separations between research and teaching within the institution.

Research on national systems

Most of the limited research in this area has focused around how national (and perhaps international) funding for research has shaped teaching-research relations.

USA: Boyer and research universities

In the USA, background research shaped the analysis of two influential scholarly (but, strictly speaking, not research) studies of the US higher education system (Boyer, 1987 and 1990). These, in effect, argued that the institutional focus on 'discovery research' (that is, high-level research which, in the UK, maps onto work valued in the Research Assessment Exercise (RAE)) had devalued the system-wide need for an attention to quality teaching, particularly given that the US system was in effect a mass system, teaching a wide intellectual range of learners. In *Scholarship Reconsidered*, Ernest Boyer (1990, p.11) challenged US higher education to 'break away out of the tired old teaching versus research debate'. Much of the reform effort that sprang from these influential publications was by research-intensive universities seeking to ensure that undergraduate students benefited from staff research (University of Stony Brook, 1998). Here the background research for this report led it to argue that: 'The research universities have often failed, and continue to fail their undergraduate populations and thousands of students graduate without seeing the world-famous professors or tasting genuine research' (University of Stony Brook, 1998, p.3).

A survey of research-based universities, three years after that report, showed some progress by institutions in raising institutional priorities to teaching and to better ensuring that undergraduates benefited from the universities' research environment. This study concluded that 'the rhetoric has changed: undergraduate research,

for example, is a staple of most universities' curricular vocabulary'. But such research-based curricula were still mainly for the most able students (University of Stony Brook, 2002).

As part of this broader reform effort in the USA, there has been greater commitment from major research funders and research policy shapers to better ensure that research funding does, in part, focus on dissemination, and for some research funding to specifically focus on supporting students (directed by academic staff) doing research. In the USA, the National Science Foundation (NSF) has radically redesigned its programmes and grants to ensure that the 'methods of research are quickly and effectively communicated in a broader context and to a larger audience' (NSF, 2003: from *Merit Review Broader Impacts Criterion: Representative Activities*. <http://www.nsf.gov/pubs/2003/insf032/bicexamples.pdf>).

This is part of a major policy goal of NSF to ensure the effective integration of research and education. One of the key financial and policy drivers to achieve this broader impact are programmes supporting undergraduate research (Kinkead, 2003). This effectively is where selected students carry out research, mentored by academic staff, and often on projects that are largely designed by staff in which students develop specialist topics. Thus the NSF Research Experiences for Undergraduates (REU) programme 'projects high-quality interaction of students with faculty or other research mentors and access to research mentors and to appropriate facilities and professional development opportunities' (Ramaley, 2004). Some of these funding streams for undergraduate research are specifically targeted to institutions outside the research elite. (See also page 27 for the positive impacts of these programmes on students.)

The UK: impact of the RAE

In the UK, there has been a range of research studies looking at the impact of the RAE, including its influence on teaching and teaching-research relations within institutions and disciplinary communities. (To repeat what is stated in the Introduction, this review does not look at the impact of the RAE on research.)

In a HEFCE-commissioned research study of the impact of the 1992 RAE on institutional and individual behaviour, McNay (1997, a and b) used focus groups with staff and institutional managers, along with document studies and questionnaires, to assess the impact of the RAE. McNay (1999, p.199), in a later, non-official report, shows how the funding rewards the RAE offered led, at the level of the individual, the department and the institution, to 'a gradual separation, structurally, of research from teaching [...] Department heads reported good researchers spend less time teaching [...] and more undergraduate teaching is done by part-timers and postgraduates'. This perspective was further confirmed by a consultancy-based research study done for HEFCE as part of a 'Fundamental Review of the RAE':

'In some institutions, the increasing use of teaching-only appointments [...] which mean that the staff concerned do not have to be entered for the RAE. However the extensive use of this practice [...] would clearly undermine any claim that research was a prerequisite for high-level teaching' (JM Consulting, 2000, p.15).

There has been linked research of the impact of the RAE on disciplinary communities. Sidaway's (1997, p.492) sociological analysis of trends in power and work relations in British geography departments in the 1990s revealed an

intensification of staff roles, as illustrated in this comment: 'We're probably going to see in this department a quite definite demarcation between teaching and teaching and administration'. This study largely derived from detailed interviews. Harley's (2002) questionnaire-based study of academics in social science and business revealed that the RAE was having significant impacts on academic identities. While for some staff it was confirming the value of research, for many it was threatening their academic identity in relation to carrying out both teaching and research. Institutionally, there was strong evidence of separation between research-active staff and others who were more focused on teaching. However, there is also evidence that the RAE is leading structurally to closer links between upper-level undergraduate curricula and staff research (Jenkins 1995; McNay, 1997a and 1997b).

Impact of the New Zealand audit

As stated on page 8, in New Zealand the definition of a university is an institution where '*research and teaching are closely interdependent and most of their teaching is done by people who are active in advancing knowledge*'. In 1998, it was decided that the 2000-01 audit should in part focus on a themed review of teaching-research relations in each university. David Woodhouse, who was in charge of this review, stated in 1998 (that is, before the audit) that the focus on the research-teaching link was partly prompted by the view that 'there is little international experience to draw on in auditing institutional quality processes in either research plus teaching or research *per se* [...] The work that has been done on the research-teaching link tends to focus on its existence, rather than its quality or utility' (Woodhouse, 1998, p.42).

Four years later, reflecting on his experience in

leading this audit and through analysis of the university submissions and the audit reports (some may see this as scholarly rather than research based), Woodhouse (2001, pp.12-13) concluded that the central impacts, and explicitly its implications for other national systems, were as follows:

- 'The selection of the teaching-research link as one audit focus [...] triggered a great deal of thought about the underlying concept, about ways of interpreting it, and about its consequences'.
- *'Explicit attention is being paid to what academics mean when they claim a link between teaching and research, with attempts to explicate it and its supposed benefits. This is the most important and potentially useful finding'*. [emphasis added]
- 'The concept of research for the purpose of its relation to teaching is being broadened from referring to *product* only, to include research and teaching *process* and *culture*'.
- 'The observed increase in teaching-only and research-only staff means that the rationale, intent and consequences of the link must be considered explicitly. It removes the ability to hide behind the false assumption that all academics are both teachers and researchers, and further that they all integrate their teaching and research in some way to the positive benefits of one or both these activities'.
- 'Incentives are being introduced (in institutions) for linking teaching and research, and making the link explicit'.

Conclusions on research on national systems

- The rewards – financial and prestige – resulting from the national allocation of research funds, whether from government or private sources, have led to both a lack of attention to teaching and to significant structural separations between teaching and research within institutions in both the UK and the USA.
- There is limited evidence that the New Zealand system-wide audit of universities concerning teaching-research relations led to more informed discussion of, and structural interventions to support, teaching-research links.
- There is some evidence from the US system of institutional and national interventions for positive impacts on teaching-research relations, though perhaps only significantly on the most able students in research-elite institutions.
- Also in the USA there have been moves by major research funders and policy shapers (such as the National Science Foundation) to require research grants to focus on dissemination – including to undergraduate teaching.

Research on the impact on students

Perhaps this is the central area that needs investigating: what is the impact on the student experience and on student intellectual development?

Up-to-date courses: staff are real people

Neumann (1994), in a large Australian research-oriented institution, interviewed in depth some 28 students in a range of disciplines, and from first-year undergraduate to doctoral students, on their experiences of teaching and research. Her conclusions were that there were tangible benefits to students of staff research, mainly through students perceiving that their courses were up-to-date and that staff demonstrated interest in what they were studying. Also, staff research interests gave students 'the opportunity to see their teachers as real people and to be able to glimpse what they do, how and why' (Neumann, 1994, p.335).

Many students are positive – but many do not see themselves as stakeholders

Jenkins, Blackman, Lindsay and Paton-Saltzberg (1998) carried out focus-group discussions with undergraduate students in a range of disciplines at Oxford Brookes University, and then replicated the study with postgraduates (Lindsay, Breen and Jenkins, 2002). Both studies demonstrated positive student views of staff research. In these studies, students who perceived staff members' involvement in research as being incorporated into their teaching tended to see their courses as current and as stimulating intellectual excitement. However, many students did not see themselves as *stakeholders* in staff research – university research was seen as quite separate from them. Most wanted staff research (including absences on

sabbatical) to be better managed so that the negative impacts – in particular, staff not being available to students – were minimised.

Zamorski (2000, p.5), at the University of East Anglia (UEA), supervised students who were employed to research their own and their peers' learning experiences in relation to staff research. They concluded that 'students value highly the experience of studying in a research environment but clearly there is a policy gap between policy intention and student perceptions at UEA. While students value being close to research, and to the idea of a university as a research community in which they are included, there are many ways in which they feel excluded' (p.1). (See also Zamorski, 2002.)

As yet unpublished research at the University of Gloucestershire further confirms the validity of these conclusions (Pell, 2003).

Are some students indifferent?

A questionnaire-based study at Oxford Brookes (Breen and Lindsay, 1999) analysed student views of staff research in the context of their motivations for study and for attending university. Students who came to university for social contacts or to gain a useful qualification were indifferent to staff research. Students who claimed to be interested in learning for its own sake were more likely to express positive attitudes to academic research and to staff involvement in that research. A third group of students, who described themselves as having no interest in communicating with staff, were the only ones who demonstrated an overall negative view of staff research.

Student epistemological and intellectual development

The few research studies cited above are largely about student perceptions. There has been limited work analysing the impact on student learning in relation to different forms of research-based learning (though that statement probably does not do justice to the growing work on the impact of problem-based learning – PBL). One significant – though as yet unpublished – study is that by Czaja, Raukhorst, Baxter Magolda *et al.* (Baxter Magolda, 1999, 2001). This study researched the impact on students' perceptions of 'knowledge' as a result of taking part in a special summer ten-week independent research programme. (Such undergraduate research programmes are a feature of many US universities. The general form is for selected students to carry out research under staff supervision.) Students' perceptions of knowledge prior to and on completion of the programme were assessed and compared with those of a control group. The central conclusions were that students who took part in the research programme became more confident as learners and more capable of thinking independently. In a related study of a similar term-time scheme at the University of Warwick, Blackmore and Cousin (2003) saw similar intellectual gains in the participating students. They also pointed to the way that this research-based involvement made the students feel themselves to be participants, albeit peripheral, in research communities of practice. They had become stakeholders in the research functions of the university.

A stronger link at postgraduate level

Some of the research and scholarship on staff views has seen that greater importance is attached to establishing and maintaining links at

postgraduate level (for example, Clark, 1993a and b; Smeby, 1998 and 2002). This view is confirmed by the study of student perceptions in a range of disciplines at Oxford Brookes University (Lindsay, Breen and Jenkins, 2002). This study replicated the methodology of a previous one at undergraduate level. This research, albeit in just one institution, demonstrated that:

- Both undergraduate and postgraduate students associate more benefits than disadvantages with lecturer research.
- While undergraduates did not see themselves as stakeholders in staff research, postgraduates nevertheless saw staff involvement in research as of direct importance and value to them. However, they did expect lecturer research to be directly salient – that is, relevant to their concerns.
- 'Postgraduate students make a greater number of positive statements, and a smaller number of negative statements about the effect of research upon teaching as the amount of research activity in their department increases.'

Results of a national survey

In the section on research on national systems, the varied programmes of the US National Science Foundation (NSF) were briefly described. 'Using web-based questionnaires, NSF surveyed more than 14,000 undergraduates, as well as their mentors, about their 2002-3 research experiences in NSF programs [...] most have excellent grades, attend a research university [...] but according to self-reports, [undergraduate research opportunities] have a major impact on most participants' confidence and their understanding of research-related issues, increase their interest in careers in research and science and engineering,

and lead them to raise their degree expectations' (Ramaley, 2004, slide 28).

Conclusions on the research on students

- There is clear evidence from a range of studies in different types of institutions of students valuing learning in a research-based environment.
- However, students vary in their attitudes to staff research. As one would no doubt predict, those with a more academic orientation to their studies are more positive to staff research. This may be linked to the disciplines students choose to study and to the cultures of those disciplines. (See section on research on disciplines on page 17)
- From one UK institution there is evidence that postgraduate students attach greater importance to learning in a research-based environment. However, these students wanted that research to be salient to their curricular concerns.
- There is, though, also evidence that these institutions and departments may not be effectively supporting students to obtain maximum value from these opportunities, or managing the negative impacts.
- We have very limited evidence of the impact of different forms of research-based learning on student epistemological and intellectual development.

Conclusions

Clearly these are but my conclusions from what I see as the key research evidence on teaching-research relations, and from asking whether 'quality' or 'effective' teaching is dependent on staff, departments and institutions being involved in discipline-based research. Please read these conclusions against your reading of the research evidence. The conclusions I draw are as follows.

The issues are layered and complex. Relatedly, there is not a *single* teaching-research relationship, there are many relationships. Indeed, perhaps we overstate or distort these relationships by referring to 'a' or 'the' teaching-research nexus. There are also issues we don't know, or have as yet to research – see later discussion.

Conclusions at the individual level

- At the level of the individual member of staff, the simple models of staff who are heavily productive in research outputs being the most effective teachers, or that high productivity in research results in effective teaching, are clearly suspect.
- However, that does not tell us the extent to which staff involvement in research (and what types of research) is necessary or important for effective teaching. Nor does it help us to differentiate between the types and levels of knowledge necessary for effective teaching in different disciplines, types of institutions or perhaps, most of all, levels of the curriculum (such as 'introductory year one courses'). Perhaps we can make informed judgments on these and other issues from reflections on practice, but that is not research evidence.
- For many staff – but certainly not all – their motivations to work in higher education are shaped by strong values of the importance of a

teaching-research nexus, though there seem significant disciplinary differences in this belief.

- How academics conceive teaching and research may be central to understanding the relationships and how they might be linked; but this research is at an early stage.

Conclusions at the departmental level

- In the UK, while there are strong positive correlations between national research and teaching rating scores, this may reflect the greater resources of the research-rich institutions, and perhaps also the influence of the 'halo effect' of that research reputation on the quality of incoming students and on the judgments of external reviewers. It is clear from research in the UK and in Australia that there is not a simple *functional* relationship at a department level between quality in research and quality in teaching.
- Within departments and institutions, teaching and research are now often organised separately; and perhaps limited thought is given to the development of policies on how they might be linked.
- Given that it is at departmental level that disciplines are mainly organised for teaching and for research, the variations in the nature of the nexus by disciplines indicate that there may well be important variations between departments in how teaching-research relations are conceptualised and delivered. (See also section on research on disciplines on page 17.)

Conclusions at the disciplinary level

- There is growing research indicating that there are important disciplinary variations in teaching-research relations. These variations are shaped by how disciplinary communities conceive the nature of knowledge, research and teaching, the forms of pedagogy and curricula in different disciplines, and for some disciplines, the impact of professional organisations and student interests on the content and practices of the disciplines.

Conclusions on institutions

- It is possible for institutions with different resources and missions to shape and deliver a view of the teaching-research nexus that reflects the resources available.
- In delivering an institution-wide nexus, how research is conceived is central. Perhaps a wider conception of research, which values a wide range of types or forms of research, better enables an institution to deliver such an institution-wide goal.
- In the UK, there is clear evidence that, while many mission statements in pre- and post-1992 institutions state the importance of the link, few teaching or research strategies have clear mechanisms for delivering the teaching-research link.
- From the UK and the USA there is clear evidence that national policies and funding for research (see pages 24 and 25) has resulted in structural separations between research and teaching within the institution.

Conclusions on research on national systems

- The rewards – financial and prestige – resulting from the national allocation of research funds, whether from government or private sources, has led to both a lack of attention to teaching and to significant structural separations between teaching and research within institutions in both the UK and the USA.
- There is limited evidence that the New Zealand system-wide audit of universities concerning teaching-research relations led to more informed discussion of, and structural interventions to support, teaching-research links.
- There is some evidence from the US system of institutional and national interventions for positive impacts on teaching-research relations, though perhaps only significantly on the most able students in research-elite institutions.
- Also in the USA, there have been moves by major research funders and policy shapers (such as the National Science Foundation) to require research grants to focus on dissemination – including to undergraduate teaching.

Conclusions on the research on students

- There is clear evidence from a range of studies in different types of institutions of students valuing learning in a research-based environment.
- However, students vary in their attitudes to staff research. As one would no doubt predict, those with a more academic orientation to their studies are more positive towards staff research. This may be linked to the disciplines students choose to

study and to the cultures of those disciplines. (See section on research on disciplines on page 17)

- From one UK institution there is evidence that postgraduate students attach greater importance to learning in a research-based environment. However, these students wanted that research to be salient to their curricular concerns.
- However there is also evidence that these institutions and departments may not be effectively supporting students to obtain maximum value from these opportunities, or managing the negative impacts.
- We have very limited evidence of the impact of different forms of research-based learning on student epistemological and intellectual development.

Conclusions on what now needs to be researched

To repeat: my interests are focused on how research shapes and – here – could shape teaching quality and effectiveness. The research questions I think worth asking are:

- What degree or type of involvement in research – and what types of research – are necessary or important for effective teaching in higher education? How, if at all, does this vary by discipline, level of student learning and institutional role or mission? How does it vary by stage of an academic's career? More specifically, as Kogan (2003, p.7) states: 'Many [UK] undergraduate courses now culminate in a research exercise. How far their teachers need to be active researchers in this is an open question'.
- What are the forms of pedagogy and course

design that best develop students' understanding of research-based knowledge and their abilities to carry out research? How might or should these vary by discipline? How do they vary by stage of the course, and by the varying foci of degrees and institutions?

- In the particular context of developing a knowledge-based economy, what are the particular areas of research knowledge and skills that students need to develop at university, and how will these vary with the employment area? How can universities best help students transfer what are often particular disciplinary conceptions of research into wider research and a knowledge-based economy?
- Given that research requires concentrated time and particular staff dispositions and skills – and in certain cases, expensive specialist resources – how can national systems, institutions and departments ensure that this is not at the expense of teaching quality? And how can national systems, institutions and departments best ensure that the research role of the university also supports student learning, and staff morale and identity?
- There are also many much more particular questions worth asking: for example, what is the national and international role of information technology in supporting research-based learning? What are the optimal forms of student assessment, staff induction, staff development, and support for research-based learning?

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