

**The Nexus of Teaching and
Research:
Evidence and Insights from
the Literature**

report

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The Nexus of Teaching and Research: Evidence and Insights from the Literature

“We live in an age where intersections and integration are the breeding ground of novelty. It is at the intersection of learning, discovery, and citizenship, and through integration of all three that we will inspire students to achieve their potential. In such an intellectual climate gifts are discovered, passions ignited, and purpose imagined... We must integrate discovery into all aspects of learning.”

Installation address - Indira V. Samarasekera, OC, University of Alberta, September 25, 2005

Introduction

This report reviews, at a high level, the evidence and insights in the literature on the connection between teaching and research (the nexus of teaching and research) and advances certain observations and recommendations for action to the Higher Education Quality Council of Ontario (HEQCO).

This study was launched by the questions – why do we believe there is a connection between teaching and research? Is there evidence for the presumption of critical synergies? Is it possible that there might be a negative relationship such as ever-increasing pressure on tenure-track faculty for research output? This study revealed considerable research literature and policy dialogue in the UK, Australia, New Zealand, and the US on these issues, focusing around four interrelated questions – 1) what is the evidence of interconnection/synergy; 2) is there value in a connection between teaching and research in a university context; 3) what are the characteristics of a positive interconnection; and 4) under what conditions are the positive benefits of an interconnection realized?

Approach to this Review

Given the constraints of time and resources, and the very significant volume of material that has been published on the connection between teaching and research in the last 15 years, this review focused primarily on 1) review of “meta-level” publications that themselves evaluated and synthesized aspects of the literature, 2) presentations at, and reports from, recent international colloquia on the teaching-research nexus, and 3) selective reading of a number of recent publications. Bibliographies of the literature were reviewed to assess the balance and evolution of focus in research and policy debate.

Methodologies Used and Issues Explored in the Literature

There is a large and diverse literature dealing with multiple dimensions of the interconnections between teaching and research (T&R) dating back through the 1970's. It was particularly triggered by the perceived adverse impact on teaching of an increased focus on research by institutions and funding agencies, set against the backdrop of a deeply held belief within the academy that there is a natural, indeed essential symbiosis (the von Humboldt tradition).

Much of the very early work was quantitative in nature, seeking to explore correlations of teaching quality (as measured through students ratings, ratings by peers) and research productivity (as measured through publications, citations, ratings by peers, the Research Assessment Exercises (RAE) score in the UK).

There have also been significant meta-analyses of that quantitative work (e.g. Hattie and Marsh, 1996) that integrate and distill the outcomes of the various correlation studies. That work has been challenged as overly narrow in its conceptualization of both research and teaching, often deploying inadequate measures and lacking consideration of the organizational and cultural dimensions of both teaching and research, e.g. conceptualizing research as a product or attainment rather than a way of thinking or process.

In this context there has developed both 1) an increasing number of quantitative studies that incorporate a wider range of research and organizational settings, and 2) a significant body of qualitative research that is founded on the understanding that the T&R nexus is not value neutral. Much of that qualitative work uses interview tools, focus groups, case studies, and humanities reflection to explore the nexus, academic conceptions of “teaching” and “research” at the level of disciplines and departments, and the impact of institutional, discipline and other environmental factors on student experiences of research. That work is also not without challenge, e.g. on the grounds of lack of adequate conceptual frameworks, the lack of clarity in terminology, and the need for more attention to the development of causal theories regarding the nature of the interconnection (strength, range, and moderating factors).

Senior policy voices (Judith Rameley, 2004) have reminded us that by adopting a medical or scientific paradigm we might be missing a critical dimension as we examine what research is informing policy and discourse.

There is a significant body of policy-related work that explores the changing nature of the type of intellectual development that higher education should instill, the teaching dimensions of the mission of the research university, and various approaches to optimizing a constructive and positive interconnection (e.g. the Boyer Commission Report, 1998; the Association of Universities and Colleges of Canada (AUCC)'s Commission of Inquiry on Canadian University Education, 1991, various papers and books). Some has been sponsored by agencies responsible for policy and funding in higher education (e.g. the Australian Department of Education, Training and Youth Affairs, 2001; the UK Department for Education and Skills, 2004), and some is a reaction to government policy (e.g. the work commissioned by the UK Higher Education Funding Council on the interactions between research, teaching, and other academic activities, 2000).

Overall, the literature includes consideration of:

- Values, attitudes, and vision (e.g. among faculty, students, institutional leaders) in regard to the T&R nexus;
- correlation studies—seeking statistical evidence for a positive, negative or null relationship (correlation studies) of T&R;
- meta-level studies of the empirical evidence;
- critical analysis of methodologies, in particular of those used for the empirical studies, as well as what are meaningful measures of teaching effectiveness (not just time) and research productivity (not just intensity);
- cause (as well as scope and strength) of influence of interconnections;
- academic conceptions of teaching and research and how that influences the relationship (and variation among disciplines);
- the attributes of research-informed learning;
- the student experience of research;
- consideration of the policies and cultures at individual, departmental, discipline, institutional levels;
- discipline and gender differences in the relationship;
- institutional moderators of the T&R linkages—type of institution, institutional size and mission, internal policies and practices (especially at the departmental level);
- the impact of governmental funding policies and practices on the T&R interface;

- strategies to facilitate and enhance a positive T&R relationship and exploring what that entails (the ways that it is manifested); and
- the effect of teaching on research (note - the majority of studies focus on the effect of research on teaching).

Even with this diversity of research approaches and issues, there is an ongoing concern that there has been inadequate attention to definitions of teaching, learning, research, and scholarship, and radically different interpretations among the various studies in the literature.

The reference list in Annex 1 provides a portal of entry to a much larger literature than is quoted herein. Two bibliographies (in section A of that Annex) are illustrative of the scope of the literature.

Antecedents to, and Catalysts of, the Current Debate

Discussions of the interconnections of teaching and research frequently go back to the unity of research and teaching that characterized the Wilhelm von Humboldt vision of the University of Berlin (19th century!). In conceptualizing “The University” von Humboldt saw the fundamental dichotomy as being between “school” and “university” rather than between teaching and research – with the essence of a university being learning based on scholarship. The “school” dealt with agreed and accepted knowledge. It was this model of the University of Berlin on which most US research-intensive universities were founded.

In the US, while there were diverse studies of issues and concepts of the modern university, and much published work that addressed the lack of linkages, it was the 1990 book *Scholarship Reconsidered: Priorities of the Professoriate* that catalyzed more focused activity. The author, Ernest Boyer, was one of the first high profile scholars (then President of the Carnegie Commission for the Advancement of teaching) to challenge academics to “break away from the tired old teaching versus research debate” (Boyer, 1990). Burton Clark (1991; 1995; 1997) was another significant voice during the 1990’s, invoking the idea of an “inquiring society” – that translates to an inquiry-based model of education.

This activity triggered a national debate about teaching that in turn led to the Boyer Commission Report (1998) *Reinventing Undergraduate Education*. Noting that “... research universities have too often failed, and continue to fail, their undergraduate populations”, the Commission called for “a new model of undergraduate education at research universities that makes the baccalaureate experience an inseparable part of an integrated whole”. This reflected both empirical and experiential evidence that there was a growing imbalance in the values afforded to research and teaching.

The Boyer Report offers 57 recommendations that had significant impact on thinking and action at an institutional level among research-intensive institutions. A follow-up report three years later explores how those recommendations are being adopted in large US research universities. National studies of student engagement and learning, the activities of the Reinvention Centre and actions by the National Science Foundation (NSF) to value the pedagogical dimensions of publicly funded research were some of the outcomes and continue to influence the landscape.

The UK has long had a lively public debate on the mission, structure, funding, and policy context for their higher education sector, particularly in response to dramatic changes in the structure and funding of the higher education system over the last 30 years. The Robbins Report (Committee on Higher Education, 1963) argued that faculty should be research active. The 1997 Dearing Report (National Committee of Inquiry into Higher Education) spoke eloquently to the issue of the interconnection of T&R in the context of a mass higher education system and recognition of the importance of research skills (the knowledge economy argument).

Much of this debate was triggered by the impact of national policies and practices for research funding and performance reporting on teaching. The construction of the UK Research Assessment Exercise (now

being replaced by the Research Excellence Framework) in the 1990s has been seen as being antagonistic to whatever positive connections existed between teaching and research in the past. That concern continues today.

In Europe, where one sees the most diversity among national higher education systems (France with extensive separation and Germany with integration of T&R) there has been an ongoing discussion, now being shaped by the Bologna process (harmonization of the bachelors and masters level education across countries), and the concept of a European Higher Education Area.

System Structure – Does it Matter?

Egbert de Weert (2004 Marwell Colloquium) offers a useful taxonomy of the various forms of organizational model that exist from the lens of how they manage the T&R nexus, while at the same time observing that there is no ideal model for an effective interconnection of T&R:

- *Integrated systems*: Examples – Germany, Austria, Italy. These represent variations on the von Humboldt model that integrate, within universities, T&R structurally and conceptually in its vision of pedagogy at the level of higher education (unity of teaching, studying, and research). Separate research institutes may also exist, but all universities are expected to demonstrate symbiosis of T&R.
- *Concentration of research in a separate set of research institutes*. Examples – France and Norway. Separate institutions – e.g. the Centre national de la recherche scientifique (CNRS) in France – have the prime mandate for research; its staff has no mandated teaching responsibilities. University faculty are expected to both teach and do research. There is a close relationship between universities and the CNRS in part because of the concentration of research in the publicly funded research institutions.
- *Institutional differentiation*. Examples – the US, the UK, Canada. Within one larger higher education system there is a stratification of institutions that reflects institutional research intensity, while all have a teaching mandate. In the US, there is a pronounced stratification of “value” for research relative to teaching (along the lines of the Carnegie classifications of higher education institutions). This “Anglo-Saxon” tradition is normally associated with intensive competition for research resources.
- *Separation of teaching and research within universities*. Example – University of Twente, MIT. Rather than a feature of the national higher education system, an institution structures and manages its T&R functions in different units (e.g. teaching in Schools and research in Institutes), with each unit having a different Head/Chair. In this model, an academic staff member has two affiliations and is involved in both T&R.

De Weert observes that while an organizational separation would appear to weaken the unity of T&R, this is not necessarily supported by the evidence; an integrated model may have dysfunctional attributes. System structure can influence behaviour, but is not a panacea.

More important than system structure are incentive structures and political expectations and these can also be system attributes. Consider, for example a separation in incentive structures outlined in an address by the then Minister of Education, Science and Training in Australia:

While scholarship and learning and teaching are fundamentally important in Australian universities, I believe that these priorities are appropriately addressed through other policies, programmes and funding, such as the ... Learning and Teaching Performance Fund...At a later stage we may wish to consider the transfer of knowledge relating to scholarship and teaching, but for now...the priority remains the application and impact of research (Bishop, 2006).

Kerri-Lee Krause (2007 Marwell conference) notes that such a national policy framework serves to “perpetuate the notion of research and teaching as mutually exclusive endeavours, addressed by

distinctly separate policies and funding arrangements.” This in turn mitigates against successful interconnections of T&R.

Evidence and Insights

Probably one of the most widely cited papers in the literature on the T&R nexus is the 1996 paper by Hattie and Marsh that stated there was no relationship between T&R at the level of the individual academic and the department based on a meta analysis of 58 other studies (note – a conclusion of a zero correlation, not a negative correlation). That study generated a firestorm of debate and contention, including charges of too much focus on correlations, equating research productivity and quality, and neglecting individual experience. In many instances, the correlation was sought in regard to the effect of the individual’s research product on teaching (e.g. in lectures) rather than on an understanding and sharing of the nature of the research process.

Representative quotes that capture the diversity and texture of *the empirical evidence from quantitative studies* follow:

“Overall, we have consistently found that there is a zero relationship between teaching and research at the individual academic and at the Department level.... We are not suggesting that research and teaching is not linked in the mind of the academic (indeed it is), but we are claiming there is no evidence of the effects of this thinking in the outcomes of teaching and research” (Hattie & Marsh 2004).

“No empirical support is found for the view that a necessary link, tight coupling or ‘nexus’ exists between undergraduate teaching and discovery research in the university” (Ontario Council on University Affairs, 1994, p18 as quoted in Jenkins 2004).

“No relationship of significance was found between faculty research productivity and teaching effectiveness. No significant difference was found in the teaching effectiveness between faculty employed at research, comprehensive, or liberal arts institutions.” (Reference to the work of Melland, H.I. on nursing education (1996) cited in J M Consulting Ltd. *The Interactions between Teaching and Research*. Annex G - Bibliography and literature review.)

“... the relationship between research and undergraduate teaching in Australian higher education. Two research indexes (weighted number of publications, and number of research activities) were used. Scores on a Likert-type scale of reported commitment to teaching undergraduate students formed the main criterion of teaching effectiveness. This was supplemented by student ratings in one of the aggregate-level analyses. The results revealed typically no relation or a negative relation between teaching and research at the level of the individual and at the level of the department, across all subject areas. The only exceptions concerned one group of former colleges of education.” (Reference to the work of Ramsden, P. & Moses, I. (1992) on Australian higher education cited in J M Consulting Ltd.,. *The Interactions between Teaching and Research*. Annex G - Bibliography and literature review.)

Qualitative and more broadly contextualized quantitative work has explored the complexity of the T&R interconnections. It has further suggested that despite the above empirical evidence, there are and can be positive synergies at the undergraduate level under certain circumstances, even if that interconnection is not tightly coupled.

“Findings indicated a very weak relationship between research productivity and classroom performance, but institutional and individual characteristics seemed to explain some differences” (Reference to the work of Noser, T. C., Manakyan, H., & Tanner, J. R. (1996) on economics faculty cited in J M Consulting Ltd. *The Interactions between Teaching and Research*. Annex G - Bibliography and literature review.).

“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” (Zaman, 2004).

“Within and across the three universities several kinds of connection between teaching and research were operating productively in both directions.... The relationships between teaching and research were differentiated by discipline, level of teaching and institutional mission” (Zubrick et al. from an Australian case study, 2001).

“Although there were many indications of research having a positive impact on teaching, this was not always a direct and straightforward relationship. In particular, there may be disciplinary differences between the extent of the interaction between teaching and research. At the undergraduate level, the relationship is more direct in the humanities than in the sciences, and at postgraduate levels the relationship is more direct in the sciences than in the humanities. Teaching can also have a positive impact on research, although this was evident to a lesser extent (Annex B - J M Consulting (2000), Report to HEFCE based on extensive study – using fieldwork in eight institutions, representing a range of higher education institutions).

And on the influence of teaching in research:

“Our numerical result, that 85% of respondents believe that their teaching has enhanced their research, is dramatic. This, and the associated, unsolicited, commentary lead us to believe that our survey results have uncovered a new view of the role of teaching in economics research. This view is not evident from reading biographical material, and has not been revealed by the literature reporting correlations or lack of correlation between research and teaching. This new view is that teaching influences research, in a wide variety of ways, at least among those scholars active in the research dimension” (Beckler & Kennedy, American Economic Review, 2004).

There has been significant international research and policy discussion of the *factors that promote or inhibit a positive synergy* between research and teaching and how best to foster or manage it. Indeed many of the international colloquia are directed at this very issue; it is a major concern of quality assurance agencies; various government agencies have commissioned case studies (e.g. Zubrick et al, DETYA, Australia 2001):

“Whilst much more needs to be known about what institutions can actually do to create real and beneficial linkages, it seems clear that many existing data collection, evaluation and reward systems retard rather than promote a positive relationship. Similarly national policies for promoting research appear to damage the relationship. Means need to be found of valuing the relationship so as to strengthen both student learning and staff research” (Final Report—Marwell 2004 Colloquium).

“The existence of this legal requirement [The Education Act of 1989 as amended in 1990 that states that in universities, “research and teaching are closely interdependent and most of their teaching is done by people who are active in advancing knowledge “], and the possibility that the government would change funding patterns to the universities’ detriment if were not achieved, suggested that there would be value in universities explaining the nature and consequences of this link, and ensuring that policies and procedures were in place to give effect to it. Such action was also warranted on academic grounds, as the legal mandate exists only as an encapsulation of current academic belief” (Woodhouse, 2001 New Zealand).

“The colloquium suggests that amongst the key variables in exploring these questions are the discipline or field of study, bearing in mind the fact that a significant proportion of academic work

is now multi- or interdisciplinary; the type of institution, department or programme (academic, professional etc); the definition(s) of knowledge held by the researcher; the approach being taken to research, e.g. “broad” or “narrow”; and the student’s learning motivation. The ways in which academic staff experience “research” may also be a significant factor” (Final Report - 2004 Marwell Colloquium).

Out of these types of studies have come a number of calls for *deliberate and active management* of the T&R nexus, e.g.:

“...we know from an increasing number of empirical studies, that while research endeavour and teaching endeavour are believed to be conceptually related in higher education, that relationship needs active management and explicit support since the pressures to split the two apart are powerful” (Higher Education Research Forum, Advice to Ministers, UK 2004).

As the discussion has evolved, various *other strands of exploration* are emerging – among them the nature of teaching and learning suitable for a “knowledge society”, on the changing nature of research, how faculty conceptualize both T&R and how these should interconnect in a positive sense. For example:

“In my research and writing I have been trying to develop new understandings of the relationship between teaching and research and what it means to develop that relationship to enhance both research practice and students’ learning. I have become convinced that we need to develop quite different ideas about the relationship of academics to students and that developing the relationship between teaching and research is to move towards a new kind of higher education encompassing inclusive scholarly communities. The resulting vision questions fundamental assumptions on which many present-day institutional practices are founded” (Angela Brew at the 2004 Marwell Conference).

“There is merit in considering the notion of public scholarship as a valid and timely inclusion in debates about how to develop an integrated approach to the core activities of teaching, research and scholarship in the sector. ...At a time of growing acknowledgement of the significance of Mode 2 knowledge production and associated fundamental shifts in modes of research and teaching (Gibbons et al., 1994), the public scholarship movement makes a valuable contribution to the discourse of integration and embeddedness that will be so important for ensuring effective and sustainable integration of teaching and learning, research and scholarship, and engagement in all its forms” (Kerri-Lee Krause, 2007).

“...A broadening of concept from research to that of disciplined enquiry enables the scope of university forms of enquiry to be widened to include applied research, research and development as well as scholarship. It is argued that all university teachers should be involved in one or other form of disciplined enquiry, even if only a minority can be involved in research in the traditional meanings of the word” (Maurice Kogan in OECD, 2004).

Additional insights are provided in Annex B which reproduces some of the literature on the desired positive attributes of the T&R nexus and summarizes the outcomes and implications of some larger international surveys of practice.

Student Views and Experiences

As the work of Brad Wuetherick (2007) outlines, there has been some work on student perceptions of and experiences with research in their undergraduate programs, albeit the literature is not as rich and extensive as most other aspects of the T&R nexus.

In a small survey of Australian students, Neumann (1994) found research to have positive benefits to students through credibility and relevance of the course offerings. Woodhouse (2001) observes, based on his work with the New Zealand quality assurance agency, that student's views on the T&R link are mixed but generally more positive than negative. Jenkins (2004) observes that, even in the studies with overall positive views of research, many students saw themselves as excluded and not stakeholders in the research process. In addition to a few studies on student perceptions, there has been some limited work looking at the impact on student learning of various forms of research integration into the curriculum and/or approach.

Three studies carried out at the University of Alberta (Brad Wuetherick, 2007) have explored different aspects of the relationship between research, teaching and learning from the undergraduate student perspective, with the following high level outcomes:

- *Awareness of Research* – A relatively high level of awareness of research activities being undertaken on campus.
- *Experiences with Research* – Despite high awareness, relatively few reported experiences with research among the same students – e.g. opportunities to undertake independent research projects (either inside or outside of a class), to work as research assistants, or to contribute to some form of research output (conference paper/poster, publication, etc.).
- *Positive and Negative Perceptions of Research* – About half of the students responded that research positively impacted their learning, (increased understanding, stimulating interest in the subject area), while between one-fifth and one-third of students believed that their experiences with research increased their awareness of problems faced by researchers, encouraged them to pursue post-graduate studies, increased their understanding of methodological issues in the discipline, or improved their research skills. Between 15 and 25% reported that research negatively impacted their learning environment through the instructor's lack of interest in teaching or the students' well-being, instructors' lack of availability, the distortion of course content towards research interests, and the inability of the instructor to communicate at an appropriate level.

Henkel (OECD, 2004) draws some conclusions from her review of the literature on student experiences:

- That various aspects of the research-teaching nexus have meaning and value for students at different levels and in a variety of contexts;
- academic concepts of knowledge and higher education continue to have influence;
- a range of students have benefited from being part of academic cultures, including achieving high levels of epistemological sophistication; and
- some categories of students are articulating for themselves the needs for access to research that may be different from what is offered by academics.

She cautions, however that in a mass education system, this may be difficult to deliver given that benefits from a T&R nexus is conditional on access to close and frequent contact with teachers.

Pressures Resulting from the Expansion of the Higher Education System

All systems of higher education have faced the challenges of expansion and accommodation of a larger and more diverse student population, in most cases without a concomitant increase in available funding or faculty compliment. Simultaneously there is more competition for limited research dollars. With these changes, should there be more stratification of the T&R mix of institutions within the higher education system, or of T&R functions within institutions, and/or recognition of the diversity of types of research and scholarship, only some of which are resource intensive? Are there innovative ways in which T&R can be linked in a cost-effective manner? Are there ways to approach that diversification without deconstructing

the positive benefits of an interconnection between T&R? Kogan (OECD, 2004) challenges with his comments:

“On the assumption that there will not be enough resources for all to undertake research ..., or indeed that only a substantial minority will have the capacity for it, we have to take some assumptions about the essential components of a university education as it is to be offered to students and match them to the disciplined enquiry spectrum. If we consider the characteristics necessary for research and teaching there is a great deal of overlap. Both require: mastery of substantive subject matter; an ability to conceptualise; to be conversant with main concepts and theories; the ability to present and disseminate research findings; to engage in collective administrative chores within basic unit; participation in disciplinary or subject area outside their own institution and country; and ability to supervise and examine doctoral learning methods for varied groups and levels of students. There are tasks and skills that are specific to the two activities, however, such as, for researchers, creating research questions or seeking research funding and, for teachers, converting research findings into curriculum or developing pastoral methods. So both combination and separation are feasible.”

Impacts of National Research Funding and Quality Assurance Systems

There is little doubt that the policies and practices of national and regional agencies have a profound impact on the values afforded T&R within national higher education systems. The dramatic rise in profile and funding of university research in many nations has shaped behaviour at the level of the system, institution and individual faculty member and this in turn has impacted on the undergraduate learning experience.

Three examples merit particular comment – the UK, the US, and New Zealand.

In the UK, a significant component of institutional funding has been linked to the outcomes of the RAE which has been challenged as having led to decreased linkages between T&R:

“...Yet the evidence is also clear that whatever the benefits the RAE might have brought to the organisation of research, research by Ian McNay and others has demonstrated the RAE resulting in institutions devaluing teaching; and structurally to a growing separation between the research worlds of the university and student learning” (Jenkins, 2007).

On the other hand, the Higher Education Funding Council of England (HEFCE) has taken major steps since 2003 to promote excellence in teaching and learning in higher education, perhaps as a counterforce. Seventy-four (74) UK Centres for Excellence in Teaching and Learning (CETLs) have been funded to foster integrating research-based learning into the undergraduate curriculum. Each CETL receives annual funding of £200,000 to £500,000 for five years, and a capital funding of £0.8 million to £2.35 million. This initiative represents HEFCE's largest ever single funding initiative in teaching and learning.

In Scotland, the Quality Assurance Agency has initiated action on a limited number of Enhancement Themes aimed to enhance the student learning experience. One of the two current themes is Research-Teaching Linkages. This action has two strands: 1) an ongoing sector-wide discussion within and between higher education institutions involving staff and students reflecting on, and exploring research-teaching linkages and how they can be maximised to enhance the achievement of graduate attributes and 2) A secondary discipline level strand which focuses on the sharing of and further development of current and emerging practice at the discipline level in nine broad areas of generally cognate subjects (Carney, 2007).

In the US, the Boyer commission report triggered a broader reform in the major funding agency – the National Science Foundation (NSF). In its Government Performance and Results Act (GPRA) Strategic Plan 2001-2006, the NSF stated that integration of research and education is one of “three core strategies that guide [NSF] in establishing priorities, identifying opportunities, and designing new programs and activities. . . . Effective integration of research and education at all levels infuses learning with the excitement of discovery and assures that the findings and methods of research are quickly and effectively communicated in a broader context and to a larger audience.”

This strategy has been translated into NSF policy and programs (Ramey, 2002). As a matter of policy, the NSF has introduced a “broader impacts” criterion that explicitly addresses the educational dimension of any research initiative:

“How well does the activity advance discovery and understanding while promoting teaching, training, and learning?...To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?”

It has also introduced a number of innovative programs designed to foster creative activities that bridge research and education in schools (through Teaching Fellowships), and throughout higher education, including the NSF Research Experiences for Undergraduates program and the Integrative Graduate Education and Research Training (IGERT) program. One aim of this latter program is to provide “a framework for integration of research and educational activities and for collaborative efforts in training that span disciplinary areas”.

Colbeck (2007) has observed that the NSF strategy to “fund projects that directly encourage integration of research and education as well as their requirement that research proposals demonstrate the broader impact of their outcomes – including on the improvement of teaching and learning – is influencing academic work” positively.

In New Zealand, as described earlier, the interconnection of T&R is enshrined in law. Within this framework, the New Zealand Universities Academic Audit Unit selected the T&R link as one audit focus in 1999-2001 and noted that this simple act of requiring self-study and self-assessment of this linkage triggered a great deal of institutional thought about the concept of the T&R nexus and what were its consequences in the context of each institution’s mission (Woodhouse, 2001). Recent government policies for the tertiary education system are seeking more focus on the relationship of processes to outputs/outcomes, and of the outputs/outcomes themselves. Jennings (2008) notes that:

“... the opportunities offered to quality assurance agencies such as the New Zealand Universities Academic Audit Unit, arising from the tertiary education reforms, are associated with their ability to provide the evidence about the real quality of the educational processes – the quality of student learning, the quality of student engagement with learning – which lie behind the measures and record of outputs and outcomes.”

The Canadian Discussion

Stuart Smith triggered a national debate on the quality of teaching/learning with his 1991 report “Commission of Inquiry on Canadian University Education”, but had relatively little impact on research in this area. In particular there was no follow through on the recommendation (#56) for a fund for practical research with clear implications for short term application (as would have informed the issue of the T&R nexus). But there was some continued dialogue. In 1994, the then Ontario Council on University Affairs (OCUA) notes that “*there is little functional interaction between undergraduate teaching and discovery research.*” A more controversial statement emerged from Pocklington and Tupper (2002):

“Our view is that university research often detracts from the quality of teaching. We regret the continuing elevation of research and the systematic neglect of the quality of instruction.”

However, there is relatively little primary Canadian literature on the T&R nexus.

In Canada, research on higher education is fragmented and generally not strongly policy oriented. The professional association – the Canadian Society for Studies in Higher Education (CSSHE) is a key national forum for higher education research. However, such discourse is absent from the last decade of publications in *The CSSHE Journal of Higher Education*. The Society for Teaching and Learning in Higher Education (STLHE) is dedicated to the quality of teaching and learning in postsecondary education and provides a means to share insights in a different type of forum, bringing together researchers and university administrators. There have been active and effective champions of the organization which has spearheaded high profile national meetings in recent years, integrating some consideration of the T&R nexus in the larger field of the scholarship of teaching and learning.

There is evidence of increasing institutional interest in the nexus. A 2006 Roundtable on Research, Teaching, and Learning was championed by the University of Guelph, in particular by President Alistair Summerlee. Senior representatives of a number of other universities were present and Mick Healey, a UK expert on the nexus, gave the keynote address.

The University of Alberta has instigated a Working Group on Teaching and Research, and a number of other institutions have invested heavily in offices dedicated to the quality of teaching. The University of British Columbia has appointed Carl Wieman, a Nobel Laureate in physics, to a special post designed to foster the quality of teaching – founded in the belief of a strong research-teaching connection. The University of Toronto has introduced a Research Opportunity Program that is based on the principle that a research intensive university should not divorce the function of teaching undergraduates from the imperative to do innovative research.

One of the triggers for the current level of interest in the T&R nexus in Canada is the impact of the cumulative investment of the federal government in sponsored research over the last decade – an investment that has not been matched by a concomitant profile for, or resourcing of, the teaching function. The particular federal investment in Canada Research Chairs (that are encouraged to teach, despite perceptions to the contrary) are seen by some as unduly privileging research over teaching.

Concluding Reflections and Recommendations

In light of this mass of diverse literature – some refereed scholarly outcomes, some discussions within the “scholarship of learning” community of practice, some larger policy reviews and discussions – what are realistic and logical “next steps” for HEQCO? Much depends on how the Council sees its role as monitor, catalyst and/or leader. Whatever that position, it is not evident that much will be gained by HEQCO simply pursuing the question of what is the “evidence” on the existence, or lack thereof, of the connection between teaching and research in Canada other than to enter into a rather non-productive debate on the nature of the methodology employed or the assumptions underlying any specific study.

However, it is equally evident that:

- Canada would benefit from more serious research and reflection in this area;
- Institutions would benefit from more awareness of the findings and insights from international research, discussion, and practice, all the while recognizing that constructive transfer of those experiences requires interpretation in a Canadian context;
- Quality, policy, and funding agencies play a key role in setting the conditions for a positive synergy.

While the T&R nexus has had considerable exposure in international spheres, attention has not been as intensive in Canada. Recent initiatives (e.g. University of Alberta, the University of Toronto project, and

the Guelph Symposium) have raised the profile, but it is far from the “leading edge” issue in higher education in Canada.

On one dimension, the evidence is clear and unambiguous - productive linkages between T&R have to be designed and nurtured; they are not created or sustained by chance. Even Hattie and Marsh (2004) who are committed to their finding of zero correlation in the interconnectedness of T&R are turning their attention to relationships at the institutional level and government policy, and to examining causal relationships between good research and effective teaching (trying to get away from “pronouncements based on belief”).

HEQCO (individually or in partnership with others) could be a key player in creating an environment of encouragement and active management for constructive synergies between T&R, with goals that could be shaped along the following lines:

- Creating a vision for the interconnection of teaching and learning in higher education for 2020 that includes consideration of how we conceive and organize research (interpreted broadly to include scholarship and participatory action research), and teaching (focusing particularly on what type of student learning we feel is appropriate).
- Catalyzing a stronger and well-networked Canadian presence in research focused on the T&R nexus.
- Assessing existing policies and practices, recommending changes, and identifying appropriate policies and practices to achieve the vision of a strong and effective T&R nexus. Consideration is required at the level of individuals, course teams, departments, disciplines, institutions, provinces, and national systems.
- Facilitating greater engagement of institutions, faculty, students, and policy and funding agencies in this discourse.

In many respects this is more an action agenda than it is a research agenda. Additional analysis and synthesis of the literature could be useful, but achieving the above goals (or variations thereof) is likely best approached by an interactive and iterative process that engages the key stakeholders in shaping the way forward and developing a common vision. Some options for consideration by HEQCO, ideally in partnership with other key stakeholders (including other provinces and federal agencies) follow:

- A series of focused workshops (dealing with different elements of the issues, e.g. how we should conceive and organize student learning/teaching and research looking forward to 2020; institutional reward structures; accountability and measurement; discipline characteristics of the T&R nexus; system and research funding system incentives and disincentives), leading to a larger colloquium in about 18 months time.
- Sponsorship of a research/community of practice network that would be charged with managing a resource website and active dialogue on issues related to the T&R nexus, including “best practices”, literature syntheses, discipline sub-networks.
- Catalysis of a student network (undergraduate and graduate) on the T&R nexus.
- Commission (or issue an RFP for) literature syntheses on specific elements of the agenda.
- Fund a limited number (through a competitive process) of institutional case studies on “good practices” at the T&R nexus (this could ultimately be used as source material for workshops and the larger symposium and/or material to populate a community resource website – perhaps ideally hosted by the T&R Nexus Network, rather than HEQCO).
- Work with partners such as Council of Ontario Universities (COU), federal funding agencies, other provincial bodies, and the AUCC to develop an innovative suite of programs that would focus on the T&R nexus (looking at the UK CETL’s and the NSF programs as possible models).
- Pursue philanthropic foundations as funding partners in projects designed to create new approaches to the T&R nexus.
- Consider hosting an international colloquium, perhaps joint with the UK, in a second phase.

For this to be both well received and robust, a carefully structured strategic steering committee would be useful – a group that will 1) ensure engagement of people at different levels within the system, 2) provide some substance expertise and 3) nurture the international connections. It will be important to draw in a larger community to provide the necessary reach, capacity, creativity, and influence. This initiative should touch all members of the community.

Annex 1 - Selected References

Nexus between Teaching and Research

A Useful Bibliographies

1. J M Consulting Ltd., Higher Education Consultancy Group. (July 2000). The Interactions Between Teaching and Research. Annex G - Bibliography and literature review. Available at: <http://www.hefce.ac.uk/research/review/>
2. Mick Healey, University of Gloucestershire. (February 2008). *Linking Research and Teaching: A selected bibliography*. Available at: <http://www.glos.ac.uk/shareddata/dms/E44EC054BCD42A0395B3E25AF8F78AD3.pdf>

B Literature References (most electronic)

Becker, W. E. and Kennedy, P. E. (2005). *Does Teaching Enhance Research in Economics?* Available at: http://www.aeaweb.org/annual_mtg_papers/2005/0107_1430_0901.pdf

Bishop, J. (2006). Media Release: The Hon Julie Bishop MP, Minister for Education, Science and Training. Keynote address of the Knowledge Transfer and Engagement Forum. Sydney, 16 June 2006. Available online: www.dest.gov.au/Ministers/Media/Bishop/2006/06/b001160606.asp

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Carnegie Foundation for the Advancement of Teaching, NJ.

Boyer Commission on Educating Undergraduates in the Research University (1998). *Reinventing undergraduate education: a blueprint for America's research universities*, Stony Brook: State University of New York at Stony Brook. Available at <http://naples.cc.sunysb.edu/Pres/boyer.nsf/>

Boyer Commission on Educating Undergraduates in the Research University (2001). *Reinventing Undergraduate Education: Three Years After the Boyer Report* Stony Brook: State University of New York at Stony Brook.

Brew, A. (2007). *Research and Teaching from the students' perspective*. Presentation at the Marwell 2007 Colloquium on International policies and practices for academic enquiry. Text of paper available at: http://portal-live.solent.ac.uk/university/rtconference/2007/resources/angela_brew.pdf

Brew, A (2005) *What do we know?*, presentation at the Canadian summit on the integration of teaching and research, Edmonton. Available at: www.uofaweb.ualberta.ca/researchandstudents/nav03.cfm?nav03=37558&nav02=37557&nav01=32191

Brew, A and Weir, J (2004). *Teaching-research nexus benchmarking project: The University of Sydney and Monash University*. Available at: www.adm.monash.edu.au/cheg/about/chegdocs/council-report-04/quality-report-council04-att3.html

Brew, A and Prosser, M T (2003). *Integrating quality practices in research-led teaching and institutional priorities*, Proceedings of the Australian Universities Quality Forum: National Quality in a Global Context, pp.118-121. Available at: www.auqa.edu.au/auqf/2003/program/day3.htm

Carney, C. (2007). *Enhancement Themes: Research-Teaching Linkages: Enhancing Graduate Attributes*. Presentation at the Marwell Colloquium on International policies and practices for academic enquiry. Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2007/resources/claire_carney.pdf

Christensen Hughes, J and Rog E (2006). *Roundtable on Research, Teaching and Learning Report on Canadian Federal Government and University of Guelph Policy Roundtable Discussions*, Guelph, 5-6 April www.mcmaster.ca/stlhe/projects/index.html

Clark, B. R. (1997). *The modern integration of research activities with teaching and learning*. Journal of Higher Education, 68 (3) , 242–255.

Clarke, B.R. (1995). *Places of Inquiry: Research and Advanced Education in Modern Universities*, Berkeley, Los Angeles and London, University of California Press.

Clark, B.R. (1991). *The Fragmentation of Research, Teaching and Study: an explorative essay* in M. A. Trow and T. Nybom (eds.) *University and Society: Essays on the Social Role of Research and Higher Education*, London: Jessica Kingsley Publishers, pp. 101-111.

Colbeck, C. (2007). *How does a national research/education funding policy influence academics' professional identities and careers?* Presentation at the Marwell 2007 Colloquium on International policies and practices for academic enquiry. Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2007/resources/carol_colbeck.pdf

Colbeck, C. (2005). *Creating an Academic Identity and the Impact of the Boyer Commission Report*. Presented at the Canadian Summit on the Integration of Teaching and Research University August 3-5, 2005

<http://www.uofaweb.ualberta.ca/researchandstudents//pdfs/CarolColbeck-CreatinganAcademicIdentity.pdf>

de Weert, Egbert (2004). *The Organisational Determination of the Teaching and Research Nexus in the 2004 Marwell Conference* Presentation at the Marwell 2004 Colloquium on Research and Teaching: closing the divide? Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2004/resources/de_weert_paper.pdf

Exchange. Issue 3 (2002). *Linking Research and Teaching*. Whole issue devoted to discussions of teaching and research, some from a policy perspective, some from the perspective of experiences of staff and students. Available at: <http://www.exchange.ac.uk/files/eissue3.pdf>

Gauthier, Michelle (2004). *Incentives and Accountability: the Canadian Context*. Higher Education Management and Policy. OECD. Volume 16, No. 2 . Available at

<http://www.oecd.org/dataoecd/23/1/37443466.pdf#page=17>

Gibbons, M, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott and Martin Trow. (1994) *The new production of knowledge: the dynamics of science and research in contemporary societies*. Sage Publications, London, California and New Delhi; 1994 [ISBN 0-8039-7793-X hardback; ISBN 0-8039-7794-8 (pbk)].

Grant, K. and Fitzgerald, S. (2005). *The Nexus Between Teaching and Research: A Qualitative Study Using two Focus Group on Academic Information Systems Teachers*. The Electronic Journal of Business Research Methodology Volume 3 Issue 1, pp 37-56, available online at www.ejbrm.com ;

<http://www.ejbrm.com/vol3/v3-i1/v3-i1-art4-grant.pdf>

Griffiths, R. (2004). *Knowledge production and the research-teaching nexus: the case of the built environment disciplines*. Studies in Higher Education Volume 29, Issue 6, December 2004 pages 709-726 as quoted in Healey 2004.

Hattie, J and Marsh, H W (2004). *One journey to unravel the relationship between research and teaching*. Presentation at an International Colloquium on Research and teaching: Closing the divide? Winchester, March 18-19. www.solent.ac.uk/ExternalUP/318/hattie_and_marsh_paper.doc

Hattie, J. and Marsh, H. 1996. *The Relationship Between Research and Teaching: A Meta Analysis*, Review of Educational Research, Vol. 66, No. 4, pp. 507–542.

Healey, M. (2004). *Linking research and teaching: Disciplinary perspectives*
Paper presented at Social Policy Association Conference: 'Third Way to Which Way?'
University of Nottingham, 13-15th July 2004.

Healey, M. and Jenkins, A. (2007). *Linking Teaching and Research in National Systems*. Presentation at the Marwell 2007 Colloquium on International policies and practices for academic enquiry. Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2007/resources/healey_jenkins.pdf

Henkel, Mary (2004). *Teaching and Research: the Idea of a Nexus*. Higher Education Management and Policy. OECD. Volume 16, No. 2 . Available at

<http://www.oecd.org/dataoecd/23/1/37443466.pdf#page=17>

Higher Education Research Forum, United Kingdom (2004).

<http://www.dfes.gov.uk/hegateway/herereform/herereform/index.cfm> and within that activity the provision of advice to UK Ministers on *The Relationship between Research and Teaching in Institutions of Higher Education*

[http://www.dfes.gov.uk/hegateway/uploads/Forum's_advice_to_Ministers_on_Teaching_and_Research\[1\].pdf](http://www.dfes.gov.uk/hegateway/uploads/Forum's_advice_to_Ministers_on_Teaching_and_Research[1].pdf)

Hoddinott, J. (2005). *How can we track the integration of teaching and research?* Presentation at the Canadian summit on the integration of teaching and research, Edmonton. Available at:

www.uofaweb.ualberta.ca/researchandstudents/nav03.cfm?nav03=37560&nav02=37557&nav01=32191

International Journal for the Scholarship of Teaching and Learning ISSN 1931-4744 © Georgia Southern University <http://www.georgiasouthern.edu/ijsot/> - a new international e-journal may merit watching for future discussions of teaching and research.

J M Consulting, Commonwealth Higher Education Management Service and the Institute of Education (2000) carried out a substantial research study as part of the HEFCE 1999 review - *Interactions between research, teaching, and other academic activities*. That report and its annexes contain a wealth of information on teaching and research, and the particular impact of the UK policies of research assessment on the interconnections.

<http://www.hefce.ac.uk/research/review/> and

<http://www.hefce.ac.uk/research/review/consult/trc.pdf>

Jenkins, Alan, Mick Healey and Roger Zetter (2007). *Linking Teaching and Research in Disciplines and Departments*. The Higher Education Academy.

http://www.heacademy.ac.uk/assets/York/documents/LinkingTeachingAndResearch_April07.pdf

Jenkins, Alan. (2007). *Towards sane UK national policies: or learning from some US policies*.

Presentation at the Marwell 2007 Colloquium on International policies and practices for academic enquiry. Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2007/resources/alan_jenkins.pdf

Jenkins, A. and Healey, M. (2005). *Institutional Strategies to link teaching and research*. The Higher Education Academy.

http://www.heacademy.ac.uk/assets/York/documents/ourwork/research/Institutional_strategies.pdf

Jenkins, A. (2004). *A Guide to the Research Evidence on Teaching Research Relations*. The Higher Education Academy. An accessible guide to research evidence on the relationships between research and teaching, focusing on how discipline based research impacts teaching practice and student learning.

http://www.heacademy.ac.uk/assets/York/documents/ourwork/research/id383_guide_to_research_evidence_on_teaching_research_relations.pdf

Jennings, John (2008). *The role of the New Zealand Universities Academic Audit Unit in a time of reform - contributing to quality New Zealand university education serving students' futures*. Publication available at:

http://www.nzuaau.ac.nz/nzuaau_site/reports/AcademicAuditServingStudentsFutures.pdf

Kogan, Maurice (2004). *Teaching and Research: some Framework Issues*. Higher Education Management and Policy. OECD. Volume 16, No. 2 . Available at

<http://www.oecd.org/dataoecd/23/1/37443466.pdf#page=17>

Krause, Kerri-Lee (2007). Australia. *Knowledge Transfer, Engagement and Public Scholarship: Emerging Possibilities for an Integrated Approach to Academic Enquiry* Presentation at the Marwell 2007 Colloquium on International policies and practices for academic enquiry. Text of paper available at

http://portal-live.solent.ac.uk/university/rtconference/2007/resources/kerrilee_krause.pdf

Lueddeke, George (2008). *Reconciling Research, Teaching and Scholarship in Higher Education: An Examination of Disciplinary Variation, the Curriculum and Learning*. International Journal for the Scholarship of Teaching and Learning Vol. 2, No. 1 (January 2008) ISSN 1931-4744 © Georgia Southern University. Available at

<http://www.georgiasouthern.edu/ijsot/>

McNeely, I. (2003). The unity of teaching and research: Humboldt's educational revolution, *Oregon Humanities* Fall, 32-35. An example of the discourse on values and vision.

<https://scholarsbank.uoregon.edu/dspace/handle/1794/1456>

Neumann, R. (1996). *Researching the teaching-research nexus: A critical review*. Australian Journal Of Education, 40(1), 5-18.

Neumann R. and Becher T. (2002). *Teaching and Learning in their Disciplinary Contexts: a conceptual analysis*. Studies in Higher Education, Volume 27, Number 4, 1 October 2002 , pp. 405-417(13)

Newby, H. (1999). Chair of one of five sub-groups in the HEFCE review of research policy and funding 1999. *The relationship between teaching, research and the other outputs of higher education institutions*.

That report is available through <http://www.hefce.ac.uk/research/review/>

Pocklington, T and Tupper, A (2002). *No place to learn: why universities aren't working*. Vancouver, BC: University of British Columbia Press (First chapter at:

www.ubcpres.ca/search/title_book.asp?BookID=1953)

Rameley, Judith (2004). *Research and Teaching: Closing the Divide? Policy Implications at the National Level in the United States*. National Science Foundation. Presentation at the 2004 Marwell Conference

http://portal-live.solent.ac.uk/university/rtconference/2004/resources/ramaley_paper.pdf

Rameley, Judith (2002). *The Engaged University: Integrating Research, Education and Community Service*. Presentation at the Reinvention Centre Conference on Undergraduate Research and Scholarship and the Mission of the Research University. Presentation available at: <http://www.reinventioncenter.miami.edu/conference/Ramaley.pdf>

Research Forum. (2004). Advice to Ministers: *The relationship between research and teaching in institutions of higher education*. Available at: [http://www.dfes.gov.uk/hegateway/uploads/forum's_advice_to_ministers_on_teaching_and_research\[1\].pdf](http://www.dfes.gov.uk/hegateway/uploads/forum's_advice_to_ministers_on_teaching_and_research[1].pdf)

Smith, Stuart (1991) *Commission of Inquiry on Canadian University Education*. AUCC. ISBN 0-8876-135-X.

Trowler, P and Wareham, T (2007) *Tribes, territories, research and teaching: enhancing the "teaching-research nexus"*. Literature review. Available at: www.lancs.ac.uk/fass/projects/nexus/documents/Deliverable_1_literature_review_13.9.7.doc

University of Alberta. (2004) *Integrating Research and Teaching at the University of Alberta: Creating a Foundation for an Inquiry-Based Life*. (2004) Final Report: Working Group on Teaching and Research. <http://www.uofaweb.ualberta.ca/researchandstudents/pdfs/FinalReportWorkingGroup.pdf>

Woodhouse, D (2001). *The teaching-research nexus: lessons from New Zealand audits*. Presentation at the VC Symposium: the teaching–research nexus: enhancing the links, University of Wollongong, Available at <http://cedir.uow.edu.au/nexus/dwoodhse.html>

Wuetherick, B and McLaughlin, L (2005). *Setting the basis for an inquiry-based life: but will this be on the exam?*, presentation at the Canadian summit on the integration of teaching and research, Edmonton. Available at www.uofaweb.ualberta.ca/researchandstudents/nav03.cfm?nav03=37562&nav02=37557&nav01=32191

Wuetherick, Brad (2007). *The Integration of Teaching and Research in Canada: The Undergraduate Student Perspective*. Paper presented at an international colloquium "International policies and practices for academic enquiry" Marwell 2007 Conference Centre, Winchester, UK. Available at: http://portal-live.solent.ac.uk/university/rtconference/2007/resources/brad_wuetherick.pdf

Zaman, Mohammad Qamaruz (2004) *Review of the academic evidence on the relationship between teaching and research in Higher Education*. London: Department for Education and Skills. This paper has an extensive review of much of the seminal literature on the issue, complete with analyses of the methodology. <http://www.dfes.gov.uk/research/data/uploadfiles/RR506.pdf>

Zubrick, A, Reid, I, and Rossiter, P (2001) *Strengthening the nexus between teaching and research*. Canberra: Department of Education, Training and Youth Affairs. Available at: www.dest.gov.au/sectors/higher_education/publications_resources/profiles/archives/strenghtening_the_nexus_between_teaching_and_research.htm#version

C Policy and Program Action References

The Quality Assurance Agency for Higher Education in Scotland has initiated action on a limited number of Enhancement Themes aimed to enhance the student learning experience. One of the two current themes (for 2007) is Research-Teaching Linkages.

<http://www.enhancementthemes.ac.uk/themes/ResearchTeaching/default.asp>

A paper by Alan Davidson provided some direction to the decisions that the steering committee took on how to frame the "action agenda" and is available at

<http://www.enhancementthemes.ac.uk/documents/ResearchTeaching/SHEEC03-02.pdf>

See also Claire Carney's presentation at Marwell 2007 conference http://portal-live.solent.ac.uk/university/rtconference/2007/resources/claire_carney.pdf

The University of Toronto Research Opportunity Program (ROP), established by the Faculty of Arts and Sciences in 1995, derives from the principle that a research intensive university should not divorce the function of teaching undergraduates from the imperative to do innovative research. Program description at <http://www.reinventioncenter.miami.edu/Spotlights/ResearchVenues.htm#toronto>

D Recent International Conferences/Colloquia (Samples)

19-21 April 2007. Marwell Conference Centre, Winchester, UK. *International policies and practices for academic enquiry.* Aim - to develop international understanding of the ways in which institutional and state/system policies can, and arguably should, be developed or modified to promote the integration of the core activities of teaching, research and scholarship and, increasingly "service" or "knowledge transfer" (scholarship of engagement). Three clusters of discussion – 1) concepts; 2) research criteria; 3) policy implications. Papers and video on web.

http://portal-live.solent.ac.uk/university/rtconference/rtcolloquium_home.aspx

24 Nov 2006. Millennium Gloucester Hotel, London. *Bringing Research and Teaching Together.* Aim - exploring links between research and undergraduate teaching programmes; learning from the UK and US experiences of linking research and teaching; and developing ideas and strategies to take this agenda forward in the UK. Presentations on web

http://www.heacademy.ac.uk/events/detail/research_and_teaching_conference_2006

8 Nov 2005. Cavendish Conference Centre, London. *The Teaching and Research Relationship: Developing Institutional Policy and Practice.* Focus - institutional policies, structures, processes and practices to develop the relationship between teaching and research. Presentations on web.

http://www.heacademy.ac.uk/events/detail/research_and_teaching_conference_2005

August 3-5 2005. University of Alberta. the Canadian Summit on the Integration of Teaching and Research. Aim - to bring together major Canadian and other international universities for discussion about the integration of teaching and research as a fundamental pillar of the undergraduate learning environment

<http://www.uofaweb.ualberta.ca/researchandstudents/nav03.cfm?nav03=37558&nav02=37557&nav01=32191>

June 11, 2005. Charlottown, PEI. *Towards a Framework for Quality Enhancement in Teaching and Learning: An Exploratory Seminar.* (Second Multi-national Forum of Teacher Scholars) Report of session on web. <http://www.mcmaster.ca/stilhe/3M.council/Forum%20Report.pdf>

November 18-19, 2004. Washington (Reinvention Centre). *Integrating Research into Undergraduate Education: The Value Added.* Aim - to distill the distinct characteristics of the educational experience research universities can offer and to articulate the "value added" of such an experience to undergraduates so that it is readily comprehended. Note –The Reinvention Center is a national center focusing on undergraduate education at research universities born of the excitement and intense national and international interest generated by the Boyer Commission Report.

www.sunysb.edu/Reinventioncenter/Conference_04/proceedings.htm

Conference proceedings available at:

<http://www.reinventioncenter.miami.edu/pdfs/proceedings2004.pdf>

18-19 March 2004. Marwell. *Research and Teaching: Closing the Divide?* Aim - to achieve a better understanding of the relationship, if any, between teaching and research in higher education, and to identify the policies that will enable that relationship to be enhanced particularly for the benefit of student learning but also for academic staff and the intellectual life of the university. Papers on web.

<http://portal-live.solent.ac.uk/university/rtconference/2004/marwell2004papers.aspx>

Final report of colloquium on web:

http://portal-live.solent.ac.uk/university/rtconference/2004/resources/colloquium_report.pdf

3rd October 2001. University of Wollongong, Australia. *The VC's Symposium on the Teaching-Research Nexus* (The Nexus Project). Aim – to examine how academics across disciplines at the University link their teaching and research interests and the ways in which the link may be strengthened. The day will end with organisational recommendations to enhance the link..Papers on web at

<http://cedir.uow.edu.au/nexus/events.html>

19- 20 January 2000. Chilworth Manor, Southampton. Seminar - *The Relationship between Research and Teaching in Higher Education: Present Realities, Future Possibilities*. Aim - The main purpose of the seminar was to consider how, why and in what circumstances teaching and research, both subject-based and pedagogical, should be linked in the context of the move towards a mass system of higher education. Seminar Report available at:

http://portal-live.solent.ac.uk/university/rtconference/2000/resources/relationship_paper.pdf

Annex 2 -

Capturing the Interconnection between Teaching and Research

There has been considerable work exploring the interconnection of teaching and research, and a diversity of ways in which it can be expressed. Examples follow of how various writers have captured/described beneficial synergies followed by the key observations from a couple of major investigative reviews of actual practice and an institutional action plan.

A From Newby, 1999¹

How does (should) teaching benefit from research?

Beneficial synergy – in a variety of ways in different disciplines and institutions, but three main mechanisms have been provisionally identified:

- ***Direct knowledge-led.*** High quality research can provide very clear benefits to student learning, for instance through exposure to a curriculum informed by knowledge at the cutting-edge. This benefit is most often held to occur (and is perhaps most direct and effective) in postgraduate teaching and in the later years of undergraduate courses in the 'scientific' or laboratory-based disciplines.
- ***Direct culture-led.*** This may be seen as the benefit in exposing students to the spirit of enquiry and the research method, to the search for and analysis of data, and the consequent development of their capacity to advance and defend theories and to subject ideas to critical analysis. This benefit is as clear in the arts, humanities and social sciences, as in the natural sciences.
- ***Indirect resource-based.*** Teaching can benefit from sharing the resources provided for research, from the role of research in attracting high-calibre staff to institutions and departments, and the generally beneficial impact on reputation and resources which research can bring to departments and institutions.

How does (should) research benefit from teaching?

The HE teaching base contributes to development of world class research. There appear to be three main mechanisms by which this is achieved:

- Direct stimulation and challenge of critical thinking which contact with students brings to researchers.
- The research outputs generated by students during course work and through projects associated with them.
- Programs aimed at inspiring and creating the research leaders of the future.

B From Healey (2004)²

Different ways of linking teaching and research:

- The content of courses is informed by staff research.

¹ Newby, H. (1999) Chair of one of five sub-groups in the HEFCE review of research policy and funding 1999. *The relationship between teaching, research and the other outputs of higher education institutions*. That report is available through <http://www.hefce.ac.uk/research/review/>

² Linking research and teaching: Disciplinary perspectives. Paper presented at Social Policy Association Conference: 'Third Way to Which Way?' University of Nottingham, 13-15th July 2004

- Students learn about research methods.
- Teaching methods adopt a research-based approach, such as through problem based learning.
- Students undertake their own research projects, whether individually or in teams. They assist staff with their research projects.
- Students gain experience of applied research/consultancy through work-based learning.
- Staff undertakes pedagogical research which benefits the quality of their teaching.

C from Griffiths, as quoted in Healey (2004)³

Models of the teaching-research nexus

- Teaching can be *research-led* in the sense that the curriculum is structured around subject content, and the content selected is directly based on the specialist research interests of the teaching staff; teaching is based on a traditional “information transmission” model; the emphasis is on understanding research findings rather than research processes; and little attempt is made to capture the two-way benefits of the research-teaching relationship.
- Teaching can be *research-oriented* in the sense that the curriculum places emphasis as much on understanding the processes by which knowledge is produced in the field as on learning the codified knowledge that has been achieved; careful attention is given to the teaching of inquiry skills and on acquiring a “research ethos”; and the research experiences of teaching staff are brought to bear in a more diffuse way.
- Teaching can be *research-based* in the sense that the curriculum is largely designed around inquiry-based activities, rather than on the acquisition of subject content; the experiences of staff in processes of inquiry are highly integrated into student learning activities; the division of roles between teacher and student is minimised; and the scope for two-way interactions between teaching and research is deliberately exploited.
- Teaching can be *research-informed* in the sense that it draws consciously on systematic inquiry into the teaching and learning process itself.

D. From Becker and Kennedy⁴

A variety of channels through which there is a positive effect of teaching on research (identified as the outcome of survey research in economics):

- *Honing Understanding* - teaching provided a perspective and understanding that had a positive influence on the way in which research is conducted.
- *Learning Through Teaching* - the best way to learn something is to attempt to teach it to others, uncovering new puzzles and prompting thinking about new issues.
- *Preparing for Class* – class preparation that involves looking at data for a lecture illustration, reading an article which otherwise would never have been read, or noticing something that had not been noticed before.
- *Explaining to Students* - thinking about how to present clearly and simply leads to new insights.
- *Classroom Trauma* – recognition through lecturing that faculty were not able to explain adequately the phenomenon they were teaching, leading to a complete rethink, and eventually a publication.
- *Discussing with Students* – Use of classroom discussions as testing grounds for ideas under development.
- *Student Questions* - questions from students, both shrewd and ignorant, that lead to substantive research.
- *Creating Examples* - efforts to find clarifying examples led to new and/or expanded inquiries.

³ Griffiths, R. (2004) Knowledge production and the research-teaching nexus: the case of the built environment disciplines. *Studies in Higher Education* Volume 29, Issue 6, December 2004 pages 709-726 as quoted in Healey 2004.

⁴ Becker, W. E. and Kennedy, P. E. (2005) “Does Teaching Enhance Research in Economics?,” http://www.aeaweb.org/annual_mtg_papers/2005/0107_1430_0901.pdf

- *Exam Questions* - the development of exam questions, where such questions by design often push the boundaries of the classroom material and so require further critical thought on the part of the instructor.
- *Supervising Students* – many forms: students producing examples from their own experience that do not fit the standard theory; students asking basic questions; students finding new data; students stimulating interest in a new topic; and students failing to replicate existing studies.
- *Pedagogical Experiments* - classroom experiments may create research value by turning up anomalies that lead to research seeking an explanation, and by revealing problems likely to be encountered when running an actual experiment.
- *Writing Textbooks* - writing a textbook may cause thinking through unfamiliar issues more carefully, sometimes revealing things that are not understood that need to be sorted out in the literature.
- *Research Strategy* - teaching influences the form of research, including giving up on a topic because the faculty member could not explain why it is important."

E From J.M. Consulting, Annex B⁵

This paper provides insights on the relationship (as defined by volumes, values and relationships) between teaching and research based on intensive fieldwork in eight institutions in the UK.

Re “volumes” of resources:

Staff time is a major resource in higher education, and many academics work over 40 hours each week. In terms of managing this resource, the evidence suggests that:

- Teaching is more quantifiable than research, and is more likely to be managed and driven by the high value of research; and
- although there were examples of different management systems in different departments, from weak to tightly managed systems, there was only one example of an *institutional* strategy for managing staff workloads.

Re “values” accorded:

In the broadest terms, it is possible to say that research is highly valued by the academic community. The high value accorded to research was in evidence in institutional and departmental policies, practices and strategies. However, the value-orientations of academics vary, and can be related to institutional, departmental and disciplinary cultures. There may be a tension between the values of staff and the departmental or institutional culture.

Overall observations

- Research has a higher value than teaching among academic staff across the sector.
- The values attributed to research and teaching have shifted over time.
- Some research-intensive institutions are placing more value on teaching, and many research-light institutions are encouraging staff to undertake more research.
- Teaching activities are more likely to be tightly managed than research activities, although the evidence suggests that research is the dominant cause of variations in workloads in most departments.
- Respondents generally claimed to work more than 40 hours per week. The value of research output in terms of academic careers is a strong motivating factor to work in the evenings and weekends.
- The pressures on academic staff, it was frequently argued, are leading to low morale.
- Many respondents claimed that their teaching and research are synergistic. We found little evidence to suggest that synergies between research and teaching were managed or promoted at departmental or institutional level.

⁵ Annex B – Academic Activity; Lead authors - Professor Ronald Barnett, Dr Kelly Coate, Professor Gareth Williams in J M Consulting, Commonwealth Higher Education Management Service and the Institute of Education (2000) research study as part of the HEFCE 1999 review - *Interactions between research, teaching, and other academic activities*

- (viii) There were some attempts to manage research and teaching 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.
- (ix) There are very few *institutional* strategies to manage staff workloads.
- (x) The positive impact that research can have on teaching varies between subject areas and levels of teaching. At the undergraduate level, the relationship between research and teaching is more direct in the humanities, and at postgraduate levels the relationship is more direct in the sciences.
- (xi) Teaching and research can also be independent of each other, and can even have a negative influence on each other.
- (xii) Staff work profiles and career trajectories vary considerably between individuals, between subjects, and between institutions.
- (xiii) Research training is more likely to be an integral part of departmental research in the sciences.
- (xiv) There are major subject variations and different underlying epistemological structures which influence the research culture within institutions.
- (xv) 'Scholarship' is understood in different ways across the sector. Its status and meaning varies between low and high research institutions.
- (xvi) 'Other' activities are not yet playing a significant part in the value systems of most academic staff.

F From Zubrick et al (2001)⁶

This systematic comparative examination of the ways the teaching-research nexus operates across the three universities in Australia used interviews with members of the senior executive management group in each university; analyses of relevant key policy documents and other discussion papers; and case vignettes from a range of academic staff from science, humanities and social science and the professions.

Factors that foster or encourage a positive nexus

A Within an institution

- Achieving a better balance between individual and departmental reward systems.
- Strategic policy alignment.
- Transparent outcomes for promotions and appointments exercises.
- Extending institutional learning from the outcomes of strategically funded projects.
- The development of better and, where possible, common metrics for teaching and research.

B. Outside or beyond the institution

- Professionally mandated curriculum and pedagogical changes.
- Seeking solutions to professional practice issues and problems.
- Publishers' demands for new kinds of student texts.
- Interfaces between policy and practice.

C Strengthening the nexus within undergraduate education

- Being more strategic in organising student project work around existing or developing staff research interests.
- Seeking and valuing the contributions of students in developing research methodology and analysis through their involvement in work-in-progress seminars.
- Acknowledging the contribution that students make to academics' work through their literature searches, field data, dissertations and work and life experiences.
- Considering how research and teaching might be linked through external organisations, such as through students' actual or potential employers, who could provide venues for developing research skills.

Impediments to a positive nexus

⁶ Zubrick, A, Reid, I, and Rossiter, P (2001) *Strengthening the nexus between teaching and research*. Canberra: Department of Education, Training and Youth Affairs. Available at:

- Persisting problems with reward systems:
 - Inadequate evaluation systems
 - Undervaluing diversity
 - Limited ability to dispense tangible rewards
- Underestimating the need for change
- Tacitly accepting a teaching/research dichotomy
- Rewarding quantity rather than quality in research
- The changing nature of academic work practices
- The challenge to build community, departmental and campus life

G *An Institutional Action Plan for Integration of Teaching and Research*⁷

Following a review of how its faculty integrated teaching and research the University of Alberta developed and published an action plan to advance this agenda. In addition to the following steps, it also supported three surveys that dealt with experiences with and perceptions of faculty research. The elements of the institutional action plan are:

A. Conceptualizing the Integration of Teaching and Research

1. Cultural Shift - The University of Alberta must continue to develop as a learner-centered institution and continue to develop ways to integrate research into the learning environment to enhance the undergraduate experience.
2. Values and Principles – The University of Alberta needs to state its commitment to its learning environment and its commitment to integrating teaching and research.
3. Environmental Scan – The University of Alberta should continue to scan the current practices on campus with respect to the integration of teaching and research.
4. Review Policies and Procedures – The University of Alberta should review its policies and procedures specifically around the integration of teaching and research.

B. Developing the Academic Plan for the University of Alberta

1. Experiencing and Doing Research - students must have opportunities throughout their programs to experience and conduct research.
2. Learning About Research - students must have opportunities throughout their programs to learn about research.
3. Developing Research Skills - students must have opportunities throughout their programs to develop research skills.
4. Setting the Foundation for an Inquiry-Based Life - students must be encouraged to develop as lifelong learners.

C. Facilitating the Integration of Teaching and Research

1. Professional Development - The University of Alberta should provide effective professional development opportunities for all academic staff on the integration of teaching and research.
2. Resources - The University of Alberta central administration must, as it develops its budgets over the coming years, ensure that adequate resources are dedicated across all areas of campus to integrate teaching and research effectively.
3. Administrative Structures - The University of Alberta must ensure that its administrative structures are enhanced to ensure they facilitate the integration of teaching and research in all areas of campus.
4. Celebrating - The University of Alberta must continue to celebrate its success stories about the integration of teaching and research, and the success of students in research.

⁷ University of Alberta. Integrating Research and Teaching at the University of Alberta: Creating a Foundation for an Inquiry-Based Life. (2004) Final Report: Working Group on Teaching and Research.
<http://www.uofaweb.ualberta.ca/researchandstudents/pdfs/FinalReportWorkingGroup.pdf>

5. Evaluating - The University of Alberta must evaluate its current programs and practices to ensure the campus is meeting the needs of our students with respect to integrating teaching and research.



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