ONE JOURNEY TO UNRAVEL THE RELATIONSHIP BETWEEN RESEARCH AND TEACHING

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This paper outlines the journey we have taken to research the relationship between research and teaching, and leads to recommendations for policy based on the findings. During this journey, we have had five major ventures seeking some directions for building models explaining the relationship between research and teaching.

But let us start with two issues: Our overall finding and the greatest misinterpretation of this overall finding. Overall, we have consistently found that there is a zero relationship between teaching and research at the individual academic 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. This we will address in our conclusions.

The Journey of Coming Together

The first part of the journey was the pre-working together phase where we had separately explored this relationship. Marsh (1984; 1987; Marsh & Overall, 1979) posited a model identifying the major potential factors in the nexus between teaching and research, and how these various factors were related. In this model, the near-zero relation between teaching and research outcomes is a function of the counterbalancing positive relation between teaching and research abilities and the negative relation between time required to be effective at teaching and research and, perhaps, the motivation to be a good researcher and a good teacher. In this model, the ability to be a good teacher and the ability to be a good researcher were posited to be positively correlated, whereas the motivation and time to be a good teacher and a good researcher were negatively correlated. Hence, the observed relation between actual teaching and research effectiveness were almost uncorrelated – the net effect of the counterbalancing influences. Hattie (1977) had suggested crossing teacher and course with effectiveness and improvement producing a "four-fold" model of teaching, and that course effectiveness may be most related to research quality and productivity.

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We were aware of some literature relating research and teaching, but it was the production of the first Australian Good University Guide that prompted our next journey, when one of the authors of the guide stated that the best advice she could give students was to seek the university with the greatest research activity, and do not go there. Similarly, Astin (1993) studied over 200 US TEOs and concluded "a college whose faculty is research-oriented increases student dissatisfaction and impacts negatively on most measures of cognitive and affective development" (p. 363). The reaction from colleagues was disgust, as it was incontrovertible that research and teaching were entwined—it was obvious, just look at them! This prompted a search for evidence to show that this suggestion of a negative relationship was incorrect. Hence, our first meta-analysis.

The Journey To Explore Prior Literature

The second part of out journey involved a systematic review of past literature, using meta-analysis, which is a method to systematically study prior research. The most difficult part of this study was locating the evidence—there just was not much of it, it was hidden in sometimes obscure journals, it was quite dated, and it was rarely theory or model driven. We tried to bring some order to this literature, and suggested reasoned arguments supporting many possible permutations relating the quality of teaching and research: a negative relationship (the scarcity of time and resources, the differential personalities and divergent reward systems), a zero relationship (they are different enterprises, unrelated personalities, and bureaucratic funding model), and a positive relationship (conventional wisdom, and similarity of underlying skills in teaching and research). The argument as to which model is most defensible is a research question, and this so often is forgotten as critics have claimed that what is self-obvious needs no evidence.

We found 58 studies (we would claim to have located close to all possible articles on this topic at that time), and derived 498 correlations of the relation between research and teaching. The weighted average of the relationship between quality of teaching and research is slightly positive = .06; less than 1% of the total variability in common. The relationships are noted by the preponderance of near-zero relationships and the resounding message is that there is very little variance, anywhere, between research and teaching. No matter how we investigated the data, zero was zero (Hattie & Marsh, 1996).

We were particularly interested in possible moderators, but found little to provide direction. There were no differences relating to the type of university (Doctoral, research, liberal arts, Polytechnics), domain of study, or type of teaching or research measure. We did find that the overall correlation between time on teaching and time on research was -.17. It does appear that there is a tension between the time devoted to the two activities, *but this tension may not be translated into differential outcomes*. Time on research is related to articles published, doctoral theses supervised, and citations. Time on teaching, however, is <u>not</u> related to quality of teaching. Those who spend more time on research do have higher research outcomes, but those who spend more time on teaching do not necessarily have higher teacher effectiveness. Further, time on research seems to come from non-teaching times, and there is not a one to one trade-off between time on teaching and research.

From this study (Hattie & Marsh, 1996) we concluded that the common belief that research and teaching are inextricably entwined is an enduring myth. Good researchers are only a little more likely to be better prepared as teachers and have better teaching competencies than non-researchers.

The Journey Onto Another Planet

The critics were vehement—we must be wrong, we looked in the wrong place, we were obsessed with correlations and the relationship is evident if only we had looked elsewhere. A most fascinating analysis of our work was undertaken by Robertson and Bond (2001), who interviewed academics who had read a review of our work. Some of the responses included: the study "is total twaddle and rubbish and I wouldn't bother myself to read the book let alone recommend it to

anybody," "it is well known that good researchers are generally good teachers," and "anyone who suggests that there is a zero link between research and teaching obviously lives on another planet to the one I live on" (p.8).

Similarly the critics queried whether correlations or qualitative research designs were most appropriate to address the key issues (Brew & Boud, 1995; Colbeck, 1998). It seems obvious to us that the choice of research method is unlikely to resolve these issues, as both can provide different perspectives. Similarly, the process and products of research are both critical. Another attempt to explain away the zero correlations is to redefine the meaning of research. Brew (1999) and Smelby (1998), for example, argued that the relation between teaching and research differs depending on how knowledge is viewed, it likely to be different at the under- and post-graduate levels. Brew claimed that if knowledge is viewed as objective and involves the creation or discovery of knowledge, "it would seem consistent to think that it requires transmission and absorption through a separately conceptualized teaching process" (Brew, 1999, p. 296). But, if knowledge is viewed as a product of communication and negotiation, then "the relation between teaching and learning becomes an intimate one". She suggested that research and teaching are not so distinct in academics' minds, as we find in most of the studies. The evidence from our various studies, which are based on the products of these various conceptions of teaching and research, provide no support for this view. We devised a study to tease out different conceptions of learning and teaching, with little gain. Teaching, in this and previous studies, is not narrowly conceived as lecturing, or research as publications, as Brew claimed. Instead, the process and products of research have been investigated from a variety of perspectives with little evidence of relations between teaching and research. 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. Maybe we need to explore this causal mechanism between differing conceptions and the effects of the conceptions to better understand why there is no linkage.

We assembled all the criticisms, devised a study to explore these alternatives, and in particular we wished to ensure that the best possible models of analyses are used (Hattie & Marsh, 1996). Our search was for potential mediating and moderating variables: including background variables such as research and teaching ability, satisfaction, personal goals, extrinsic rewards, constraints, beliefs; departmental ethos for teaching and research; resource issues, the most common being time on teaching and research; and the actual activities that academics undertake in pursuit of teaching and research outcomes. We spent some time constructing instruments to assess these possible moderators and mediators, and administered them to a sample (N=182) from one university. We also had access to multiple indicators of research publications and multiple indicators of teaching effectiveness – including academic's self-ratings of their own effectiveness as teachers and researchers.

The relation between the overall teacher rating and total number of publications was close to zero (r = .03) – and it remained zero in spite of many attempts to differentiate between construct specific methods of teaching (by the factors within the teaching evaluation) and research (by type or quality of publication), and by a factor analysis of the four indicators of teaching and the five indicators of publications. In the multi-level analyses model, the variance in teaching effectiveness (overall teacher rating), research publications (total publications), and the teaching-research relation was divided into variance due to differences between departments (level 2 - departmental level) and variance due to individual academics (level 1 - differences within departments). The variance components at the individual academic level were substantial, indicating that there was considerable variance at the level of individual academics. However, the covariance term (representing the teaching-research relation) was still close to zero, and this was consistent across the 20 academic departments. There are two separate issues that were worth distinguishing: (a) the size of the (zero) correlation did not differ significantly from department to department; (b) the size of the correlation between dept-avg teaching and dept-avg research also did not differ significantly from zero. It certainly demonstrates that differences in departmental ethos (or any other departmental characteristic) can

have little or no impact on teaching effectiveness, research publications, or the teaching-research relation. In contrast to suggestions by Ramsden and Moses (1992), there is no teaching-research relation at the departmental level.

We also built a structural equation model, more specifically to test Marsh's (1987) model. As predicted, there is a substantial negative relation between time spent on teaching and time spent on research (-.33) and no significant relation between teaching and research outcomes. There are, however, no significant relations between teaching and research ability or between teaching and research motivation. Also consistent with predictions, self-ratings of teaching ability have a moderate effect on students' evaluations of teaching (.28) and self-ratings of research ability have a substantial effect on research publications (.53). The corresponding motivation and time variables, however, have no significant effect on the teaching and research outcome variables (beyond what can be explained in terms of the ability self-ratings). Self-rated research ability has many effects in addition to its effect on research outcomes, such as positive relations to research motivation and time spent on research, and negative effects on teaching motivation and time spent on teaching. Self-rated teaching ability has no significant effect on teaching motivation or time spent on teaching, but had a negative effect on research motivation. Furthermore, despite the halo method effects that are likely to produce a positive bias between self-ratings of teaching and research, even these two self-ratings were close to zero ($r = .10$). Hence, even when asked to rate their teaching and research, responses from academics do not support a positive relation between the two activities.

With respect to "time", we found that time on research is related to research productivity but not teaching effectiveness, whereas time on teaching is not related to teaching effectiveness and slightly negatively related to research productivity. Those who spend more time on research do have higher research outcomes, but those who spend more time on teaching do not seem to be more effective teachers. Where there is some choice, academics choose to reduce time devoted to undergraduate teaching and increase time devoted to graduate teaching; and in particular halve administrative duties. Also, academics vary in the total amount of time that they give to their work per week. Following Feldman (1987) and our meta-analysis, we would agree that time on research probably comes from non-teaching times, and that there is, at best, not a one to one trade-off between time on teaching and research.

In an attempt to more directly target the teaching-research nexus, we specifically constructed scales about academic beliefs that effective teaching facilitates effective research and that research productivity facilitates effective teaching. Responses to the two scales were substantially correlated (high scores on one were related to high scores on the other—suggesting a mutual facilitation) and academics differed substantially in the extent to which they thought that either activity facilitated the other. However, there was no evidence that these beliefs moderated the relationship between the two activities. The teaching/research relation was still close to zero even for those academics who believed that one or both activities facilitated the other in their own work.

We also found that research activity could predict many indicators, such as self-ratings of research ability, personal goals, proportion of time spent on research, and research nexus (the belief that research facilitates teaching effectiveness). But teaching effectiveness predicted little on the teaching side. The teaching-research relation was highest for those who spent the highest proportion of their time teaching, almost zero for those who spend moderate amounts of time teaching, and negative for those who spend the lowest proportion of time teaching. The teaching-research relation is no more positive for those who have the most positive beliefs that good teaching contributes to good research and vice versa. This suggests that academics who spend a high proportion of their time devoted to teaching are able to devise strategies whereby their teaching efforts contribute to their research productivity, and those who believe teaching and research are related are less likely to exhibit this relationship.

At the end of this leg of our journey we concluded that there was strong support for the "independent constructs" of research and teaching. There is some support for their antagonistic nature in relation to time spent on the two activities, but this does not explain why the relation between teaching and research outcomes is not more positive. We found no support for the various suggested mediators and moderators. These results support earlier conclusions that the near-zero correlation between teaching and research is very robust.

The Journey Into The Core Of The Institution

That our research has had little effect on academic's beliefs does not surprise us, but during this part of our journey we wanted to more fully understand the contexts in which academics work that allow them to sustain this belief, contrary to the evidence. Hence, we more fully investigated the context of a large teaching and research University to find when teaching and research came together, and how the nexus was promoted.

In New Zealand (NZ) there is a 3-4 year cycle of the Government auditing universities based on the requirements of the NZ Education Amendment Act (1990). This Act stipulates that a criterion of a University is that research and teaching are closely interdependent and that most of the teaching is conducted by people who are active in advancing knowledge (not that such mandates are necessarily effective; within 10 years in a country with a population of 3m+ there were over 1000 tertiary education organizations in NZ, most claiming to meet the provisions of the Act!). In the 1999 audit, one of the three questions was the degree to which each University fostered the relation between teaching and research. As part of the audit, the University described in this case study investigated every policy and practice to demonstrate how they operationalised this nexus, and a survey was conducted of heads of the academic units to ascertain the degree of success achieved in enhancing the teaching/research relationship

The Mission statement of the University clearly expresses at its outset (p. 1) the University's aspirations to achieve high international standing as a teaching and research institution. One strategy to achieve and deliver high quality undergraduate and postgraduate education is by "retaining a core commitment to research-based teaching and enhancing scholarship through clearly linking research, professional practice and teaching" (p. 13); by "ensuring that research and creative work inform teaching and supervision at undergraduate and postgraduate levels" (p. 14); and by "giving high priority in the academic development, reward and recognition systems of the University to excellence and innovation in creative work, research, research training and research dissemination" (p. 14).

The University therefore expected that the consequences of the link between teaching and research would be: visible in institutional policies, in departmental and academic staff practice; should be experienced positively by students in learning situations; active and productive researchers should be teaching at all academic levels; recent research should be incorporated into undergraduate and postgraduate teaching; the research culture should have an influence upon teaching and learning; academic advancement criteria should recognize and reward teaching/research links; noteworthy accomplishments pertaining to the link should receive public acknowledgement; academic staff training should support the building of the nexus; and to assist their training, students should have opportunities to participate in research teams. Thus, if a nexus exists, the University expected that there will be tangible reciprocal and mutually supportive links between teaching and research, and that these links should be experienced and nurtured through the activities of both academic staff and students.

However, it was difficult to find this Mission executed in the policy statements. For example the Standard Employment Contract schedule of duties stated that academic staff are employed to: (i) engage in research and publication within the field of their appointment; (ii) conduct research-informed teaching in accordance with their share of the Department, School or Center's teaching program. But no comment about the nexus; it is assumed by its absence! Departments indicated in

the teaching/research nexus survey that it is common practice for the particular research activities of staff to be taken into account in allocating teaching topics and duties, but they rarely cited evidence beyond specific incidents (e.g., a comment about one staff member indicated he was "developing a GIS capability in his teaching which is a new research interest. His research has provided the basis of the papers in Infrastructure Planning, first offered in 1996 … is a direct spin-off from his research program and has, in turn, stimulated a number of graduate students to carry out thesis work in the area of careers").

The University awards annual Distinguished Teaching Awards, and the Vice Chancellor regularly has Recognition Dinners to celebrate research excellence and other commitments to the University. It has not, despite being encouraged, established an award recognizing the best teacher/researchers, preferring to recognize them separately. One of the few instances where there was a policy encouraging the nexus, was in the criteria for the annual Teaching Improvement Grants, which asked for a "demonstration of a relationship between teaching and research". The only instance in appointment, continuation, promotion, performance review, or application for study leave was for in the 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.

The argument in the audit was that "The University has concluded that its teaching is done mainly by staff who are involved in research. This reflects the institutional priority placed on research-based teaching. Mechanisms exist to balance individual staff workloads between the two activities in order to take maximum advantage of skills. Furthermore, there are support and development processes in place that encourage researchers to reflect upon and improve their teaching performance." It was claimed that the teaching/research nexus was most evident in postgraduate teaching, via staff-student team teaching (usually of undergraduate courses), in research seminars, and in co-authorship of research outputs. Almost all academic staff respondents in the "Research Informed Teaching" study claimed that a *research culture* permeated the teaching process at the University, and this research culture was thought to be a consequence of researchers' personal qualities (e.g., spirit of enquiry, intellectual rigour and critical self-reflection), interacting with collaboration and competition with colleagues and reinforced by institutional imperatives of excellence in scholarship, research originality and knowledge dissemination. This University has been most active in seeking changes to these policies, and is committed to ascertaining: how reward structures may identify and acknowledge more directly the links between good teaching and good research; the effects of the nexus in the learning environment (mainly by devising measures of student satisfaction that they are seeing and experiencing the benefits of research in teaching), and modifying the University's research management plan.

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.

The Journey Into The Policy World

Given this research activity, we have been asked on many occasions for comment, our work has been cited more often defending the claim that teaching and research should be separately funded (we never made this interpretation), and we have been vilified for "kicking an own goal", "bringing academia into disrepute", and "working for the government".

We wish to repeat the statement we made at the outset about what we have and have not said. It is incorrect to use our findings as causal to the claim 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 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 as 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 if the correlation is perfect, zero, or negative. Such a policy decision is more a function of where the system wishes to go.

We also have not researched the relationship between teaching and research at the Institution level, and while we have found limited evidence of such research, we have not made claims about how Institutions develop, or should develop. 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. A research plan at the highest level would entail relating the research quantum of Universities with a method for evaluating teaching common across the Universities. This could lead to statements that Institutions with research (or teaching) profiles also have high teaching (or research) profiles. Such evaluation systems are rare, but they do exist and we are exploring options to conduct such research (we note, also, that a further level of analysis well worth exploring is at the discipline level).

At the Institution level

A worthwhile question is to ask: "What would a University look like where there was substantial evidence of a teaching-research nexus?" We argue that this question should guide Universities that wish to be funded as teaching and research institutions (and they should also ask "What evidence would they accept that the nexus was not present?"). There are numerous strategies that can be used to enhance the relation. Woodhouse (1998) and Jenkins, Blackman, Lindsay, and Paton-Saltzberg (1998) outline many such actions from a student perspective, and Hattie and Marsh (1996; Marsh & Hattie, 2002) from a staff and university perspective. We would consider this to include:

- Evidence in the policy documents that the link was primary, identified and esteemed
- Appointment, continuation, and promotion policies demanded evidence of the link
- Evidence that they select, retain, promote, and support academics who are good at both teaching and research
- A reward or recognition system that requires a minimum quality threshold of activity in research *and* teaching, and a de-emphasis on rewarding one or the other
- Institutional systems for rewarding creativity, commitment, investigativeness, and critical analysis in both teaching and research by academics and students, and particularly valuing these attributes when they occur in both teaching/learning and research
- A workable mechanism whereby the job conditions can change to meet the needs of the Institution and the academic in the proportion of time given to teaching and research (and other commitments)
- A mix of academics, some specializing in teaching, some in research, but the majority in both
- That the best researchers teach across all levels of the programs
- Evidence that the academics role model the research orientation (in the processes of how research needs to be conducted and in productivity and quality)
- Availability of professional development training in becoming an excellent teacher/researcher, and learning how to improve based on feedback evidence (see Marsh & Roche, 1993)

- Courses which "teach" research activity typical of that area, and where the processes of research used by scholars in that field were learned
- Courses where the material was up-to-date, and includes the lecturer's research writings
- An emphasis on learning the research method and experience, rather than an emphasis on any particular conception of model of teaching and/or research. It is the students' learning that is more critical than the lecturer's teaching or research methods
- At the undergraduate years there is an emphasis on the process of research (see Zubrick Reid & Rossiter, 2001), and in the graduate years there is also an increasing commitment to their involvement in the products of research
- The success of the academic programs are measured in terms of the students' knowledge of current research, demonstrations of the research processes in the area, a demonstration of and commitment to the principles of research enquiry, and an eagerness to (re-)search for more understanding of the area. This to be illustrated in the exam questions, assignments, and course experiences
- A major aim of the Institution being to increase the relations between teaching and research and continually devise strategies to achieve this Mission
- Evidence that there is "independent research-based investigations as to whether our institutional mission and our departmental teaching and research policies are underpinned by research evidence" (Jenkins, unpublished manuscript, p. 347)

At the academic level

Similarly we can ask: "What would an academic look like where there was substantial evidence of a teaching-research nexus?" Many of the above would hold, but there are extra sources of evidence. One is that the academic participates in the research domain, and this involves the presence of research outputs. Certainly the RAE (and equivalents in Australia, Hong Kong, and now NZ) has demonstrated that there is less research productivity in the more professional schools (business, teaching, social work, dentistry, clinical medicine), and certainly that not all academics, even in the highest rated Institutions, publish regularly (although it is rare to find an academic who does not proclaim that they "research"). Indeed a major explanation for the zero relationship is that the frequency of publications is very low, and this restriction of range severely reduces the correlation between research and teaching.

There is every reason to believe that such an academic could have various conceptions of teaching and research. There is no need to "prescribe" any of Boyer-type conceptions of scholarship, or Brew's (1999) four conceptions of research: domino (problem solving) trading (research is products and people), layer (process of discovery), and journey (journey of discovery). There is no need to claim a particular priority for these beliefs, as does Brew, who concluded that research and teaching are both viewed as activities where individuals and groups negotiate meanings, building knowledge within a social context. There is, however, not *one* conception valued over any other, and nor is any move to legislate on teaching and/or research likely to make a difference.

We can certainly imagine teachers developing research skills in the learning of their students, even when the teachers do not themselves have an active research program (our secondary school teachers are excellent in such teaching). This, surely, is not as convincing as active researchers teaching – providing (and here is the issue) that they are as excellent in teaching as the non-researcher. It is excellence in both that is esteemed.

There are academics (particularly in the professional schools) who spend more energies setting up meaningful experiences for their students, assessing not only whether they have the material but can use it in various (often pressurized) contexts, and see teaching more as the development of a person. Academics with these beliefs spend much time, effort, and commitment working with their students. They rarely use the traditional lecture methods (and a tutorial or some labs) as their dominant approach (an approach which is more likely to mimic how research in some disciplines actually occurs, and it allows the academic the time to engage in research usually accompanied by

students doing the lab work, etc.). More likely the teaching in these (e.g., professional) contexts portrays research as somewhat detached or separate from the people who discovered it, and the rich professional contexts in which the students are learning are NOT the same contexts in which they do their own research. Hence the activity of teaching is very divorced from research, unlike the traditional lecture model. Herein lies one major explanation for the unrelatedness of teaching and research.

A further theme emerging in recent literature is to more closely examine the actual *tasks* undertaken by academics and argue that there are common tasks in both teaching and research. Colbeck (1998) observed 12 academics in two universities and claimed that the mean proportion of time engaged in activities that integrated teaching and research time was 19%. She found that this proportion was less influenced by the levels of students (under- or post-graduate) and more by the purpose of teaching (classroom or training students to conduct research). Academics who use a master-apprentice model rather than a counselor model to teach students how to conduct research were more likely to integrate research into teaching. The integration occurred more in universities that had broader conceptions of what counts for research (ironically the less esteemed Universities), and where there was more flexibility by academics to choose their teaching responsibilities and courses. Colbeck suggested that we and others have not found a relation because we are looking at outputs of activities whereas we should be looking at the nature of the activities. While we have some agreement with this criticism, we would also hope that the outputs of teaching and research (learning and student evaluations, research productivity and quality) are also related—and they are not.

At the government level

But why would a University invest in such a model to enhance the relationships between teaching and research IF the grants process by which it receives funds is not supportive of these initiatives. The more elite universities (Ivy League, Sandstones, Oxbridge) have a vested interest in funding based on research performance, and many have thence claimed that because their research performance is exemplary *ergo* so is their teaching (see Cuban, 1999, for an excellent discussion about how Stanford promoted this claim). Given the missions of Governments in recent years has been to open places for more students and promote equity, there has been more attention on funding "places"—and the discussion about quality means quality for employability and quality of the teaching/learning experience (wherein thence is the need for research?).

To advance the Mission of teaching and research, we would contend that it is necessary for Governments to provide funding for Institutions that can demonstrate that a minimum percentage of their staff exceed a threshold in research and teaching. Funding for other research and teaching could then supplement other initiatives where desired (the most common still being based on student numbers). The issue may be that this funding is only in some Departments/Disciplines or for some programs (e.g., doctoral and masters), but such contentious conditions will need debate. Such a policy would also place more emphasis on the assessment of teaching and learning, and this can only be worthwhile.

The current situation with the assessment of research is quite advanced (e.g., RAE, Research Quantum, PBRF) but, despite the longer history, the assessment of teaching/learning it is less advanced. Most assessments have been by students evaluating their teaching and courses and we see much merit in this method (Marsh, 1984, 1987). What is problematic is that the quality of teaching and learning is rarely compared appropriately across teaching methods, rarely uses item response models, and rarely is equated appropriately across institutions (see van der Linden & Hambleton, 1997). We have suggested a remedy to this problem (Hattie, 2003).

In many ways the US Universities have less funding debates tied to whether there is or is not a nexus between teaching and research; they seem to have long resolved this issue. A major difference between the US and UK (and Australian, Hong Kong, NZ) context is that in the US there is a longer tradition of tertiary institutions having clearer purposes (there has been no recent Thatcher

or Dawkins revolution): the Carnegie classifications of Doctoral, Masters, and Liberal Arts etc. are widely accepted whereas in the UK context there is still a struggle to be a "bit of everything. The US funding model is very much student based and much research funding comes from "outside" agencies such as Government, philanthropies, and the military. In the US there is more stability in the teaching context, whereas in the UK there has been a major shift in the conditions of Universities (e.g., staff:student ratios, note Marginson, 2003, has documented the change from 1:14 SSR in 1970 to 1:25 in 2003 in Australian Universities), there have been changes in the intellectual qualities of the student body, and there is a seemingly constant change in curricula and courses as the system has endeavored to open access to students in the UK. In the US there has long been a professional class of academic administrators who run Faculties and Universities whereas in the UK there is still an expectation that academics who teach and research are in the best position to also govern and administer (and it is this administration that teachers and/or researchers want most to be rid of). Now the UK system (Government and Institutions) are turning to face the issues of research and teaching quality given that the tertiary doors have been opened widely. Quality costs; and by giving funds to all under the assumption that all are teacher/researchers is costly. There is a tension here as Universities want to be full of teacher/researchers, but they do not necessarily want all other Universities to be similarly funded (as then they get less).

It has been demonstrated that the relative returns from research and teaching are quite different for the academic than for the Institution. Hum (2000) has shown that researchers will receive greater rewards so long as its market reach is longer, research talent is in shorter supply, and the benefits of research can be partially appropriated by individual scholars (you did *not* invite us on this exciting trip from the antipodes to the UK because we had made contributions to teaching!). Teaching is more "exchangeable" in that others can readily take on the course and teach; this is less the case for research. Teaching remains "fundamentally a local market, interactive, and personal process, while research is open to the wider market, non-interactive, and public good phenomenon" (p. 13). Hence those who are less exchangeable are more valuable to a University. The key to resolving the teaching-research nexus is to make the most valuable person across Universities the best researcher and teacher. Academics gain many rewards from the many research grants (esteem, intrinsic and extrinsic rewards), but from teaching mainly gain only intrinsic rewards and a constant debate about workload.

The Next Phase of Our Journey

Our current thinking is more related to what Institutions do with respect to enhancing the nexus between teaching and research. We are still committed to the finding that good researchers are neither more nor less likely to be effective teachers than are poor researchers. Good teachers are neither more nor less likely to be productive researchers than are good teachers. There are roughly equal numbers of academics who – relative to other academics—are: (a) good at both teaching and research, (b) poor at both teaching and research; (c) good at teaching but poor at research; and (d) poor at teaching but good at research. Perhaps identifying groups of researchers in these four quadrants and then evaluating ways of changing them such that they end in a different (and supposedly more desirable) quadrant would be most fruitful. It is highly likely that any such shift would require changes not only to the academic but particularly to the Institution policies.

We may, however, need to stop looking at academics or the ethos of departments and move more to asking about Institutional and Government policy level. Our research has shown at the academic level the correlation is zero, the multilevel analyses demonstrated that the near-zero correlation between teaching and research was remarkably robust across 20 academic departments. It is rare to find a set of findings so robustly centered on zero. The "answer" appears more related to what Institutions do or do not do.

We need to remind ourselves that the origins of universities came from the transmission of knowledge, culture and values (i.e., from a teaching role), and it was only much later (start of 20th century) that this transmission was enhanced by the pursuit of research (e.g., Leinster-Mackay,

1978). It would be difficult to imagine today's university teachers not being aware of recent research, although whether they have to also generate this research to be excellent teachers is questioned by the results of this and other studies on the relation between teaching and research is close to zero. Perhaps the major implication of this study is that it may be of most value to ask institutions how they could re-weight research and teaching *within* institutions and departments—if they decided to have and could afford such a Mission.

Like our voyage, there is a need for Governments and Universities to have many journeys before we they begin to enhance the relationship between teaching and research. They will need to come together, to explore prior literature, agree the solution is on the same planet, address issues at the core of the Institution, ensure appropriate policy, and then guarantee that the evidence about the nexus between teaching and research will be robust, acted upon, and esteemed. But there are still many journeys ahead, and it seems at least, a major journey should be to investigate the relationship at the Institution level, the causal mechanisms that lead to greater (or any) link, and to stop making pronouncements based on belief. The question as to the nexus is a research question, and only dependable evidence will address it.

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