The University of Sydney

Institute
for Teaching
and Learning

Research-led Teaching and Scholarship of Teaching Project

Report to Teaching and Learning Committee of Academic Board

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on behalf of the
Research-led Teaching Working Group

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Contents

1. **Background**

   In 2000 a University-wide project was established by the Pro-Vice Chancellor (Teaching and Learning) to address aspects of the Strategic Plan related to the relationship between teaching and research. Key project aims for 2001-2005 were to:

       (a) Increasingly employ undergraduate teaching and learning strategies which enhance the links between research and teaching and utilise scholarly inquiry as an organising principle in departmental organisation, and curriculum development.

       (b) Encourage and reward the scholarship of teaching.

   In May 2002, a report was prepared and a presentation made to the University's Teaching and Learning Committee spelling out the vision and the results of the investigation into best practice, and outlining progress to date. The report suggested that it was now time to give further impetus to the project. Teaching and Learning Committee endorsed the recommendations of the report, including the establishment of a Working Group to discuss how to further this initiative at Faculty, School and Departmental levels and to develop a set of indicators whereby progress could be monitored based on international best practice. A Working Group consisting of Faculty representatives nominated by the Deans was accordingly set up.

2. **Key Achievements**

       (a) The Working Group has established a draft set of performance indicators for research-led teaching and the scholarship of teaching.

       (b) Data has been collected in relation to the majority of the performance indicators

       (c) At the suggestion of the Working Group, in collaboration with the Marketing Department, the university marketing survey now gives data on student university choices in relation to the research record of the university

       (d) The educational output of cooperative research centres has been investigated

       (e) A statement on what the university understands by research-led teaching has been drafted

       (f) A research-led teaching and scholarship of teaching website has been established

       (g) Workshops and presentations on research-led teaching have been held in faculties

       (h) A pilot project on students' experiences of research in the University of Sydney has been undertaken

       (i) A formal benchmarking relationship has been established with Monash University

3. **Executive Summary**

   There is a demonstrated need at all levels to improve students' perceptions of research and its relationship to their courses. The findings of this report suggest that faculties could better articulate information about the University's research and the role of research in undergraduate teaching in their marketing material. A qualitative study of students' experiences will provide further information to inform future strategies.

   Academic capacity to integrate research and teaching is high owing to the large proportion of research active staff in the university. The findings suggest that there is a need to increase the proportion of senior staff who teach at first and second year levels in most faculties. The issue of how senior staff with large research roles could further contribute to research-led teaching in first and second year levels needs further exploration. Further work also needs to be done to examine the effects of casualisation on the University's ability to integrate research and teaching. Implementation of the Academic Board Policy on Postgraduate Research Higher Degree Training and supervision will enable the extent to which supervisors are active researchers to be assessed.

   There is good evidence that curricula are being designed to engage students in a variety of research-based activities, induct them into the research community and develop an awareness of research. Nonetheless, there is scope for all Faculties to extend the ways in which they currently integrate research and teaching in curricula and develop the opportunities students have to engage in research-based activities. The research publications of staff could be publicised more widely in all faculties.

   The report findings indicate that School and Department encouragement for aligning research and teaching is varied across the University. Not all undergraduate students have the opportunity to engage in research seminar programs. More could be done to develop the relationship between research and teaching through TIF and strategic development funds. Not all Departments have formal or informal teaching benchmarking relationships and/or collaborative curriculum development activities with similar Schools and Departments in other research-intensive universities. Such activities need to be encouraged.

Faculty encouragement for research-led teaching is also varied. As Strategic and Teaching and Learning Plans are revised it is hoped that all faculties will include encouragement of research-led teaching including strategies applicable at all levels. Good practice in establishing internal pedagogical research grant schemes by some faculties should be emulated by others. In many cases there remains a perception that research-led teaching is appropriate for senior year students. The Working Group encourages faculties to consider the extension of strategies to develop research-led teaching to more junior undergraduate levels. Evidence-based teaching is being used in a number of faculties. The Working Group considers that more work needs to be done to articulate the relationship between research-led teaching and the scholarship of teaching.

Encouragement of research-led teaching should be at all levels of the University. The Working Group hopes that College Pro-Vice-Chancellors will include strategies to encourage the linking of research and teaching and specifically research-led teaching in revised College Strategic Plans.

The University's Strategic Plan includes statements demonstrating the University's commitment to strengthening the relationship between research and teaching. It is hoped these statements can be strengthened when the Plan is next revised.

The University's Research Management Plan and research policies currently make scant reference to teaching. Teaching policies are varied in the extent to which research-led teaching is encouraged. More recent policies include substantial references to it. Further consideration of the ways in which research and teaching can be of mutual benefit need to be considered by the relevant University groups and Committees.

A number of University policies treat teaching and research as quite separate activities. There is a need to give attention to the links between research and teaching and also the need to develop the scholarship of teaching in revising promotions, appointment, probation and tenure policies and SSP guidelines. The Working Group commends to all Faculties best practice in the scholarship of teaching as exemplified in some faculties.

Members of the Working Group have developed their understanding of the implications and meaning of research-led teaching through cross-faculty Working Group discussions. There is now a need to extend academics' understanding in all faculties of what is involved in research-led teaching through discussions at all levels. This is an important part of developing a context where research-led teaching is encouraged and where the implications of research for teaching are considered on an ongoing basis. The Working Groups commends the Research-led Teaching Website to Faculties (http://www.itl.usyd.edu.au/RLT) as a useful resource in thinking about the relationship between teaching and research and what they can do to strengthen it. There is now a need to articulate what is special about research-led teaching in a research-intensive university.

Benchmarking research-led teaching with other research-intensive universities is important to considerations of the level of research-led teaching at the University of Sydney and to provide information about ways in which the initiative can usefully be developed.

Recommendations to Teaching and Learning Committee

Recommendation 1:   The Working Group recommends that Teaching and Learning Committee recommend to Academic Board the adoption of the statement on research-led teaching contained in Section 5.1 of this report as university policy.

Recommendation 2:   The Working Group recommends that Teaching and Learning Committee endorse this report and monitor progress on the performance indicators on an ongoing basis.

Recommendation 3:   The Working Group recommends that Academic Board monitor through its Undergraduate Studies and Postgraduate Coursework Committees that research and scholarship on teaching and learning is demonstrably used in designing new curricula (see Section 4.3.4).

4.   **Performance indicators for research-led teaching & the scholarship of teaching.**
Performance indicators were established by the Working Group in order to provide a mechanism for auditing progress towards reaching the university's strategic goals for strengthening the relationship between teaching and research, and to encourage the development of research-enhanced teaching. The indicators are based on data some of which is available centrally and some of which has been sought from Faculties, Schools and Departments via a questionnaire.

This report presents findings from the collection of base-line performance indicator data. While the report presents information collected at particular points in time, it is recognised that the development of research-led teaching is a dynamic, on-going process and that the way the University is integrating research and teaching is rapidly changing. The collection of performance indicator data raised some important issues for the university and has itself generated discussions leading to changes.

4.1.   *Student awareness of and active engagement with research*

      4.1.1   **Performance indicators**
          a)   Undergraduate and postgraduate student awareness of the research culture of the university and the research being done in their School/department/ faculty
          b)   Responses on the SCEQ and Unit of Study Questionnaires related to the University's research-based environment

      4.1.2   **Rationale**
      Research-led teaching has to be seen as much from the students' perspective as the academic perspective**.** Claims that our teaching is research-led, are not credible if students have negative or no ideas about the University as a research environment, nor of the relationship between what they are learning and research.

      4.1.3   **Findings**
          a)   In order to understand how and whether undergraduate students in the university are aware of the research done in the university and are influenced by this in their choice of institution, the Working group examined information from surveys conducted in the Marketing Department. The Working Group considered that it would be useful to have additional information and worked with the Marketing Department to include in the incoming students' survey, items students enrolling in 2003 were asked to rank "the university's research record" and "active contact with researchers" according to their importance when deciding to enroll at Sydney University. Findings from this survey indicated to the Working Group that more work should be done to publicise the university's role in research and its relationship to teaching.

             The Working Group carried out an analysis of Academic Board Review reports in the 2002 round of reviews. According to these reviews, in some faculties positive comments were noted in relation to student perceptions of the relationship between teaching and research. In Pharmacy, for example, both postgraduate and undergraduate coursework students were able to cite examples of the use of research by staff in their teaching, and in Law and Medicine, students were reported to be positive about their exposure to research in their courses. Academic Board reviews also noted that in Architecture, Science, Veterinary Science and Dentistry, students were aware of the research interests of staff. In the SCA and Veterinary Science students thought research influences what was taught/ their learning (i.e. more than other universities) and in Economics & Business Students said they found the active researchers were better teachers.

             However, in Economics & Business, students had varying experiences of staff integrating research into their teaching. Some students were critical of staff who based lectures solely on their own publications. It was reported in Science that some students thought staff think that first and second year students were not capable of benefiting from engagement with cutting-edge research. In Arts the Review team found that undergraduate students thought that lecturers were not using their own research in their teaching, and that students thought that the Faculty provides insufficient opportunities for students to engage in rigorous debate and develop critical and analytical skills. The Review reports in Agriculture and Nursing noted that students were not aware of the research culture and of research-led teaching in the Faculty or were unaware of the research interests of staff. Indeed, in Agriculture it was noted that students thought that research was something staff

did in their holidays. In Engineering it was found that students thought it would be good if more staff talked about their research.
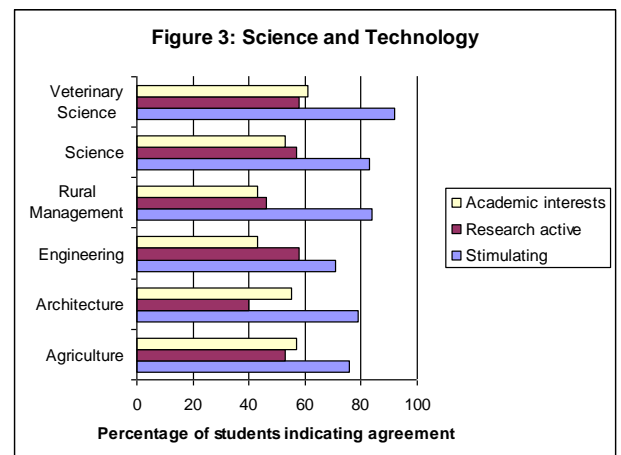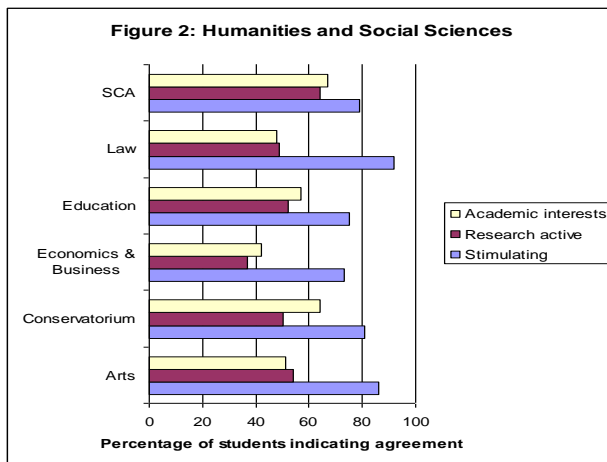
These findings do not take account of developments that may have occurred in response to Academic Board recommendations.

A pilot study is being conducted to understand better how students perceive research: who does it, where it is done, why it is done and what are the benefits. We are also interested in students' perceived benefits of research on their learning. We have recruited 5 students to participate in the pilot study. 15 semi-structured student interviews will be conducted by student researchers from a variety of faculties in November 2003.

b) The Working Group examined 2002 SCEQ data relating to students' perceptions of research in the university. Figures 1-3 give responses on the following questions for each of the three colleges: "I am able to explore academic interests with staff and students", "I feel I benefit from being in contact with active researchers," and "I find my studies intellectually stimulating".

Figure 1: Health Sciences

Percentage of students indicating agreement
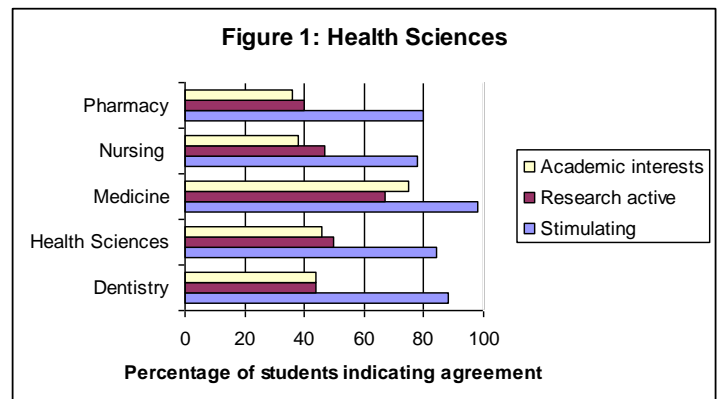
This data suggest that while the vast majority of students find their courses intellectually stimulating, there is a great deal of scope for improvement in terms of students' perceptions of benefiting by being in contact with active researchers. There is also much scope for improvement in the extent to which students feel they are able to explore academic interests.

Figure 2: Humanities and Social Sciences

Percentage of students indicating agreement

Figure 3: Science and Technology

Percentage of students indicating agreement

4.1.4   Conclusions

There is a demonstrated need to increase students' perceptions of research in the university by doing all we can at all levels to improve students' perceptions of research and its relationship to their courses. The findings here suggest that faculties might like to strengthen information about the University's research and the role of research in undergraduate teaching in their marketing material. The qualitative study of students' experiences will provide further information to inform future strategies.

4.2. *Academic capacity to integrate research and teaching*

4.2.1 **Performance indicators**
(a) Proportion of teaching staff with PhD or research record
(b) Proportion of higher degree research supervisors who are active researchers
(c) Proportion of senior and active researchers engaged in first and second year undergraduate teaching

4.2.2 **Rationale**
The University's capacity to integrate research and teaching is crucially dependent on the capacity of teaching staff to integrate their own research into their teaching. These indicators are designed to assess that capacity. The Working Group considered that at postgraduate level the capacity of supervisors to integrate research and teaching depends on whether they are active researchers. With regard to undergraduate education, the Working Group considered that it is the integration of research at first and second year levels which pose the greatest challenges. If the University is serious about developing research-led teaching, then senior academics and key researchers should be involved in teaching junior year students.

In some faculties where creative arts is the major research activity (for example the SCA) possession of a PhD may not be such a valid indicator of capacity to integrate research and teaching.

4.2.3 **Findings**
a) Fifty-six percent of teaching staff have a PhD or Doctorate (Source: Statistics office) and 72% have published in 2002 (Source: Research & Research Training Management Report 2003). It is not known what the overlap is. These figures exclude casual staff.

b) It is not yet known what proportion of higher degree research supervisors are active researchers. This information should become available via the office of the Dean of Graduate Studies through the registration of supervisors.

c) While some 50% of teaching staff are at level C and above, only one third of staff at these levels are engaged in first year teaching. A similar number are engaged in second year teaching. 67% of senior staff teach at the senior levels. There may be scope for increases in the numbers of senior staff teaching at first and second year levels.

In Working Group discussions of findings it was noted that the overall capacity of faculties to integrate staff research and teaching was affected by the extent of casualisation among the academic workforce since casual teaching staff are not required to do research. These effects clearly vary between faculties, but in terms of research-led teaching, the effects currently can only be surmised. The Working Group considers that further investigation into this phenomenon is warranted.

4.2.4 **Conclusions**
Academic capacity to integrate research and teaching is high owing to the large proportion of research active staff in the university. These findings suggest that there is a need to increase the proportion of senior staff who teach at first and second year levels in most faculties. The issue of how senior staff with large research roles could further contribute to research-led teaching in first and second year levels needs further exploration. Further work also needs to be done to examine the effects of casualisation on the University's ability to integrate research and teaching. Implementation of the Academic Board Policy on Postgraduate Research Higher Degree Training and supervision will enable the extent to which supervisors are active researchers to be assessed.

4.3. *Curriculum designed to engage students in a variety of research-based activities, induct them into the research community and develop an awareness of research*

4.3.1 **Performance indicators**
(a) Number of Schools and Faculties where students engage in research-based activities
(b) Specific reference to staff publications is made public to students
(c) Research and scholarship on teaching and learning is demonstrably used in designing new curricula and monitored by Academic Board Committees

4.3.2 Rationale

These indicators are designed to examine the extent to which the curriculum is organised in such a way as to maximize the linkages between teaching and research. A number of dimensions for research-led teaching have been developed from an examination of examples collected internationally. These dimensions have underpinned the research-led teaching website (see below) and provide a framework for examining the examples that have emerged in collecting data on these performance indicators.

4.3.3 Findings

a) Faculties have been asked to provide examples of good practice in relation to a set of research-based activities that undergraduate students may engage in. This information provides a broad indication of the spread of these activities across the faculties although once again it should be noted that the information is captured at a particular point in time and does not do justice to changes that have been made since it was collected. Further information is to be provided on the research-Led Teaching website (See Section 4.2 below).

A. Conference presentations, for example, assessed work is presented in the form of poster or verbal presentation; use of student conferences etc. This is relatively widespread and there are some innovative examples of this within the university. For example, all undergraduate students at the Health Sciences/ School of Occupational & Leisure Sciences / Bachelor of Applied Science (OT) present a paper or workshop at a student run conference at the end of their fourth year.

B. Student journals, for example, where students submit work for peer review; and/or students' work is included in a published journal. This is less common and more work is needed in Faculties to explore what this may mean for them. For example in Arts *Edubba Studies in Ancient History* is a journal of work from the previous year's students. This is distributed to students in the current first year and other interested parties.

C. Bibliographical exercises, for example, library searching exercises; use of bibliographical database activities; Library skills development. This is common in all faculties and Fisher Library training has been important in this. For example, Veterinary Science: first year vets and second year Agricultural students receive a library retrieval skills and database searching workshop which is reinforced in second and third year respectively by an advanced database searching session.

D. International networks, for example, students carry out collaborative exercises with students in overseas universities, student exchanges, visits etc. What this may mean in particular faculties is not well understood. Where there are student exchanges, these tend to be voluntary with small numbers of students involved. An exception is in Economics and Business where the numbers are larger. Exchanges may go in both directions with Sydney students going overseas and overseas students coming to Sydney. For example, Dentistry: Students in Year 3 of the BDent program are required to complete an elective which may include a collaborative project in another school or country.

E. Project work, for example, students work in teams to carry out projects perhaps simulations of professional research or consultancy. There is considerable confusion between project work and problem-based learning and discussions need to be held to clarify this in some faculties. Project work is widespread in undergraduate degrees. For example, Engineering: In CIVL4807 Project Formulation students have produced highly professional Business Plans and presented these to a "Board of Review".

F. Research essay, for example, students research a topic searching bibliographical sources, writing a piece of expository academic prose. This is common across all faculties. It dovetails with the bibliographical exercises mentioned above.

G. Research skills development, for example, students engage in specific research activities such as questionnaire design; textual analysis or activities designed to develop laboratory skills. This is widespread with faculties having dedicated courses generally taken before honours and sometimes at the beginning of a Masters program. Examples earlier in students' careers

however are not common. For example, In Music Education, student learning is based around analysis of teaching/learning situations, proposal of methods of proceeding, problem solving, and consideration of philosophical and strategic factors.

H. Inquiry-based learning, for example, problem-based or issues-based learning where the students develop their understanding of a topic through their research, reading and discussion in a context where the curriculum is structured around a particular professional scenario or problem which students work in teams to solve. Problem Based Learning, which refers to the way the curriculum as a whole is organised, is not to be confused with project based learning which refers to an aspect of the students' coursework. A number of faculties engage in Problem Based Learning for a whole year (see also Academic Board Reviews of Faculties below).

Academic Board Reviews of Faculties in 2002 demonstrated that there are a number of faculties with a range of 'student-focused' (Prosser & Trigwell 1999) ways in which research is integrated into students' learning. This includes on the one hand students engaging in inquiry/research based learning/ research-based learning exercises /projects including fieldwork and professional placements, case-based curricula, evidence-based practice (Architecture, Science, Pharmacy, Education Law, Conservatorium and Agriculture), engaging in problem-based learning (Veterinary Science, (in the third year), and Pharmacy (in the fourth year) Nursing (2B & 3B), and Medicine) and through researching and writing program notes (Conservatorium). On the other hand research is integrated into student learning through a range of activities mirroring the research process such as involving students in seminars, conferences (Pharmacy, Law, Law, Veterinary Science, Education, Conservatorium, Pharmacy, Agriculture, Rural Management, Medicine, Architecture, SCA, Economics & Business and Nursing), journals (Arts, Medicine, Conservatorium) a Faculty Research day where undergraduate and postgraduate students present their research, and Summer research scholarships (Dentistry).

Another set of ways in which students are engaging with research in their learning is through undertaking research for assignments, tutorials and workshops (Dentistry, Pharmacy, Medicine, Veterinary Science, Law, and Agriculture (some industry funded though IP is a problem)), engaging in critical review, engaging in critical reflection/ self directed learning (Education and Dentistry, Veterinary Science), or student peer review/marking and/or workshops (Dentistry), and undertaking compulsory subjects in legal research and legal writing (Law).

From a 'teacher-focused' perspective (Prosser & Trigwell 1999) examples of research-led teaching focus more minimally on exposure to the latest international research, direct contact with active researchers (Science, Veterinary Science), currency of material/ current research communicated to students, taking electives/projects closely aligned with research interests of staff (Law, Architecture, Education, Health Sciences, Science, Engineering and Dentistry), links with the profession (Architecture) or drawing inspiration from lecturers' work (SCA). In Nursing there is a focus on clinical experience in the integration of teaching and research.

In some faculties, specific initiatives are targeted at particular groups of students: for example, an advanced Engineering program for high achieving students engages students in interdisciplinary teamwork focused on inquiry in Engineering. In Science there is a 1st year program designed to lead students to being a professional scientist that includes presentations by Honours Students and in Arts there is a peer support network in first year. In the Faculty of Health Sciences generic attributes are emailed to all first year students.

b) Most faculties report that specific reference to staff publications is made public to students. Exceptions are the Faculties of Dentistry and Law and there is currently no data for Medicine. A variety of media are used for this including course reading lists, websites, a book of experts, faculty referencing guides, individual staff web pages, foyer displays, email, notice-boards, newsletters, and in class.

c) The Working Group considers that the performance indicator "the extent to which research and scholarship on teaching and learning are demonstrably used in designing new curricula and monitored by Academic Board Committees" is out of its control and recommends that Academic

Board monitor through its Committees that Research and scholarship on teaching and learning is demonstrably used in designing new curricula.

4.3.4 Conclusions

There is good evidence that curricula are being designed to engage students in a variety of research-based activities, induct them into the research community and develop an awareness of research. Nonetheless, there is scope for all Faculties to extend the ways in which they currently integrate research and teaching in curricula and develop the opportunities students have to engage in research-based activities. The research publications of staff could be publicised more widely in all faculties.

The Working Group recommends that Academic Board monitor through its Undergraduate Studies and Postgraduate Coursework Committees that research and scholarship on teaching and learning is demonstrably used in designing new curricula.

4.4. *Departmental encouragement for aligning research and teaching*

4.4.1 Performance indicators

a) Existence of an advertised student research seminar program or evidence of engagement of undergraduate students in departmental seminars

b) TIF and Strategic development funds are used to strengthen the link between teaching and research

c) Existence and use of benchmarking activities with other research-based institutions and the use of this in curriculum design and research development

4.4.2 Rationale

These performance indicators are focused at the level of the School or Department. They are designed to indicate the extent to which Departments/Schools are working to foster a research-based climate. Involving students in departmental seminar programs creates a positive research-based climate for students while the existence of TIF or strategic development funds being used to strengthen the links between teaching and research indicates that the Department/School has a positive attitude to encouraging the development of a research-led teaching environment. Benchmarking activities are one indicator of an evidence-based approach to curriculum development.

4.4.3 Findings

a) All faculties in the College of Science and Technology with the exception of Architecture, report that there is an advertised student research seminar program or evidence of the engagement of undergraduate students in departmental seminars. The same is true in CHASS with the exception of the Faculty of Law. With the exception of Dentistry and some Schools in the Faculty of Medicine, faculties in the College of Health Sciences do not have research seminar programs available to undergraduates.

b) Table 1 provides a list of strategic projects faculties have identified as bringing teaching and research together.

College of Humanities and Social Sciences (CHASS)		
Faculty	Projects	Fund Source
Arts	• Articulating Arts • Competence in Written English • Inquiry-based learning • Peer Support	TIF
Education and Social Work	• Scholarship funds used to carry out research on teaching and learning) • School-University Partnerships in Teacher Education	TIF
Economics and Business	• Curriculum Review in Accounting and Business Law • Faculty Quality Assurance Initiatives • Review of Generic Skills in undergraduate and postgraduate programs • Benchmarking project with UMelb • Comparison of Project Rates and Learning	TIF
Law	• Student Experience in International Programs	TIF

Conservatorium	• Performance and Communication Studies	TIF
Sydney College of the Arts	• Multiple Modalities Project • Enhancing Foundation Studies	TIF TIF
College of Health Sciences (CHS)		
Pharmacy	• Experiential learning in Clinical Practice Placement Program • Criterion-based Assessment	TIF TIF
Dentistry	No specific funds allocated in the Faculty • Benchmarking project with UAdelaide and UToronto related to assessment and PBL • Designing small groups*	 TIF TIF
Health Sciences	• Research into Teaching and Learning Scheme • Enhancing first year experience and outcomes • Peer mentoring scheme • Best practice in inquiry-based learning	 TIF TIF TIF
Nursing	No funds allocated	
Medicine	• Virtual tutor supported Anatomy	TIF
College of Science and Technology (CST)		
Agriculture	• Intranet development for teaching and research • Equipment funds for field-based teaching methods • Integrated teaching in Plant Science, Mycology and Entomology*	TIF
Rural Management	• Faculty research grant scheme includes an allocation to pedagogical research • Research into Capability Program • Evaluation of the Business Mentor Program in first year • Development of Advanced Cropping Systems	Scholarship Index funds
Engineering	• Tutor training in Engineering* • Common Entry for Engineering • Developing multimedia software for enhancing undergraduate courses	TIF
Science	• SCIFER manages a competitive application process for pedagogical research • Tutor Training Program • Generic attributes and employment related outcomes • Assessment tools in online WebCT (Psychology) • Investigation of the assessment of group-based learning • Extension of PBL into later years • Inquiry-based learning in intermediate Geology units • Using research techniques in first year labs • Recycling teaching materials • Interactive lecturing with a classroom communication system	SCIFER TIF
Veterinary Science	• Innovative clinical teaching • Improving Assessment • Improving learning outcomes: aligning student perceptions and learning (with Agriculture) • Supporting teaching and learning via VEIN	TIF TIF TIF

Table 1: Strategic Development & Teaching Improvement Funds designed to bring research and teaching together

c) A wide range of benchmarking activities is reported. This includes formal and informal faculty level benchmarking (Education, SCA, Engineering); benchmarking of course design (Chinese Studies, Italian); (mutual) course review (English, Italian, History, Rural Management); the

exchange of course material (Italian, Spanish, Electrical Engineering), cross-campus teaching (Italian, Spanish, Russian, German); the exchange of scholars (Conservatorium); graduate attributes (Veterinary Science); joint exhibitions (SCA). Some faculties indicate that benchmarking takes place through formal professional accreditation (Engineering and Architecture). The faculties of Nursing, Law and Education & Social Work reported that they had no benchmarking relationships. A few schools in Health Sciences and in Medicine have informal arrangements.

See also section 4.7.3.j below.

4.4.4 Conclusions

These findings indicate that School and Department encouragement for aligning research and teaching is varied across the University. Not all undergraduate students have the opportunity to engage in research seminar programs and this is regrettable. More could be done to develop the relationship between research and teaching through TIF and strategic development funds. Not all Departments have formal or informal teaching benchmarking relationships and collaborative curriculum development activities with similar Schools and Departments in other research-intensive universities. Such activities need to be encouraged.

4.5 *Faculty support and encouragement for strengthening the nexus between research and teaching*

4.5.1 Performance indicators
a) The links between research and teaching are explicitly encouraged in Faculty Strategic Plans
b) The existence of funding allocated to pedagogical research grants
c) Number of points on the Scholarship index

4.5.2 Rationale

These indicators are focused at the Faculty level. They indicate a positive and strategic approach to the development of strong relationships between research and teaching. While the majority of research-led strategies and initiatives focus on disciplinary research, two of the indicators here are designed to examine the extent to which faculties are developing an evidence-based approach to teaching development through pedagogical research. (See Section 4.1 below for a statement of how these different aspects are related).

The Scholarship Index provides an indicator of the extent to which aspects of the scholarship of teaching are being pursued. Data are collected and points are awarded on the following indicators:
- Qualification in university teaching (10 points)
- National teaching award AUTC/CUTSD (winner) (10 points)
- National teaching award (finalist only) (5 points)
- University teaching award (including awards for Excellence in Research Higher Degree Supervision) (5 points)
- Faculty teaching award (2 points)
- Publication on university teaching – book (10 points)
- Publication on university teaching – refereed chapter (2 points)
- Publication on university teaching – refereed article (2 points)
- Presented conference paper or poster on university teaching (1 point)

4.5.3 Findings
a) Eleven faculties indicate that the links between research and teaching are explicitly encouraged in their Faculty Strategic Plans. Statements in these plans range from restatements of the university Strategic Plan Goal 1 points 3 and 6. It is clear that some faculties have developed these ideas into specific strategies for development. Some examples are:

"To encourage curriculum development which engages students with the latest scholarship of leading researchers in the Faculty (Arts 3.2).

"Encouragement of increased nexus between research and teaching in Pharmacy (Pharmacy, Strategy for Goal 2)

"Enhance staff development in teaching and in the scholarship of learning" (Dentistry, Goal 1)
"Instill a research culture in all undergraduate and postgraduate students" (Dentistry, Goal 2)

"The faculty will maintain and enhance the quality of its programs and continue to improve the teaching and learning experience of its students by ensuring that its programs: Are informed by scholarship of the highest quality, and have strong links to research programs…" (Agriculture, Goal 1, Strategy 1).

"Encourage students to identify with a research community." (Science, Strategy 1.4)
"Create a forum where educators can discuss and develop ideas and methods of teaching" (Science Strategy 5.1)

"Develop, implement and present curricula informed by scholarship and research to prepare graduates for leadership and contribution in the veterinary and animal science professions" (Veterinary Science Teaching and Learning Plan).

In some cases specific reference is made to such developments being appropriate for senior students. However, it is hoped that where this is the case faculties will consider the extension of strategies to develop research-led teaching in more junior years.

b) Only four faculties; the Faculties of Education and Social Work, Science, the Conservatorium and Health Sciences have internal competitive research grant schemes specifically for research on teaching and learning. The Health Sciences scheme includes a requirement for applicants to show how their research will further the Faculty Teaching and Learning Plan. The Faculty of Rural management indicated that pedagogical research was funded through the Faculty research grant scheme.

c) Tables 2 and 3 provide data on the number of points on the Scholarship Index for 2002 and 2003 respectively obtained from the Office of the Pro-Vice-Chancellor (Teaching and Learning).

	Points Audited	*FTE academic staff	Points per FTE academic staff member
Arts	83	257.2	0.32
Economics and Business	91	224.3	0.41
Education	18	127.3	0.14
Law	24	75.3	0.32
Conservatorium of Music	29	74.6	0.39
Sydney College of the Arts	10	35.2	0.29
Total College of Humanities & Social Sciences	255	793.9	0.32
Agriculture	0	66.1	0.00
Architecture	0	48.7	0.00
Engineering	23	151.7	0.15
Rural Management	39	34.1	1.14
Science	150	519.9	0.29
Veterinary Science	1	63.2	0.01
Total College of Sciences & Technology	213	883.7	0.24
Dentistry	30	34.3	0.87
Health Sciences	183	217.3	0.67
Medicine	103	405.6	0.25
Nursing	56	81.1	0.69
Pharmacy	41	43.9	0.93
Total College of Health Sciences	413	782.2	0.53
Total University	881	2459.8	0.36

Table 2: Scholarship of Teaching Index Points 2002

*Figures are taken from the University of Sydney Statistics Handbook 2002 (p.54). They include appointments at continuing, part-time and casual levels.

	Points Audited	**2002 FTE academic staff	Points per FTE academic staff member
Arts	118	257.2	0.46
Economics and Business	107	224.3	0.48
Education	50	127.3	0.40
Law	72	75.3	0.96
Conservatorium of Music	24	74.6	0.32
Sydney College of the Arts	10	35.2	0.28
Total College of Humanities and Social Sciences	381	793.9	0.48
Agriculture	0	66.1	0.00
Architecture	13	48.7	0.27
Engineering	48	151.7	0.32
Rural Management	47	34.1	1.34
Science	239	519.9	0.50
Veterinary Science	72	63.2	1.14
Total College of Sciences & Technology	419	883.7	0.48
Dentistry	45	34.3	1.31
Health Sciences	293	217.3	1.35
Medicine	119	405.6	0.30
Nursing	57	81.1	0.70
Pharmacy	57	43.9	1.30
Total College of Health Sciences	571	782.2	0.73
Total University	1371	2459.8	0.56

Table 3: Scholarship of Teaching Index Points 2003

** Figures are based on 2002 academic staffing numbers. 2003 figures unavailable until March 2004.

4.5.4   Conclusions

Again Faculty encouragement for research-led teaching is varied. As Strategic and Teaching and Learning Plans are revised it is hoped that all faculties will include encouragement of research-led teaching including strategies that are applicable at all levels. Good practice in establishing internal pedagogical research grant schemes by some faculties should be emulated by others. There remains a perception that research-led teaching is appropriate for senior year students. The Working Group encourages faculties to consider the extension of strategies to develop research-led teaching to more junior undergraduate levels.

Evidence-based teaching is being used in a number of faculties. The Working Group considers that more work needs to be done to articulate the relationship between research-led teaching and the scholarship of teaching.

4.6.   *College recognition and support for the development of the links between research and teaching*
4.6.1   Performance indicator
a)   Strategic plans refer to the links between teaching and research

4.6.2   Rationale
If the University is to demonstrate that it is a research-led teaching environment then research-enhanced teaching must be encouraged at all levels. This performance indicator assesses the extent to which at College level, research-led teaching is being encouraged.

4.6.3 Findings

a) The Strategic Plans of the College of Health Sciences and the College of Science and Technology make no reference to the relationship between teaching and research. The Strategic Plan of the College of Humanities and Social Sciences includes the following statement:

"All course offered in the College will be of the highest possible relevant academic standard, informed by active scholarship, research and professional practice" (CHASS page 5)

It is hoped that the new College Pro-Vice Chancellors will include strategies to encourage research-led teaching when their respective College strategic plans are revised.

4.6.4 Conclusions

Encouragement of research-led teaching should be at all levels of the University. The Working Group hopes that College Pro-Vice-Chancellors will include strategies to encourage the linking of research and teaching and specifically research-led teaching in revised College Strategic Plans.

4.7. *University commitment to the development of strong relationships between teaching and research*

4.7.1 Performance indicators

a) University Strategic Plan explicitly states that the links are important
b) University advertising promotes the link between teaching and research
c) Research Management and Teaching Management plans refer to the importance of linking research with teaching
d) Academic Board Reviews of Faculties demonstrate research-led teaching is being developed
e) Appointment, promotion, probation and tenure criteria all explicitly require the teaching/research link to be addressed.
f) SSP Requirements include development of teaching and research
g) The University's teaching evaluation and quality assurance and enhancement processes are research-based
h) Teaching, Learning and Assessment Policies and Research Policies stress the importance of linking teaching and research
i) Criteria for awards for outstanding teaching and excellence in research higher degree supervision include currency of material and require the teaching/research nexus to be addressed
j) Audit of research-led teaching carried out on a triennial basis and benchmarked with other Universities.

4.7.2 Rationale

These ten performance indicators are all focused on examining the extent to which the University as a whole is committed to the development of the relationship between teaching and research as demonstrated in its strategic plan and policy documents. Once again, the intention here is to give baseline data from which to measure future developments.

4.7.3 Findings

a) Aspects of the University of Sydney Strategic Plan relevant to the development of research-led teaching and scholarship of teaching are:

- to provide curricula informed by current research scholarship creative works and professional practice, and be responsive to the needs of the many communities served by the university and result in graduates well equipped to contribute successfully to the global society in which they live and work (Goal 1. 3);
- to develop and reward well qualified staff with a strong commitment to teaching informed by research and offer opportunities for teaching development (Goal 1. 6);
- to assist the transition of students into research-based programs through opportunities provided within undergraduate programs (Goal 3. 9);
- and to support the conduct of outstanding research by both students and staff (Goal 3. 11).

The working Group hopes that these can be strengthened when the Strategic Plan is revised.

b) It has not yet been systematically investigated whether university advertising promotes the link between teaching and research. However, the working group commends this to faculties and to the

University's Marketing Department as an important aspect of future marketing (see Section 3.1.4 above).

c) The University's Research Management Plan does not make reference to links between undergraduate teaching and research. In the Report for 2002 reference was made to ensuring a quality research training experience for research higher degree students: "We recognise the intricate relationship between research and research training. The production of outstanding research higher degree graduates can only take place in an intellectually stimulating environment populated by supervisors and mentors who are active researchers using leading-edge infrastructure." (p.11) This statement is missing from the 2003 report.

The University policy on the Management and Evaluation of Coursework Teaching Presents a model of the kind of considerations required for the University to address issues of research-led teaching. It makes a number of references to the relationship between teaching and research. It indicates that the University is committed to "creating an academic climate that fosters learning, scholarship and the application of research findings to improve teaching practice" (p3). In setting out Academic Board's policies and procedures for reviews of faculties, the policy requires faculties in their self-evaluation report to indicate how the faculty ensures: "integration of research, including both disciplinary research and evidence about effective learning and teaching, into its undergraduate an postgraduate courses" (p16). Reviewers are asked to consider:
- How links between current disciplinary research and the research expertise of staff and the curriculum are managed
- How links between developments in the theory and practice of university teaching and learning and the curriculum are managed. (p20).

In the review, students may be asked to indicate to what extent they consider they benefit from the research expertise of their teachers and to give examples of how research has enhanced their experience and understanding (p22). Reviewers are also asked to consider whether the design and content of the curricula encourage the development of (among other things) transferable skills (including inquiry, research and communication skills" (p24). They are also asked to evaluate whether the curriculum is adequately informed by recent developments in the theory and practice of university teaching and learning, by current research and scholarship, and by the research expertise of staff (p25).

d) The results of the first round of Academic Board Reviews of Faculties in 2002 demonstrate that research-led teaching was being well developed in some faculties and less so in others. Some aspects of the Review findings have been discussed in Sections 3.1.3.a) and 3.3.3.a) above. In this section findings of the Review Committees in relation to the extent to which the context of the faculty encourages research-led teaching and in relation to the extent to which the scholarship of teaching/ pedagogical research is encouraged are considered. The Working Group has not yet considered findings of the review reports for 2003, yet notes progress is now being made with respect to these findings.

Context
In Pharmacy a strong awareness of discipline based research and research-led teaching was demonstrated across all disciplines. Other faculties were commended for a positive research environment where students learn from the research activities of staff (Medicine, Arts, Education, Pharmacy, Dentistry).

Teaching staff of the faculty are disciplinary experts/ strong researchers selected on their achievements in research (including performance) and teaching/ expertise (Veterinary Science, Conservatorium, Education, Medicine, SCA, and Science). In the Conservatorium there is a belief that the curriculum can only be taught by experienced researchers.

Research interests of staff are matched with teaching responsibilities, to, for example: inform teaching and inspire curiosity, embed teaching more in theory, or to transfer conceptual and methodological advances in the discipline into undergraduate and postgraduate programs (Medicine, Nursing, Veterinary Science, Law, Education, Agriculture, SCA, Health Sciences and Pharmacy. New appointments are made/are needed to stimulate the research environment; new research clusters support research and the scholarship of teaching (Law, Education & Dentistry).

In Arts new units have been introduced to replace units that no longer represent the research interests of staff, but there is concern that restructuring may inhibit the capacity of staff to integrate their research and their teaching. Nevertheless, in Arts, team teaching is said to often result in team research and enables research expertise of all contributing staff to be reflected in the curriculum.

In the Conservatorium all staff are involved in teaching all levels. All are involved in performance or research. Dentistry is commended for the fact that Senior staff are involved in first year teaching, while the Academic Board Review report of the Science faculty in 2002 indicated that in some departments of Science research-intensive staff do not teach junior years; in others they do.

In Education and in Science, students are involved in staff research projects (more of this is encouraged in the Review Report). In Law and Arts the fact that postgraduate research students are engaged as tutors is seen as a way for the curriculum to be research-led

Potential ways of incorporating research findings into teaching and learning are discussed at annual retreats (Arts and Pharmacy). In the SCA there is on-going discussion about the nature of research in the discipline. In Rural Management there is a high level of debate on teaching and learning issues including the inclusion of staff seminars on teaching informed by research.

In Economics & Business senior and postgraduate electives are offered based on staff research interests, while in Arts, Education, Health Sciences and Agriculture, visiting scholars/guest lecturers share their research or external researchers write some course material. In Engineering staff believe students should know about research because it makes the subject more interesting

In some faculties it was noted that research-led teaching, or how research could inform teaching was not understood by all staff (Rural Management, SCA). Developing a strong research ethos is a particular challenge in a discipline that has traditionally not been research-based (Nursing). The location may facilitate (Conservatorium) or inhibit (Westmead) the ability of staff to integrate their research and their teaching. In Veterinary Science, the Conservatorium and Rural Management it was noted that Research and teaching compete for time.

Scholarship of Teaching/pedagogical research
Encouragement for the scholarship of teaching varies from faculty to faculty. In many there is encouragement and resources provided for a wide range of initiatives. In others, support is minimal. The following detail is provided to illustrate that range.

In Science, Veterinary Science, Education and Health Sciences the scholarship of teaching is recognised and rewarded by the faculty. Faculty teaching and learning policies and processes are research/evidence based and/or the scholarly literature on teaching and learning is used in curriculum design and in faculty teaching and learning policy development in Science, Veterinary Science, Medicine, Education, Dentistry, and Health Sciences. In Medicine, Pharmacy, Science, and the Conservatorium the faculty commissions/ carries out pedagogical research and this is integrated into teaching. Indeed in Medicine and Veterinary Science the Faculty has an evidence-based response plan to the SCEQ and GCEQ

There are different levels of encouragement for staff to complete the Graduate Certificate (Higher Education). This course is mandatory for all new staff in Veterinary Science and this has stimulated pedagogical research. In Economics & Business, and Pharmacy teaching relief, incentives, or support is provided to staff who undertake it. In Engineering, Dentistry, Rural Management, Health Sciences, Nursing, and Pharmacy, staff are encouraged to undertake/ are undertaking/ have undertaken the Graduate Certificate (Higher Education) or studies in higher education teaching and learning but the existence of incentives is not noted. In the Review of Pharmacy it was noted that some staff are undertaking Graduate Diploma, Masters, and Doctoral programs in teaching the discipline, while in Medicine and Health Sciences, specific graduate programs in how to teach the discipline are taught within the faculty.

In some faculties there is now a Teaching and Learning support unit within the Faculty (Medicine, Health Sciences, Economics & Business, and Nursing). Some faculties have an educational consultant/ director of teaching development/ teaching quality fellow who assists with course design and teaching and learning development (Veterinary Science, Law). In Engineering, and

Veterinary Science it was noted that the Faculty Teaching and Learning Committee includes people external to the faculty with expertise in teaching.

Health Sciences has a research on teaching and learning website and in Rural Management research on teaching and learning is incorporated into an in-house publication (*Learning Matters*). In Medicine, Arts, Science, and Rural Management there is a staff seminar series on teaching and learning issues, while in Pharmacy the research seminar program includes occasional sessions on pedagogical research. Opportunities are provided for staff to discuss teaching issues in Engineering though it is not indicated what these are.

As noted above, Science and Health Sciences have competitive research grant schemes for research on teaching. In Health Sciences there is a research on Teaching and Learning Sub-committee of the Faculty T & L Committee. In a number of other faculties research into teaching is encouraged and carried out and may be viewed as an important alternative to disciplinary research. Individuals / groups in the faculty engage in pedagogical research/ have received grants to do so in Science, Veterinary Science, and the SCA, Education, Health Sciences, Nursing, Science, Dentistry and Rural Management. Research into teaching and learning carried out by a few staff influences and increases interest of others in teaching and learning, or unit of study coordinators use pedagogical research experts in the faculty as resources in Science, Veterinary Science, Economics & Business, and Pharmacy.

In a number of faculties (Science, Agriculture, Medicine, Health Sciences, Law, Medicine, Pharmacy, Architecture, Arts, SCA, Rural Management) staff publish in disciplinary journals, are invited to speak on teaching or there is encouragement for / funding to attend/ present papers at, teaching and learning conferences.

Formal and/or informal benchmarking arrangements with other research-based universities exist in the Faculties of Dentistry, Veterinary Science, Conservatorium, and Education) (See also Section 3.4.2.c)).

In Engineering, and Education the Faculty criteria for excellence awards encourage links between teaching & research (this is in line with University policy).

e) In University policies for appointment, probation and tenure, teaching and research are treated separately. While the policy on probation and tenure does not make any specific assumptions about the nature of the position, teaching and research are treated as separate "categories of activity. The Probation Review Report could usefully include reference to research-led teaching and the scholarship of teaching.

With regard to the University's promotions policies, teaching and research are again treated as separate categories. Some hints of a research-led environment are included in the criteria, for example, for Level A/B the requirement to keep up to date with the subject; Level C requires research on teaching, and in order to demonstrate leadership in teaching, promotion to Level E requires "publications in the area of teaching" (p16).

f) SSP Requirements similarly treat teaching and research as separate activities, requiring the development of one or the other during the period of Special Studies Leave.

g) The University's teaching evaluation and quality assurance and enhancement processes are research-based. The Institute's Teaching Evaluation & Enhancement Service is intended to support the Academic Board resolutions on "*The Management and Evaluation of Teaching*". This service is an evidence-based quality assurance system for teaching and learning. It takes as its starting point a well researched theoretical perspective on student learning in higher education (Ramsden 2003, Prosser and Trigwell 1999, Biggs 1999). It is argued that the explicit use of a relevant theoretical base promotes coherence between quality assurance and quality improvement processes and provides a key to effective quality enhancement in higher education (Barrie & Prosser 2003).

h) The University's policies on teaching, learning and assessment make spasmodic reference to research-led teaching. For example, the "*Guidelines for Good Practice in Teaching and Learning*" indicates that faculties should document the mechanisms by which they assure themselves that

their educational programs "draw upon the disciplinary research expertise of academic staff" and "are informed by developments in the theory and practice of university teaching and learning." (p21). There is scope for increased attention to be given to research-led teaching in revisions of teaching policies.

As far as it has been possible to adduce, there is no mention of teaching in any Research Policies. The Research-led teaching Working Group suggests the implications for teaching should be included within all research policies.

As a result of a presentation to the Working Group by Professor Les Field, Acting Pro-Vice Chancellor (Research), it was decided to investigate the ways in which the Cooperative Research Centres planned to carry out the teaching function of their brief. The Working Group believes that there is scope for the development of stronger linkages of these Centres and undergraduate teaching.

i) The criteria for the Vice-Chancellor's awards for outstanding teaching include:

- "Command of the subject matter, including the incorporation in teaching of recent developments in the field of study and appropriate links between research and teaching," (Criterion 2) and

- "Participation in professional activities and research related to teaching" (Criterion 10).

The criteria for the Vice-Chancellor's awards for research higher degree supervision include:

- "Ability to integrate students into the research community, including, where appropriate, encouraging publication and developing professional links with other postgraduate research students" (Criterion 2)

- "Scholarship in research training and supervision, including impact of research activities on supervision, research and contributions to the literature on effective supervision, and leadership in developing the skills of other supervisors" (Criterion 9).

j) *Benchmarking*
A formal benchmarking relationship has been established with Monash University. This project aims to analyse methods of implementing the teaching-research nexus. The project will compare performance on dimensions agreed by both benchmarking partners as follows:

- terminology, definition and policy; by comparing Monash and Sydney terms and definition
- by comparing Monash and Sydney reference to teaching-research nexus in internal and external communications. strategic planning;
- planning documents; by comparing Monash and Sydney processes for teaching-research nexus identified in strategic planning
- by comparing Monash and Sydney identification of teaching-research nexus in planning documents including, for example, University Strategic Plan, Learning and Teaching Plan TP, Support Services Plan, Research Management Plan, Research Training Plan, Campus Plans, Faculty Operational Plans, School and Department Plans.
- courses; by comparing Monash and Sydney processes for teaching-research nexus in terms of course: approval, implementation, monitoring, review
- graduate attributes; by comparing Monash and Sydney identification of research skills and the ability to undertake research in graduate attributes
- staffing profile;. performance management; by comparing Monash and Sydney strategies for inclusion of teaching-research nexus in performance management
- rewards; by comparing Monash and Sydney recognition and rewarding of teaching-research nexus (eg University Awards).
- recruitment and probation; by comparing Monash and Sydney strategies for inclusion of teaching-research nexus in recruitment documentation and probationary reports.
- organizational and staff development; by comparing Monash and Sydney staff development opportunities in terms of teaching-research nexus

- internal and external communications; and
- others as identified during the consultation process with committees and groups.

The resulting report will provide documentation of the Monash position, and the Sydney position. Accompanying the report will be a series of recommendations for enhancing the teaching-research nexus based upon the benchmarking experience.

At the faculty level, dimensions of the nexus to be considered include the following:
- bringing the teacher's research findings into the classroom;
- research, curriculum development and internationalization;
- building students' research and inquiry capabilities;
- utilizing and building a community of scholars;
- exploring the context of research;
- teaching research methods;
- researching teaching; and
- teaching leading to research.

This aspect of the report will identify examples of the development of the teaching-research nexus, conceptions of the nexus and level of prioritization of the teaching-research nexus for various faculties. The report will document the Monash position and the Sydney position, and will be accompanied by recommendations for enhancing the nexus.

The final report from the benchmarking exercise will analyze current methods for implementing teaching-research nexus and develop recommendations. It will be disseminated through relevant committees.

4.7.4   Conclusions

The University's Strategic Plan includes statements demonstrating the University's commitment to strengthening the relationship between research and teaching. It is hoped these statements can be strengthened when the Plan is next revised.

The University's Research Management Plan and research policies currently make scant reference to teaching. Teaching policies are varied in the extent to which research-led teaching is encouraged. More recent policies include substantial references to it. Further consideration of the ways in which research and teaching can be of mutual benefit need to be considered by the relevant University groups and committees.

A number of university policies treat teaching and research as quite separate activities. There is a need to give attention to the links between research and teaching *and also the need to develop the scholarship of teaching* in revising promotions, appointment, probation and tenure policies and SSP guidelines. The Working Group commends to all Faculties best practice in the scholarship of teaching as exemplified in some faculties.

Members of the Working Group have developed their understanding of the implications and meaning of research-led teaching through cross-faculty Working Group discussions. There is now a need to extend academics' understanding in all faculties of what is involved in research-led teaching through discussions at all levels. This is an important part of developing a context where research-led teaching is encouraged and where the implications of research for teaching are considered on an ongoing basis. The Working Groups commends the Research-led Teaching Website to Faculties as a useful resource in thinking about the relationship between teaching and research and what they can do to strengthen it.

Benchmarking research-led teaching with other research-intensive universities is important to considerations of the level of research-led teaching at the University of Sydney and to provide information about ways in which the initiative can usefully be developed.

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5. Other initiatives

5.1 Statement on what the university understands by research-led teaching

The Working Group has established a statement about what it understands by research-led teaching and including a set of key principles for research led teaching and the scholarship of teaching.

> **What the University of Sydney means by "research-led teaching" and the "scholarship of teaching**
>
> Research-led teaching refers to initiatives designed to bring the research and teaching functions of the university closer together. The aim is to enhance students' learning experiences by progressing the ways in which coursework teaching is informed by disciplinary-based research at all levels.
>
> Research led teaching needs to be distinguished from the scholarship of teaching. Research led teaching is about making our teaching and our students' learning more research focused – in terms of what we wish our student to learn, while the scholarship of teaching is about drawing on and contributing to research and scholarship about the way we teach and learn within our disciplines.
>
> The University's strong research record and large number of active researchers is the foundation for research-led teaching. At the University of Sydney, we expect students to report that they are taught by active researchers and consider that they are entitled to expect that they will be so. As far as possible, students are also expected to engage in research activity of some kind. The nature of such activities will vary at different levels.
>
> Research-led teaching emphasises the partnership of academics and students as they engage in the critical challenge of open exploratory inquiry. It points to teaching and learning that encourages active learning, critical creative thinking and lifelong learning. Teaching and curricula are designed on the basis of the best available evidence of effectiveness for learning. Since research-led teaching is likely to vary in different disciplinary contexts, discussions at the faculty, school and departmental level are encouraged. Research-led teaching is encouraged in institutional strategies and benchmarked with other research-intensive universities worldwide.
>
> **Key principles for research-led teaching:**
> (a) To enhance student awareness of and active engagement with research[1]
> (b) To design curriculum that engage students in a variety of research-based activities, induct them into the research community and develop their awareness of research
> (c) To enhance the skills of students so that they are able to undertake research
> (d) To ensure/develop academic staff capacity to integrate research and teaching[2]
> (e) Schools and departments to encourage the alignment of research and teaching
> (f) Faculties to support and encourage the strengthening of the nexus between research and teaching
> (g) Colleges to recognise and support the development of the links between research and teaching
> (h) The University to commit to the development of strong relationships between teaching and research

5.2 Research-led teaching and scholarship of teaching website

A website has been established to support the Research-led Teaching and Scholarship of Teaching Project. We also hope to stimulate ideas about research-led teaching and the scholarship of teaching more widely. The website is currently being advertised to all staff via a postcard.

One section of the website provides insight into international scholarly discussions about the nature of research-led teaching and the scholarship of teaching and brings together resources for critical reflection on the relationship between research and teaching. It introduces ideas in the scholarly literature about the nature of research-led teaching and practical ways to bring research and teaching closer together. This section also includes some ways to think about research-led teaching and some relevant papers and presentations.

The second section provides information about the University of Sydney project. It includes information about the background and objectives of the project, information on the Research-led Teaching Working Group and its

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[1] "Research" includes consultancy, performances, creative works, exhibitions, industrial and professional secondments and clinical practice.
[2] "Teaching" refers to all strategies used across the university to engage students in learning: lectures, tutorials, flexible, online and distance modes, clinical and bedside teaching, one-to-one and studio teaching etc.

members, information about what faculties are doing to develop research-led teaching, about the resources available at the university for this and about past initiatives at the University which have led to the current ones. In addition, this section of the website includes resources demonstrating the evidence base for particular teaching and learning issues, for example, student retention.

The third section of the website is underpinned by a searchable database of teaching and learning innovations which have a commitment to research-led teaching and the scholarship of teaching. The examples showcase the initiatives at the University of Sydney together with a number from overseas institutions.

The Resources section of the website brings together a number of resources academics will find useful in continuing their discussions about the nature of research-led teaching and the scholarship of teaching. It includes bibliographic material on higher education, the nature of research in higher education contexts, the nature of scholarship, linking teaching and research , the scholarship of teaching, locating research-led teaching and the scholarship of teaching in the disciplines, key national policy papers, lists of generic and disciplinary specific pedagogical research journals and a link to useful related websites.

5.3 Faculty workshops and presentations

ITL staff have given presentations or presented workshops on this topic in the following faculties:

- (a) Faculty of Arts
- (b) Centre for Regional Education at Orange (CREO)
- (c) Faculty of Economics and Business
- (d) Faculty of Science
- (e) Faculty of Health Sciences
- (f) Faculty of Veterinary Science

It is clear that the performance indicator data collection process in faculties has been important in raising issues and awareness of research-led teaching among staff. It is hoped that all faculties, schools and departments will continue to hold discussions on research-led teaching on an ongoing basis.

6. Conclusions

Research-led teaching is an ideal. It has to be accepted, recognised, named and applied as a normal and natural part of our academic culture if it is to become embedded in everyday practice and if it is to improve the quality of teaching and student learning. This report highlights the fact that the situation with regards to the development of research-led teaching across the university is very diverse. While it is recognised that there are diverse ways of addressing research-led teaching in different faculties, inconsistency in the levels of engagement in research-led teaching across the university now needs to be addressed. A move to more student-focused approaches to research-led teaching is indicated. For this to happen it is important that the University establish a definition of what it understands by research led teaching. The Working Group has prepared such a definitional statement and recommends the adoption of this statement as University policy by Academic Board. A policy on the relationship between research and teaching now needs to be developed.

Colleges and Faculties need to commit to the development of research-led teaching in their Strategic and Teaching and Learning Plans. Importantly, training and/or support is needed for faculties unclear about what it is about and how to implement it. We need to articulate what is special about research-led teaching in a research-intensive university and we need to raise awareness of its importance within faculties, schools and departments.

At the centre of initiatives to develop research-led teaching are our students. Questions about research-led teaching and why we should develop it are central to a higher education where inquiry is becoming centre stage for both academics and students. 'Inquiry, investigation, and discovery', says the Boyer Commission on reinventing undergraduate education in the US, 'are the heart of the enterprise, whether in funded research projects or in undergraduate classrooms or graduate apprenticeships. Everyone at a university should be a discoverer, a learner' (Boyer Commission 1999).

Vital elements of a university education thus need to become focused on preparing students to solve a range of interconnected, frequently unforeseen problems which are going to continue especially when the student leaves university. It is important to encourage students to be open to new problems and new questions and finding new ways of searching for new solutions. The University is working towards a new policy on the attributes of its graduates which incorporates such qualities; specifically, an attitude or stance towards scholarship and

knowledge, Global citizenship and lifelong learning. The purpose of teaching thus becomes to induct students into various forms of research and inquiry so that individuals are able to live in a complex, uncertain world where knowing how to inquire is a key to survival. "What is required" says Ron Barnett, "is not that students become masters of bodies of thought, but that they are enabled to begin to experience the space and challenge of open, critical inquiry (in all its personal and interpersonal aspects)" (Barnett 1997).

This suggests that we need to work with students to induct them into the culture and community of researchers. We all need to develop knowledge of what it is to engage in a subject in a research-based way, to understand the key issues and debates in the subject area and know what other researchers in the subject do both in general and specifically. We need to engage our students in activities which mirror the research processes that academics are engaged in through for example, laboratory experiments, fieldwork etc. Students should be encouraged to learn methods and techniques used in research in the subject and have opportunities to practice such methods and techniques. We need to involve our students as participants in ongoing research programs with a sense of belonging to the community of researchers. This all implies that students should engage in inquiry based learning for their studies (Brew forthcoming).

This report has presented understandings and practice in relation to research-led teaching and the scholarship of teaching along a set of performance indicators as demonstrated in 2002 and 2003. It represents a picture of the work of the Working Group. Research-led teaching in the university is developing all the time. It is a dynamic scenario that changes as academics' understandings of the implications for them grow. Having established performance indicators for research-led teaching and the scholarship of teaching, and audited research led teaching within the University there is now a need to articulate what is special about research-led teaching in a research-intensive university.

The Working Group looks forward to continuing discussions at faculty level and across the university. Its next steps will be to develop strategies for furthering this important initiative.

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