The management of research at institutional level

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Introduction

Many academics still find it difficult to come to grips with the terms 'research management' and 'the management of research' at institutional level. They see research as an activity undertaken within departments or research centres, and dependent essentially on the initiative, energy and expertise of individual academics or research teams. They can understand the idea of managing a research project, or managing a research grant, but the notion of managing research from the centre of an institution doesn't seem to make much sense at all.

This view is quite understandable, and certainly it is true that the single most important ingredient in carrying out high quality research is well qualified researchers. However, in many disciplines today, high quality research also needs money and appropriate infrastructure, whether it be costly equipment, a good research library, or technical support. Moreover, the whole environment in which research is carried out and funded has changed to such a major degree in recent years that new institutional approaches are required.

This brings us to research management. The whole idea of research management is to develop institutional policies and procedures to support research effort and to ensure that appropriate resources and infrastructure are available to support high quality research. Research management is not about telling researchers what they must research or how they should undertake research projects. Rather it is concerned with providing the support and the institutional environment that is conducive to carrying out high quality research. It is about the management and maintenance of research infrastructure, about efforts to secure increased research resources for the institution, it is about making sure that faculty and departmental research plans are in harmony with the broad direction that the institution has decided to take and is able to support. In a time when research in many fields is becoming more costly and in the context of overall limited resources at institutional levels, it is important to have strategies about how to develop and maintain the resources necessary to support such research.

While many academics still have some difficulty with the concept of research management, most universities as institutions are now quite comfortable with the idea. Research management plans have been common since the late 1980s, most universities have both research policy committees and Pro Vice-Chancellors or Deputy Vice-Chancellors for research, and research offices are now well developed with specialist staff in areas such as research contracts, consultancies and scholarships. In many universities, there is increased awareness of the need to plan and have institutional priorities with regard to the provision of research infrastructure.

In this paper, I propose to discuss three topics related to research management - research management plans, intellectual property and the establishment and maintenance of research centres. This will illustrate some of the issues that institutions are addressing in their efforts to manage research resources and to provide an environment supportive of research effort.

Research management plans

A decade or so ago research management plans and strategic planning were foreign concepts to most Australian universities, al-though a small number of universities and a slightly larger number of CAEs were beginning to think about strategic planning. However, research management plans suddenly became part of institutional life when they were required by the Commonwealth Tertiary Education Commission (CTEC) in the late 1980s, and in many cases universities developed their first research plans well before they embarked on developing their first strategic plans. Since the late 1980s, however, there have been strong pressures on universities to take planning much more seriously, especially in the context of an overall government strategy to give universities more discretionary freedom but in turn to require better planning and greater accountability. Of course, within this context, there is often considerable dispute about the extent to which universities have actually gained greater management independence.

The Review of Efficiency and Effectiveness in Higher Education established by Minister Susan Ryan in late 1985 was one of the first attempts in this country to provide a detailed discussion of the importance of research resources and how they should be managed, and introduced the idea of research management plans. Admittedly, for many years prior to 1985 the various reports of CTEC (and predecessor commissions) had discussed the management of large equipment items and there had been special schemes for funding new and replacement equipment. But to my knowledge, the *Report of the Review on Effectiveness and Efficiency in Higher Education* was the first detailed discussion of the management of research in the context of how institutions might better manage their resources, and contained the first explicit recommendation for institutions to have research management plans. Further, it should be noted that this report provided an excellent discussion of many aspects of management and planning in higher education. Some of these were taken up by the system at the time, but quite a deal was lost in the rush to implement the Dawkins reforms which followed soon after.

With regard to the management of research, the Efficiency and Effectiveness Report drew attention to the increase in the scale and nature of resources needed for research in many disciplines. It pointed to what still remains a major dilemma for the management of research resources and for strategic planning:

There is thus a real dilemma for universities seeking to maximise the benefits from their research activities. On the one hand, resources of time, support staff, capital facilities, equipment and library services need to be available to all academics to enable them to fulfil their responsibilities as researchers, as well as teachers. On the other hand, available resources are inevitably limited and some choices or restrictions are unavoidable. A balance must be struck among:

* *opportunities to pursue basic, curiosity-motivated research;*

* *support for excellence;*

* *encouragement for the researchers of the future; and*

* *meeting the needs of industry and the community generally.*

It is obvious that the balancing of these competing priorities is no easy task ... What is vital, however, is that each institution develops deliberate policies for defining its research objectives (Review of

Efficiency and Effectiveness 1986, pp. 141-142).

The Report then went on to say:

The Committee considers that an effective way for universities to plan and manage their research activities in the face of competing priorities and scarce resources is to develop research management strategies. In this way, the institution's research objectives and priorities can be open to examination, both within the university and outside it. In addition, the availability of such documents would assist the CTEC, outside funding bodies, and other institutions in exercising their responsibilities for oversighting research activities and allocating funds (pp. 143-144).

This led on to a specific recommendation that:

All universities prepare, and make available to the CTEC in the triennial planning context, research management policies which provide a strategy for the effective use of the funds presently available to the institution for research (p. 145).

Significantly, the Report said that such a strategy should include the formulation of objectives and priorities and should be based on 'the development of special concentrations of activity within particular disciplines within each institution, and the adoption of staffing policies to ensure appropriate appointments are made in such fields'. It expressed the view that while every staff member of a university should have at least an initial opportunity to do research, 'not all will be equally effective'. It went on to warn against an emphasis on the responsibility of individual academics to engage in research can 'result in research funds being spread too thinly for effective use of resources'.

The Report's recommendations with regard to research management strategies or plans were taken up by CTEC and institutions were required to present research management plans with their next triennial submissions. Hence very quickly all universities embarked on the task of preparing plans. Following the demise of CTEC, DEET took over this policy and required universities to provide research management plans as part of their annual submissions related to profile negotiation. While in 1994 the policy was slightly relaxed in that institutions were not required by DEET to submit their most recent research management plan, it should be noted that the guidelines for this year's quality assurance round require institutions to submit the latest version of their research management plan with their institutional portfolio. (Quality Assurance Program Guidelines April 1995, p. 5).

Since the late 1980s universities have had to come to grips with some of the difficulties in developing effective research management plans. At first many institutions approached the development of plans with a great deal of confidence, believing that it would be a relatively simple task to develop a plan which would not only meet the requirements of the Commonwealth but would also provide a useful management tool for internal resource allocation and priority setting. But many soon discovered some of the pitfalls (and conflicts), especially in specifying institutional research strengths and in deciding how to concentrate resources and encourage a greater degree of selectivity in resource allocation.

While there is a great deal of variety across the system in the approaches adopted for research management plans, it appears that research management plans have gone through three distinct phases. The first plans developed in the enthusiasm of the late 1980s tended to be more descriptions of institutional strengths in research and of the committee structures for research management and the allocation of resources including scholarships, and specification of what resources the institution had available or was likely to have access to for research. Generally there was a relatively small emphasis on specifying research management goals and objectives, and setting out the strategies to be used to achieve these. While many of these plans took a great deal of effort to prepare, in many respects their value was limited in terms of specific plans to guide future action. At the same time, many institutions derived value from the attempts to set out clearly the institutional committee structures related to research management and the resources available to support research.

A second generation of plans began appearing in the early 1990s, and these marked a major step forward in the approach to and methodology of planning. They were essentially strategic plans setting out specific planning objectives, strategies to achieve these, and performance indicators which would be used to determine whether the goals had been met. Many plans also indicated what financial resources would be needed to achieve particular objectives and where such resources would come from, and also set particular targets to which the institution would work. For example, the current University of New England Research Management Plan for the 1995-1997 triennium specifies the following targets:

* *In 1995, 1996 and 1997 annual increases in the number of applications for ARC large grants, in the success rate and in the total funds attracted. By 1997, to aim to submit 100 ARC large grant applications and attract $1.5 million in total ARC large grant allocations (in 1995 , 88 applications were submitted and $1,303,600 was attracted in total grants).*

* *In 1995, 1996 and 1997 annual increases in the number of applications to other National Competitive Grant schemes, in the success rate and in the total funds attracted.*

* *Increase funding from industry by 10 per cent p.a. over the triennium.*

* *Increase enrolments in research higher degrees by 15 per cent over the triennium.*

* *Increase the proportion of academic staff holding doctoral degrees to 70 per cent by end of 1995-1997 triennium (currently 65.5 % of academic staff hold a doctorate - Arts: 61.9%; EBL: 52.2%; EHPS: 38.3%; Sciences: 79.3%).*

* *Introduction of scheme of Vice-Chancellor's awards for research excellence by 1996.*

* *Major survey of research higher degree candidates and supervisors to be carried out in 1995, and smaller follow up surveys in 1996 and 1997.*

* *Increase the number of ARC Collaborative Grant applications from 8 in 1994, to 12 in 1995, 14 in 1996, and 16 in 1997.*

* *Management information system for research activity to be in full operation by January 1996.*

* *Study of PhD completions and progress rates to be completed by June 1995.*

* *Full implementation of new policy on outside earnings by June 1995.*

* *Secure adoption of new University policy on intellectual property by August 1995. (University of New England Research Management Plan 1995, p 27).*

My impression is that these kind of plans are proving to be much more helpful as management tools.

Already some institutions have moved to what I see as the third generation of research management plans. These are almost identical to the second generation plans, except that they are part of a set of integrated institutional plans which not only include a corporate plan or institutional strategic plan, but also detailed plans for teaching and learning management and community service management and operational plans at faculty, school and departmental levels and for major administrative units. Further, all these plans are well integrated and have built-in mechanisms for monitoring and evaluation as well as very explicit and effective links between planning, monitoring, evaluation, and budgeting.

To my mind, this more integrated approach to planning and budgeting is highly desirable. For any set of integrated institutional plans to be really effective they must have built-in mechanisms for monitoring, evaluation and updating, while the link between planning and

resource allocation is crucial. Further, this new approach has the potential to overcome some of the problems that bedevilled many first generation plans, and this related to deciding on strategies of selectivity and concentration and at the same time providing mechanisms to strengthen weaker areas and provide for the development of new researchers. With the new approach, institutional research plans can concentrate largely on developing an environment to support research, specifying budget and resource allocation principles with regard to central research funds, and attending to major issues concerning the development and maintenance of research infrastructure, but leaving faculties, schools and departments to determine the key issues of priorities for research development, especially in terms of disciplines and research areas. Of course, mechanisms must be found to achieve a high degree of effective planning integration between University-wide and faculty plans, but in the past it appears that in many cases far too much institutional effort in research plans went into trying to identify areas of research strength and develop policies of concentration and selectivity. In many cases, this proved to be a waste of effort, since the largest single element of research funding - academics' time - is largely allocated in all institutions on the basis of student load.

One somewhat curious and largely unnoticed development at the national level is the development of a more integrated approach to planning and budgeting that is being actively encouraged by the Committee for Quality Assurance in Higher Education. Consider the following comments in different individual institutional reports from the 1994 quality round (Report on 1994 Quality Reviews 1995, Volume 2):

The review team found that corporate planning is well-established and that the strategic planning process is participative. A strategic plan for the period 1995-2005 is being prepared, involving wide input from across the institution. Faculties are also developing strategic plans which are being related by an integrative process to the corporate plan....

The University's quality management processes are presented as a learning organisation model based on a culture of continuous improvement in which staff have responsibility for quality.... In addition to the University Teaching and Learning Plan, each Faculty has such a plan. The University has recently appointed Deputy Deans (Teaching and Learning) to provide faculty leadership in teaching and learning and to enable a process of quality networking to become established across the University .... The Teaching and Learning Plan identifies strategies intended to address areas needing improvement as well as to enhance areas of strength .... The Quality Management Plan adopted in 1993 provides a strategic framework for quality processes throughout the University .... Since 1993, the University has moved to quantify targets for improvements in the quality of student learning experiences and outcomes as well as for CAUT and University teaching and development grants.

The University has an obvious and strong planning culture. The mission is well communicated throughout all levels of the institution. Its senior management are clearly committed to strategic planning, while schools, faculties and divisions are oriented toward operational planning .... Planning is based on a quinquennial cycle incorporating an annual monitoring, review and operational cycle. Overarching 'flagships plans' such as the teaching and learning plan are taken into account in the development of faculty, school and division plans. The research and community service plans are further examples of flagship plans .... The University views the management of teaching as an integral part of the strategic planning process.

The review team found evidence that the University is taking a systematic and thorough approach to planning and review. The Strategic Planning Working Group on Quality of Education was set up in 1988 and formally completed its work in 1993. The Vice-Chancellor's Planning Group is now responsible for planning, monitoring and review on a University-wide basis .... The University's planing processes are simple, well understood and implemented

in a systematic way. An annual planning round involves discussions with faculties and other academic units based on detailed performance data and other documentation.... There is provision for budget adjustment based on performance overall and the university provided evidence that this had occurred.

The team found evidence this year of on-going improvements to the planning process and a clear identification with the planning process throughout the organisation. The University's mission, goals and strategies are set out in Planning for the Next Century Parts I-IV. Part V Implementing Agreed Strategies identifies a series of operational goals to inform and guide more detailed strategies at the various levels of academic departments, schools, faculties, Academic Senate, Budget and Planning Committee and administrative divisions .... Faculty Strategic plans that the review team saw appeared to be well aligned with the University's plan and had clearly defined targets, timelines and accountabilities. There was a strong transparent link between the planning and budgetary processes. The Budget and Planning Committee reviews school strategic plans and considers school operational plans at an annual budget and planning meeting.

The University of ... has a well developed planning framework, which has continued to evolve through a process of continuous evaluation, feedback and review, since its first strategic plan was published in 1981 .... All areas of the University participate in the annual planning review process, and there is a strong and widespread sense of ownership of the strategic plan... A strength in the University's planning lies in the setting of good numerical targets which are monitored, and which it is prepared to amend when appropriate.

Significantly, the above comments refer to institutions all placed in the top group of institutions in the 1994 quality round.

An analysis of the reports for all institutions which participated in the 1994 quality assurance round similarly indicates the importance that the Committee is giving to an integrated approach to planning and budgeting. A major theme is strong praise for efforts to develop such an approach and recommendations to strengthen planning, and especially to introduce a systematic and integrated approach with a strong emphasis on setting goals, specifying strategies, putting in place monitoring and evaluation mechanisms with the use of performance indicators and the benchmarking.

Significantly, many of the institutions placed in Group Three in the second round were specifically encouraged to develop a well integrated approach to planning. In one case, for example, the review team commented:

The prospects for the University's planning processes at the time of the visit by the review team are difficult to assess as there was still much to be done in setting priorities and targets. The team encourages the University to move rapidly to an integrated process which sets clear targets and incorporates systematic processes to monitor achievements.

In another case, the review team said:

Faculty plans provided to the review team included goals, objectives and targets in a number of areas with less emphasis on quantitative targets and timelines. In future development of overall planning processes, the team encourages the University to place more emphasis on quantitative targets and timelines to monitor performance.

In another case the review team considered that 'academic planning and resource allocation could be more clearly aligned' and in another said that with regard to planning there was not 'a systematic approach involving data collection, monitoring and review for continuous improvement'. Two final examples are instructive in that they spell out in greater detail the particular detailed approach to planning which seems to be favoured by the Committee and its review teams. In the first case, the review team commented:

Although good progress has been made the final plan was not available during the visit. Issues which the review team suggests the planning process take account of are:

- the need to ensure the development of a fully integrated Plan across the University;

- the desirability for close alignment of the planning and budgetary processes, particularly within faculties;

- as suggested by the review team in 1993, the development of a management information system to support a range of indicators which would assist the planning process and allow the University to monitor its performance;

- the desirability of enmeshing the concept of continuous improvement in the planning process through the provision of training for all staff and students involved in planning, and the establishment of mechanisms to enable the sharing of information...

In the second case, the report stated:

While the portfolio describes the process by which the University's mission statement and strategic framework is linked with school action plans and targets, the team suggests that it would be further improved by:

- *ensuring quantitative targets linked to the performance measures established in the strategic plan are included in action plans;*

- *framing the strategic plan in such a way as to provide guidance for the priorities of school action plans;*

- *clarifying the process for aligning the strategic plan and school's plans; and*

- *having in place a mechanism to produce or update the next strategic plan.*

With the strong move to a more integrated approach to institutional planning, it appears likely that there will be further developments with respect to thinking and practice about research management plans. These seem likely to include the greater use of particular quantitative performance indicators and benchmarking, and more systematic efforts to recognise elements of good practice and make the details of this widely available across the institution. Further, it seems almost inevitable that there will be serious attempts at the national level to evaluate institutional attempts in implementation.

Intellectual property

Intellectual property is a fairly recent term to come into the vocabulary of research management, although for many years universities have had an interest in patents and patentable inventions. Many universities too have had patents committees and policies for the distribution of revenue from the sale and licensing of patents. But in the last two or three years, most universities have made major advances in their thinking and policies on intellectual property.

The term intellectual property has now come generally to refer to the various rights which the law gives for the protection of creative effort and especially for the protection of economic investment in creative effort. It covers not only patentable inventions covered under the *Patents Act 1990* (Commonwealth), but also

- *copyright vested by virtue of the* Copyright Act 1968 *(Commonwealth) in literary works, computer programs, dramatic works, musical works, artistic works, films, sound recordings, broadcasts, published editions and certain types of performances;*

- *trade marks registered under the* Trade Marks Act 1955 *(Commonwealth);*

- *designs registered under the* Designs Act 1906 *(Commonwealth);*

- *new plant varieties registered under the* Plant Variety Rights Act 1987 *(Commonwealth); and*

- *circuit layouts registered under the* Circuits Layout Act *1989 (Commonwealth).*

Some people argue that copyright should not be regarded as part of intellectual property. However, to take this view will lead to a rather limited conception of intellectual property, and will mean that copyright issues will have to be treated separately by any university. Further, commercialisation of copyright materials, especially sophisticated distance education packages, seems likely to become an increasingly important issue which raises many of the same issues as commercialisation of patentable inventions. Because of the number of pieces of legislation affecting issues related to intellectual property and the complexity of many of the issues involved, most universities have turned for advice to their in-house legal department or have sought outside expert legal advice.

With the increased emphasis since the late 1980s given to commercial and entrepreneurial activity in universities, it is not surprising that interest in intellectual property issues increased quickly. This interest was further stimulated by various schemes to develop closer research links with industry and in the early 1990s with the establishment of CRCs. CRCs posed an immediate problem for a number of universities since it was necessary in the establishment of a CRC to enter into contractual relationships with outside partners with regard to the ownership of any intellectual property developed as a result of joint effort in the CRC. It was not, however, until the release of the AVCC discussion paper (AVCC 1993) that many universities began work to develop comprehensive policies and carefully-worded rules or statutes with respect to the ownership and commercialisation of intellectual property.

The AVCC paper drew attention to the urgency for universities to develop clear policies on intellectual property generated by staff and students through normal operating grant funding and under agreements with outside bodies and under grants and sponsorship. It pointed to the changing environment for research and research funding:

Intellectual property laws are complex. The academic context in which they are applied has also grown more complex with the greater public profile of universities, the differing expectations of funding bodies and the inherent tensions between 'publication pressure' and the need for confidentiality in commercial transactions (AVCC 1993, p i).

The paper provided suggested guidelines for development of a University policy on intellectual property, but emphasised that the guidelines were not meant to be prescriptive or to achieve uniformity across the system. Among other things, the document provided useful definitions of key terms, explained how intellectual property rights arise, discussed the legal principles involved in obtaining rights to different kinds of intellectual property and suggested appropriate criteria to be taken into account in determining the ownership of such property, and discussed a variety of issues related to both staff and students.

The AVCC guidelines suggested that for academic staff a set of criteria for claiming ownership of intellectual property should be developed, and that the University should claim ownership of all property developed within these criteria, with the exception of categories of property specified. It also suggested that with regard to students universities should consider making specific claims for categories of intellectual property.

In developing their own policies, the approach taken has varied among universities, particularly with regard to the extent to which institutions claim ownership of the intellectual property generated by staff and how the work of research higher degree students is treated. The University of Melbourne, for example, took what has been regarded as a tough view in its statute of 1993 (University of Melbourne 1993). In this, the University:

- *reaffirmed its ownership of all inventions by staff and students;*

- *treated all copyright work, with the exception of academic publications, in an analogous way to inventions (whether patentable or not) with the ownership and management of commercial development rights resting with the University;*

• *assigned academic publications to the staff member on the condition that, where they were created in connection with their employment by the University and where the University had made a substantial contribution to their creation, the University has automatic, nonexclusive royalty-free use of such works for its educational purposes and the University will seek to recovers its costs where substantial resources have been used in the production of such works;*

• *provided guidelines concerning the duty of staff members and students to report the creation or commercial exploitation of intellectual property created pursuant to University employment or with the use of substantial University resources; and*

• *established a policy for the apportionment of the net proceeds of any commercial exploitation which provides encouragement and rewards to the originators.*

A much less strong position in contrast was taken the same year by the University of Newcastle. In its draft policy of November 1993 (University of Newcastle 1993), which had as its primary intention the creation of a climate of innovation and invention, the University recognised that research students owned the intellectual property generated in the course of their study but intended to ask such students to grant the University a nonexclusive licence. With regard to intellectual property generated by staff in the course of their employment, the University claimed ownership, but stated that it would not 'assert its ownership of any University intellectual property in relation to copyright in books, articles, lectures or other written work, other than that specifically commissioned by the University or in computer related work other that specified ... where royalties on such works do not exceed $15,000 per annum'. The draft policy also stated that the University would not 'assert its ownership of University commissioned lecture notes, courses, radio broadcasts and audiovisual material, which may have been developed in pursuance of its teaching function' or of any University intellectual property in the personal artistic works created by staff engaged in teaching Fine Art except where the monies obtained by sale exceed $15,000 pa or intellectual property in musical or dramatic works.

A discussion paper prepared in 1993 by a Working Party at the University of Sydney (University of Sydney 1993) took a somewhat similar approach to that of the University of Newcastle. This paper was openly critical of the University of Melbourne approach to the question of the ownership of copyright and what it regarded as a centralist approach which it thought would be difficult to administer and would be likely to discourage frank and honest discussion among staff and students. The paper recommended that:

• *while the University should not make any claim to intellectual property developed by students, there should be provision for students, should they choose, to participate in the scheme regarding the commercialisation of intellectual property;*

• *research students who participate in team research should be required to assign in writing any intellectual property rights arising from their contribution to that research team on the condition that they retain an interest in commercialisation of the property; and*

• *the University acknowledge the copyright ownership of academic staff in lectures, literary works and teaching materials.*

More recently, Monash University in mid-1994 developed a revised intellectual property statute (Monash University 1994) and regulations. Instead of adopting the University of Melbourne approach, the Monash approach is more akin to that of the University of Newcastle and the University of Sydney. In particular, in developing its policy on intellectual property, Monash made special efforts to ensure that the traditional rights of academics were preserved, while at the same time recognising that course materials should belong to the University. It should be noted that Monash now is a major supplier of distance education courses and programs. The Monash approach is for the

University to make a general claim to all intellectual property developed by academic staff created as part of their employment or where the University has contributed other University owned intellectual property or has made a specific contribution of funding, but to specify the exception of copyright work where the subject matter is primarily concerned with scholarship, research, artistic expression, creativity and academic debate. The statute also acknowledges the moral rights of copyright originators and so, for example, requires that where a copyright work is reproduced by the University in an unchanged form the originator of the work will be acknowledged.

In developing a policy on intellectual property at the University of New England in recent months, my colleagues and I agreed that the key matters to be addressed in such a policy were the rights of academic staff with regard to copyright of academic material, the rights of students, moral rights, and the need for the University to have ownership of teaching materials used for award courses delivered by distance education. We were also aware of the growing criticisms of the University of Melbourne intellectual property statute on the issue of copyright for academic work.

With regard to academic staff and students, we were concerned to develop rules on the ownership and commercialisation of intellectual property in such a way to respect the traditional rights of academic staff and students in publication of the findings of research activity and also rewards both academic staff and students for their efforts in the creation of intellectual property of commercial value. With regard to academic staff, we recognised that, under current arrangements, frequently a publisher of academic or scholarly material claims copyright to all such material and it is often a condition of publication that the originator assigns copyright to the publisher. Further, we wished to do everything possible to encourage the free exchange of information based on the results of scholarship and research. At the same time, we were concerned that rules should protect the rights of the University to use and commercialise intellectual property to its advantage for the public good and in the interests of staff and research students, and that rules should actively encourage the development of an environment conducive to invention and the effective commercialisation of intellectual property.

After considerable discussion we developed rules that claimed ownership for the University of all intellectual property created by staff in pursuance of their terms of employment and which in its creation the University contributed other University intellectual property or made a specific contribution of funding other than salary. This claim includes patentable inventions, copyright to original course and teaching materials 'published by the University for use in award courses and continuing education programs offered by the University', copyright to films, sound recordings and multimedia, copyright to data-bases with potential commercial value, and work where intellectual property owned by the University has been used. However, at the same time, the rules state that, subject to the inclusion of the above items, copyright to all materials generated by staff is assigned to the originator, thus giving staff full rights to the publication of academic material. In doing so, we were conscious of the provisions under the *Copyright Act 1968*, where the 'author of a literary, dramatic, musical or artistic work is the owner of the copyright subsisting in the work' (Section 35 (2)), except that for work generated by the originator in 'pursuance of the terms of course of ... employment by another person under a contract of service or apprenticeship, that other person is the owner of the copyright subsisting in the work...' (Section 35 (6)).

With regard to research students, we concluded that the legal position was that the student owned any intellectual property developed during the course of study. However, we recognised the difficulty likely to be created in some departments in that research students were working in areas where patentable inventions were likely to result and that any patentable inventions resulted from the work of their supervisors would be the property of the University. Thus we came up with the idea of a provision in the rules to enable students to assign in writing their intellectual property to the University and for a Head of Department to be able to require a student to do so in order to work with a

particular supervisor or supervisors, or as a member of a particular research team. Sections 2.7 and 2.8 of the University of New England rules state as follows:

2.7 In the case of intellectual property created by a student, that property is owned by the student. However, the student may assign the property to the University, in which case such property will be treated in the same manner as property generated by staff of the University. Further, postgraduate students and bachelor degree honours students wishing to work with a particular supervisor or supervisors, or in a particular research team, may be required by the Head of Department to assign in writing any property generated from the research project to be the property of the University.

2.8 At the commencement of an honours or higher degree research program, the student and supervisor(s) may be required to meet with the Head of Department in order to determine an arrangement for the ownership of any intellectual property arising from the student's project. In such meetings, the University's policy on the ownership and commercialisation of intellectual property and revenue sharing arrangements with respect to commercialisation of intellectual property must be fully explained to the student before the student signs any agreement. Such agreements may cover proposed revenue sharing arrangements for intellectual property which may be jointly created by the student and supervisor(s). In cases where it is agreed by the student that any property generated by the student will be assigned to the University, any property created will be subject to these rules and the student must be treated no less favourably than originators employed by the University. When any agreement with respect to the ownership of intellectual property is signed by a student, the Head of Department must inform the Intellectual Property Officer and the Secretary of the PhD Committee. Arrangements for revenue sharing for intellectual property created by a student must follow University policies as approved by Council. (Rules on Intellectual Property 1995).

In developing these particular rules, the University was concerned to seek to protect the rights of students and to ensure that the student should not be asked to sign any agreement until the conditions were properly explained and that in the event of commercialisation of any intellectual property resulting from the research the student should be treated no less favourably than staff.

With regard to moral rights, our rules specify that, where the University owns copyright material which it intends to publish without adaptation or modification it will ensure that the authorship is acknowledged; if adaptation or modification is proposed, the University will consult with the originator concerning possible acknowledgement. The rules also state that where an originator wishes not to be acknowledged as the creator of intellectual property which has been modified or adapted, the University will respect that wish.

Where the University owns copyright material, the rules give the originator 'a nonexclusive, royalty-free and irrevocable licence to use the work for the originator's teaching and research at the University and, with the approval of the University, at other institutions'. Where the originator is the owner of intellectual property created in the course of employment with the University, the rules state the originator 'must allow the University a nonexclusive and irrevocable licence to use the intellectual property for teaching and research without the payment of any fees'.

At UNE a substantial amount of research funds come from the various rural industry R & D corporations and other funding bodies, and contractual arrangements in many cases often specify that intellectual property will be jointly owned by the University and the funding agency. Hence it was necessary in our rules to make it clear the University may enter into agreements with external sponsors of research whereby the University agrees to relinquish or share all or part of intellectual property that results from externally sponsored or

contract research with that sponsor or another party. In such cases, the ownership of intellectual property will be governed by that agreement.

UNE rules do not specify the distribution of revenue from licensing agreements or the sale of patents as this is covered by *Budget Principles* approved by University Council. The *Budget Principles* document states as follows:

The University has assigned the first right of refusal to commercialise any or all intellectual property and projects to which it has rights of ownership or rights to commercialise to University Partnerships.

For licensing income, the distribution will be as follows:

• *One third to the inventor or inventors;*

• *One third to the University, to be distributed equally between the Vice-Chancellor's Initiative Fund, the Faculty and the Department; and*

• *One third to University Partnerships. (Budget Principles, section 2.6)*

Under an interim agreement signed in 1989, the rights to commercialise intellectual property owned by the University rests with University Partnerships, a company wholly owned by the University. Our working group recognised that it will be necessary for the University to revise the policy on revenue sharing so that the commercialisation of copyright material is included, preferably with the same revenue sharing arrangements as for patents.

In the rules we developed, three other features that deserve comment. First, an Intellectual Property Committee replaces the former Patents Committee. The Intellectual Property Committee will be chaired by the Pro Vice-Chancellor (Research) and will include other senior officers, the Chair of the Academic Board, the Copyright Officer, the Chief Executive Officer of University Partnerships (or nominee), two persons elected by the Research and Postgraduate Studies Policy Committee, and one postgraduate student nominated by the postgraduate students' association. The terms of reference are to provide advice and make recommendations to the Vice-Chancellor and Academic Board on matters of policy with respect to the ownership and commercialisation of intellectual property, including revenue distribution and confidential matters; to receive reports from University Partnerships on progress with patents and the commercialisation of intellectual property owned by the University; to determine whether intellectual property owned by the University and which University Partnerships do not wish to commercialise should be transferred to the ownership of the originator; to approve agreements with external sponsors of research whereby the University relinquishes or shares all or part of registrable intellectual property that results from externally sponsored research; to make recommendations to the Vice-Chancellor concerning agreements for the sale or licensing of intellectual property owned by the University; to assist in the implementation of these rules, and particularly in education and information efforts; and to conduct a review of the University's policy on intellectual property from time to time and report to the Vice-Chancellor and the Research and Postgraduate Studies Policy Committee.

Second, with regard to higher degree theses, we included a provision so that, on the recommendation of the Head of Department and in order to protect intellectual property owned by the University or where the research drew on intellectual property owned by the University, for a limited period an embargo could be placed on access to a thesis by other parties than examiners and the PhD Committee. This embargo is based specifically on intellectual property considerations and is in addition to an embargo that may be imposed on access to a thesis for other reasons at the request of the student.

Third, we have provided for staff contracts for both academic general staff to include clauses designed to ensure protection of the University's intellectual property. However, these clauses will emphasise the University's commitment to the principle that 'the results of research carried out by academic staff should be published and made generally available to other researchers and the wider community' but will explain that, in order to protect the rights of the University and

academic staff in the creation of intellectual property of commercial value, the University has developed rules on the ownership and commercialisation of intellectual property which are binding on all staff.

Establishment and management of research centres

In most Australian universities, research centres have played a major role in recent years in the development of research activity. The growth of research centres has been greatly assisted by the ARC programs for special research centres and key centres for teaching and learning, by the Commonwealth's CRC program, and by the willingness of government departments and industry to enter into arrangements with universities for the establishment and funding of centres.

This rapid development in the number and size of research centres has provided a considerable problem for many universities from a management perspective, for in many cases research centres have been developed without any clearly developed and well articulated University-wide policies concerning the role that research centres should play, and without detailed guidelines with regard to their establishment and management. This was the situation that the University of New England faced this year when it attempted to develop rules for the establishment and management of research centres. A preliminary study found that the University had a surprising number of separate centres and institutes, that these centres included units which had a very clear research focus but also others that were concerned mainly with academic work other than research, including continuing education, consultancies and academic coordination, while there were other centres involved in academic support and administrative work.

This study also found that, not only did the University lack rules to guide the establishment and management of centres, but that thinking within the University was confused about which centres were substantially engaged in research and which were engaged in other tasks. The current University *Handbook* , for example, provides a list of centres and institutes, but the list is incomplete and includes a number of non-research entities; including the Agricultural Business Research Institute (a self-financing marketing and consulting agency which is now established as a solely owned University company), the Commonwealth Council for Educational Administration (the secretariat for an international organisation concerned with educational management in British Commonwealth countries), the Language Training Centre (a centre which provides English language training for overseas students of non-English speaking background), the New England Educational Diagnostic Centre (a centre jointly sponsored by the Department of School Education, the Catholic Education Office, independent schools in Armidale, and the New England Health Service which provides services for children in regular school classes who have significant learning difficulties), and the Regional Centre for Music and Drama (the headquarters for the New England Theatre Company). Earlier editions of the *Handbook* included under the heading of 'Institutes and Centres' the University's rural properties and University Partnerships (the University's technology transfer company).

Even amongst the centres which have an academic rather than an academic support or administrative focus, there are major variations in size and functions, and a variety of different management and reporting arrangements. Some centres are comparable in size to smaller academic departments and have their own research and support staff, while others are simply a structure involving one or two academic staff (and in one case a single member of the academic staff). Some centres are primarily concerned with research, whereas others are involved in teaching or in a variety of different academic functions such as research, consulting and related commercial activities. Some centres regularly produce annual reports and publish comprehensive accounts of their activities while in other cases it appears that no annual reports or financial returns at all are produced, and little is known of what activities are undertaken and what resources are attracted and used. Some centres have formal constitutions approved by the University Council, but in other cases it appears that centres may have been

established without the endorsement of the Council or the Vice-Chancellor. In many cases, there is a lack of clarity about governance arrangements and reporting lines. While a number of centres appear to have advisory boards or committees, details on these are not published in the University *Handbook.* Some centres are active in research and other activities and make an important contribution to the overall work of the University, while other centres appear to be inactive, or largely so.

The work of developing rules was largely an effort to address these problems and to ensure that scarce resources were being used efficiently. But it also sprang from a wish to make it easy for groups of competent researchers with shared interests to establish centres, and to provide for their efficient management. Behind this was the assumption that well managed centres have the capacity to make a significant contribution to research activity and research training.

In deciding how to approach the problem of developing rules for research centres, we soon came to the view that it was advisable to concentrate solely on research centres, and not on all kinds of centres involving academic staff and engaged in different academic activities. We defined a research centre as a recognised University academic entity which provides a special focus for research and, where appropriate, related postgraduate teaching activities.

The rules that we developed specified in the first place that research centres are expected to:

- *develop new relationships with industry and government agencies, and with other research organisations;*

- *attract external funding;*

- *contribute research outputs that are nationally significant; and*

- *provide a quality environment for the training of postgraduate research students. (Rules on the Establishment and Management of Research Centres 1995, section 1.3)*

It was stated that a research centre may be established when it can be demonstrated that the proposed activities are likely to be assisted significantly by having a separate structure from departments, or where a research centre structure is likely to facilitate major interaction with bodies outside the University and attract significant outside resources.

Apart from this, the rules we developed dealt with four main topics. First, they set out a procedure for proposers to follow in putting forward a formal proposal for establishment of a centre. The rules specify that each proposal for a new centre must include the following information:

- *the mission and objectives of the proposed centre;*

- *justification for the establishment of a centre in terms of these guidelines, including evidence of research grants and output for members for the past three years;*

- *a strategic plan for the first three years of the centre's operation, including specification of objectives for the first three years of the forward plan and performance indicators to be used to evaluate achievements;*

- *funding details, including a business plan and a full budget with cash flow projections for the first year and outline budgets for the two following years;*

- *details of the governance of the centre, including arrangements for the establishment of an advisory committee and for its membership;*

- *a list of initial members of the centre, including CVs and showing the proportion of time each member will devote to the activities of the centre; and*

- *proposed accommodation needs and any special facilities and/or equipment required. (Rules for the Establishment and Management of Research Centres 1995, section 2.1).*

Each proposal must provide convincing justification for establishment of a centre. The objectives must be clearly specified in the draft constitution and should be in accord with the University's overall mission and goals, and with the objectives of related departments and faculties as set out in their strategic plans. The objectives of a centre will normally include one or more of the following:

- *to promote and conduct high quality research and disseminate research findings;*

- *to offer postgraduate courses and supervise higher degree research students;*

- *to undertake consulting and contract research through the University;*

- *to provide a structure to facilitate interaction which assists high quality research activity and the attraction of research funding; and*

- *to be engaged in technology transfer and the commercialisation of research findings. (Rules for the Establishment and Management of Research Centres 1995, section 2.3).*

The Vice-Chancellor will refer proposals for advice to the Research and Postgraduate Studies Policy Committee, which may request further information of the proposers, but centres are established by Council on the recommendation of the Vice-Chancellor.

Second, the rules specify clearly management arrangements. Each centre must have a Director, appointed by the Vice-Chancellor and responsible for the management of the centre including the supervision of research and support staff specifically appointed to it rather than to a Department. The constitution of each centre must be approved by the Vice-Chancellor and must specify the procedures for consultation within the centre to be followed in the appointment of the Director. Each centre must have an advisory committee (or board) or management committee (or board), with the membership composition, role and responsibilities approved by the Vice-Chancellor. External involvement in the advisory committee or management committee is highly desirable, but each committee should also include substantial representation from the University. Generally the role of an advisory committee will be to provide advice on forward plans and proposed activities of the centre, and comment on performance in the light of specified objectives and performance indicators. Management committees generally will take a more active role than advisory committees in approving plans and budgets, and in monitoring research and financial performance. The constitution of each centre should specify the method of appointing the advisory committee or management committee and its chair, the term of office of members of the committee, and how casual vacancies will be filled.

Third, the rules specify clear accountabilities and management reporting arrangements. For administrative purposes, University research centres can be of three types, each with different accountabilities:

- *Category (a) Attached to a Department- accountable to the Head of Department.*

- *Category (b) Attached to a Faculty - accountable to the Dean.*

- *Category (c) Outside the Faculty Structure - accountable to the Pro Vice-Chancellor (Research). (Rules for the Establishment and Management of Research Centres 1995, section 2.5).*

At any time a research centre may make a case to the Vice-Chancellor for transfer from one type of accountability category to another. This is intended to encourage the progression from a small centre attached to a department to a centre with a greater degree of independence, usually with staff appointed to the centre.

Each research centre must provide an Annual Report to the Vice-Chancellor for each calendar year by 30 April of the following year. This report, which should be submitted through the Head of Department, Dean or Pro Vice-Chancellor (Research), depending whether

the centre is attached to a department, attached to a Faculty or outside the Faculty structure, should include the following:

- *a financial summary for the year (including details on external grants and contracts), with the budget including projected cash flow for the following year;*

- *a list of all members of the centre (including any staff appointed to the centre), with an account of their activities in the centre for the year reported;*

- *a summary of the activities for the year, including publications, material submitted for publication, higher degree completions, applications for patents or other forms of commercialisation, and activities proposed for the current year; and*

- *an evaluation of performance for the year in terms of the objectives and performance indicators specified in the strategic plan of the centre. (Rules for the Establishment and Management of Research Centres 1995, section 2.7).*

Fourth, financial arrangements are made clear. All centres are expected to attract a significant component of their budget from outside funding. Category (b) and category (c) centres will receive University funding on the basis of the proportion of the research quantum funds they attract to the University and their research higher degree student load, in accordance with Budget Principles approved by the University Council.

In order to help finance centres as well as to encourage strong centres to take an active role in higher degree research training, the rules specify as follows:

On the recommendation of the Academic Board, the Vice-Chancellor may give approval for a research centre (other than a centre attached to a department) to be recognised as an academic department of the University for the purposes of enrolment and supervision of PhD candidates and masters candidates by research. Student load will be credited in accordance with University Budget Principles.

Research centres may offer units towards University awards through the Faculties. Funding for such teaching must be negotiated with the Deans of the Faculties involved. (Rules for the Establishment and Management of Research Centres 1995, section 2.10)

We consider this provision to be an important innovation, but it still has to be determined under what conditions the Academic Board should recommend such recognition.

Fifth, the rules provide incentives for strong research centres to be recognised as University research centres. Only recognised University research centres will appear in the University Handbook in the list of research centres, while only recognised centres will be eligible to apply for funding available for research centres. In this way, we hope to make a clear distinction between official research centres and other centres in the University and be able to provide as much support as possible to research centres.

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The Australian Research Council Large Grants Scheme: Problems, concerns and recommendations for change

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This paper discusses problems with the Australian Research Council (ARC) Large Grants Scheme including the composition and function of ARC panels, rejection of 30% of applications without peer review, validity of assessment when peer review is employed, the manner in which panels reach funding decisions, ARC administrative processes, and the level of competition for ARC funding. Consideration is given to changes that will improve the effectiveness of the Large Grants Scheme.

The Australian Research Council (ARC) advises the government on funding for basic research in all disciplines except medicine and dentistry. The level of competition for ARC Large Grants (only some 20% of applicants in 1992-1994 were successful) has led to scrutiny of decision making processes employed by the ARC. As noted in a recent review of grant outcomes, "In a situation where less than 20% of applicants for grants are successful, it is essential to ensure that the procedures are rigorous and the outcomes generally accepted as fair and equitable by the applicants (ARC 1994, p. 14).

Although the Large Grants Scheme has never been subjected to evaluation on the basis, for example, of the assessment of the National Science Foundation undertaken by Cole and Cole (1981), some ARC procedures were appraised in the administrative review of NBEET undertaken by Wiltshire (1994) and through reviews of outcomes of ARC funding in a number of disciplines. In addition, there have been surveys of applicants (Wood, Meek and Harman, 1992; Over 1995) as well as commentary on the Large Grants Scheme (Over 1994). These sources will be drawn upon to discuss problems with the Large Grants Scheme and to provide recommendations for change. First, however, an outline of how the ARC Large Grants Scheme operates is required.

The ARC Large Grants Scheme

There is a single funding cycle each year. Applications, which close at the end of February, are assigned to broadly-based panels, each of 10-14 members. Currently there are four panels: biological sciences; physical, mathematical and chemical sciences; engineering, earth and applied sciences; social sciences and humanities (see DEET 1994). At the April meeting each panel culls 30% of all applications in its field without use of external peer review. The remaining applications are sent for evaluation to assessors (including at least one nominated by the applicant). A further 30% of applications are deemed unsuccessful at the July meeting, when assessors' reports are available. Applicants still under consideration are then allowed to provide the panel with a one-page response to comments made by assessors. In September each panel meets to rank all applications that survived the earlier culls. The lists from the different panels are then integrated by the Research Grants Committee (a constituent committee of the ARC), and forwarded by the ARC to the Minister. Applicants are advised in November as to whether their application is being funded, and the level of funding.

Although it provides independent advice on allocation of research funds to the Minister, the ARC otherwise operates as a Council of the National Board of Employment, Education and Training (NBEET). When the structure and functions of NBEET were recently under review, the ARC sought unsuccessfully to become a separate statutory authority. The linkage between employment, education, and training created by government policy directives (eg, Dawkins 1988) thus remains, despite obvious tensions as to the extent priority should be given to basic research as opposed to applied research. However, the review recommended that the Employment, Education and Training Act 1988 be reworded "to ensure that fundamental research remains the key distinct priority for ARC, and is not to be traded off with allocations to applied research" (Wiltshire 1994, p. 50).

Problems with the Large Grants Scheme

Outcome reviews and surveys of ARC applicants have identified problems with the Large Grants Scheme relating to the composition and function of ARC panels, culling of applications without peer review, selection of assessors, the evaluative criteria employed by assessors, the manner in which panels reach funding decisions, the extent to which the ARC monitors progress, administration of the Large Grants Scheme, and the level of demand for ARC funding. These issues are now addressed, and consideration is given to ways in which ARC processes might be changed.

Concerns identified in outcome reviews

The ARC has commissioned evaluation of grant outcomes in specific disciplines by experts, Australian and overseas, who themselves were ineligible to receive ARC funding. In identifying the ARC Large Grants Scheme as the primary Australian source (and in some cases virtually the only source) for funding basic research in their discipline, review committees have endorsed the use of peer review as the basis for allocating research funds. The general conclusion from the reviews has been that investigators supported under the Large Grants Scheme have been productive despite limited funding. However, the Materials and Chemical Engineering Committee claimed: "While the outcomes of the ARC funded research have been successful, it is not possible for the Committee to be certain that those funded were the best people in their respective fields".

Although commending the dedication and diligence of members of ARC panels, most reviews highlighted the difficulty panels face in evaluating applications when some disciplines are either not represented at all on the panel or are represented by a single member. As noted in the Mathematical Sciences review, "it is not in the interest of good management that an equitable outcome of the competitive process should rely so heavily on the efforts of the individual involved". The review committees generally favoured discipline-specific expert panels (along the lines of the National Science Foundation, NSF) rather than the present system of broadly-based panels, although reliance on advisory groups (eg, for selection of assessors) in support of panels as presently constituted was seen as a feasible alternative. A supplementary proposal was that several professional scientific positions (similar to NSF program managers) be established "to provide an informed interface between ... ARC and the research community".

The critical issue as identified by review committees is the need to ensure that all applications receive expert evaluation. Matters of particular concern to review committees were culling of applications